

Positive or preventive?

Reproduction in Taiwan
and the Netherlands,
1850-1940

Chuang Ying-Chang,

Theo Engelen &

Arthur P. Wolf (eds.)

Life at the Extremes Volume II

aksant

Positive or preventive?

Reproduction in Taiwan and
the Netherlands, 1850-1940

This publication has been made possible with the financial support of the Netherlands Organization for Scientific Research (NWO).

Part of the research for this volume is financed with research grants of the Netherlands Organization for Scientific Research (NWO), the Chiang Ching-kuo Foundation (Taiwan) and the National Science Council of Taiwan.

This volume is the second in the series *Life at the Extremes. The demography of Europe and China* (LatE) edited by Chuang Ying-Chang (Academia Sinica, Taiwan), Theo Engelen (Radboud University Nijmegen, the Netherlands) and Arthur P. Wolf (Stanford University, U.S.A.).

Previously published:

LatE 1: Theo Engelen & Arthur P. Wolf (eds.), *Marriage and the family in Eurasia. Perspectives on the Hajnal hypothesis* (Amsterdam: Aksant, 2005)

ISBN 90 5260 213 1

© 2006, the editors & authors/Aksant Academic Publishers

*All rights reserved including those of translation into foreign languages.
No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without prior permission from the copyright owner.*

Book Design: MulderVanMeurs, Amsterdam
Printed in the Netherlands by A-D Druk BV, Zeist

Aksant Academic Publishers
Cruquiusweg 31
NL-1019 AT Amsterdam
www.aksant.nl

Positive or preventive?
Reproduction in Taiwan
and the Netherlands,
1850-1940
Chuang Ying-Chang,
Theo Engelen &
Arthur P. Wolf (eds.)

Aksant
Amsterdam, 2006

Contents

- 7 **1 Introduction: Malthusian realities**
Theo Engelen & Arthur P. Wolf
- 19 **2 Quantifying the colonized**
The history and significance of demographic sources from colonial Taiwan
Paul R. Katz & Chiu Cheng-lueh
- 41 **3 Sources for the historical demography of the Netherlands in
the 19th and early 20th centuries**
Jan Kok
- 53 **4 Two ethnographies of reproduction**
Hill Gates & Marloes Schoonheim
- 81 **5 Burden or opportunity?**
Illegitimate births in the Netherlands and Taiwan
Hill Gates, Jan Kok & Sping Wang
- 107 **6 Fertility four ways**
Dutch urban and rural and Taiwanese urban and rural
Theo Engelen & Arthur P. Wolf
- 121 **7 Group identity and fertility: An evaluation of the role of religion and
ethnicity in the Netherlands and Taiwan**
*John Shepherd, Pan Inghai, Jan Kok, Claudia Engel, Theo Engelen &
Melissa Brown*
- 163 **8 Fertility and infant and early childhood mortality:
Some lessons on stopping behavior from Taiwanese and Dutch cases**
John R. Shepherd, Jan Kok & Hsieh Ying-hui
- 199 **9 Marital fertility and birth control in rural Netherlands and Taiwan,
19th and early 20th centuries**
Jan Kok, Yang Wen-shan & Hsieh Ying-hui

237 **10 Malthus on China: A brief for the received view**
Arthur P. Wolf & Theo Engelen

263 **Bibliography**

Introduction:

Malthusian realities

*Theo Engelen &
Arthur P. Wolf*

Writers willing to risk global comparisons have long expressed interest in the differences between European and Chinese fertility. In eighteenth century they include Adam Smith, François Quesnay, and Thomas Malthus; in the nineteenth, Adolphe Quetelet; and in the twentieth R. H. Tawney, Thomas Mallory, Warren Thompson, and, most recently, Kenneth Pomeranz, James Lee, Cameron Campbell, and Wang Feng. But despite three centuries of interest and a great deal of speculation, quantitative comparisons are rare and the differences between European and Chinese fertility remain ill-defined and subject to inconclusive controversy.

The papers included in this volume are the first fruits of an effort to repair this situation. The strategy is to begin with two localities that have excellent data. These are Taiwan and the Netherlands where highly reliable household registers allow one to construct accurate and highly contextualized fertility rates. Europeanists are certain to object that the Netherlands does not represent all of Europe. They will be right. And sinologists are certain to object that Taiwan does not represent all of China. And they will also be right. But what both parties will have failed to consider is that when the known ranges of Chinese and European marriage and fertility rates are compared there is no overlap. The societies of Europe and the provinces of China are all separate entities, but the distance between them is not significant compared to the distance between Europe and China. For most purposes it does not matter if one compares England and Kiangsu, France and Kwangtung, or the Netherlands and Taiwan.

The point is implicit in John Hajnal's distinction between what he called "the European marriage pattern" and the "non-European marriage pattern."¹ In the small corner of the world that includes the Netherlands, women did not marry until ten or more years after menarche and many did not marry at all; in the rest of the world, including most conspicuously China, they married at and sometimes even before menarche and all but an exceptional few married. Hajnal recognized that "significant departures from the European pattern may be found not only as one proceeds eastward but on the southern edge of Europe as well."² And he also recognized that non-European societies may show "wide variation in the pattern of their rates." He nonetheless insisted – rightly in our view – that "all the varieties that exist are separated by a distinct gap from the European."³

The first volume in this series lays the foundation for this and subsequent volumes with a detailed examination of Hajnal's generalization and the research it has stimulated. This volume, the second in the series, takes the obvious next step by examining the extent to which the difference identified by Hajnal is asso-

1. Hajnal, "European marriages patterns in perspective".

2. *Ibid.*, 103.

3. *Ibid.*, 106.

ciated with a difference in fertility. Readers who are familiar with recent research in comparative history will recognize that the timing is fortunate. The past decade has seen the publication of a series of books and articles arguing that the differences between Europe and China have been greatly exaggerated.⁴ Hajnal himself escapes the revisionists' ire because no one can dispute the difference in European and Chinese marriage rates. The target instead is Malthus who argued that the difference in the marriage rates resulted in a difference in fertility and consequently a difference in population pressure and general well-being. All of the papers in this volume are relevant to the debate generated by this claim and most address it directly.

The first two papers in the volume, by Paul Katz and Jan Kok, introduce the reader to the sources that are the basis of the subsequent papers and the project as a whole. They will be invaluable for anyone who is so inspired by our work – or so incensed – that they want to undertake research of their own in Taiwan or the Netherlands. We also intend them as justification of our strategy of initiating detailed comparisons of China and Europe with Taiwan and the Netherlands. The two papers demonstrate the quality of the data available in the two countries as well as provide guidance for those who would like to pursue the questions raised on their own.

The argumentative section of the volume opens with a paper by Hill Gates and Marloes Schoonheim entitled “Two ethnographies of reproduction.” The paper compares customs and attitudes in Taiwan and the Netherlands and is therefore “ethnographic,” but it does not treat the facts presented as showcase curiosities. They are all organized as the basis for a comparison with a strong thesis. The thesis flows from a premise that is, surprisingly, foreign to most demographic analyses. It is what Gates and Schoonheim take to be “a fundamental human commonality – pregnancy, lactation, and child care are exhausting.” The result is that “in high fertility societies, women, at least, will endlessly reinvent antinatalism.”

Gates and Schoonheim find evidence for this antinatalism in both individual and global phenomena. At the individual level they cite examples of Chinese women using their financial contribution to their family to negotiate reduced fertility. Gates found that in both Taipei and Chengtu the fertility of women in family businesses was a function of how much capital they had contributed to the business.⁵ The greater their contribution, the lower their fertility. All of these women “wanted fewer children than they had, and fewer than their husbands had wanted.” At the global level Gates and Schoonheim argue that the

4. The major revisionist works are Lee and Campbell, *Fate and Fortune in Rural China*; Lee and Wang, *One Quarter of Humanity*; and Pomeranz, *The Great Divergence*.

5. Hill Gates, “Cultural support for birth limitation among urban capital-owning women”.

20th century drop in birth rates among Taiwanese and Dutch Catholic women was not precipitated by “a mental revolution regarding family planning.” “In both, antinatal tendencies long submerged, were developed and intensified...to meet and merge with changed ideological, social, and economic conditions.”

The reason this did not happen earlier was that in both Taiwan and the Netherlands female antinatalism was opposed by powerful institutions. In the Netherlands “the church...claimed a God-given power to depute parish priests to monitor childbearing and punish couples who appeared to be limiting their own fertility.” Many couples “internalized church teachings and struggled to conform to them.” Others “conformed mainly for fear of being shamed or to maintain their membership in a culturally dominant institution.” In Taiwan the analogue to clerical power was parental power. Almost without exception young couples spent the early years of marriage living with and under the authority of their parents. “Mothers-in-law were outspoken and even punitive towards brides who were slow to conceive, or whose birth intervals were unusually long. Overbearing parents bullied unwilling couples into initiating sexual relations when they were reluctant partners.”

The revisionists argue that contrary to Malthus, Chinese fertility rates were no higher than European rates despite the fact that Chinese marriage rates were far higher than European rates. This was possible because Chinese couples controlled fertility within marriage by means of abstinence, contraception, and infanticide. Gates and Schoonheim argue to the contrary that there was little, if any, marital fertility control in either Taiwan or the Netherlands. The means were banned by the Church in the Netherlands and condemned by parental interest in Taiwan. In the Netherlands the Catholic church used the confession box to monitor unexcused abstinence as well as contraceptive use. In Taiwan abstinence was possible and was practiced, but – as papers in this volume demonstrate – did not have much effect on completed fertility. Female antinatalism was always present but remained submerged, surfacing only in oblique ways like women’s explanation of why they weaned their daughters a month or two earlier than their sons. It is, they claim, for their own sake. “The sooner you wean a girl, the sooner she will stop ovulating and be done with the dirty business of bearing children.”⁶

The core of Gates and Schoonheim’s analysis is a proposition concerning the primary determinants of fertility in Taiwan and the Netherlands. We will call it *the* proposition because it is one that is shared by most members of our project and appears in one form or another in many of their papers. It is this: Until the 1960’s in Taiwan and the 1910’s in the Netherlands fertility levels were maintained at their characteristic levels by two institutionalized authorities, clerical authority in the Netherlands and parental authority in Taiwan. Put another way,

6. Arthur P. Wolf, “Is there evidence of birth control in Late Imperial China?”, p. 135.

the proposition says that any analysis of fertility in Taiwan or the Netherlands – indeed, any analysis of fertility in China or Europe – must attend to the interests of clerics and parents.

The fourth paper in the volume – the work of Hill Gates, Jan Kok, and Sping Wang – can be read as a test of *the* proposition. The paper compares illegitimacy rates in Taiwan and the Netherlands with what can only be regarded as startling results. Knowing that Taiwanese women married seven or eight years earlier than Dutch women, one anticipates a much lower illegitimacy rate in Taiwan than in the Netherlands, simply because Taiwanese women were not at risk as long as Dutch women. What the authors find, however, is that the ratio of illegitimate to legitimate births was actually higher in Taiwan than in the Netherlands. Moreover, when the authors take account of the difference in age at marriage by calculating age-specific fertility rates for never-married women, they find that “for the 20-34 age group, the risk of an illegitimate birth [was] 17 to 30 times higher for the Taiwanese than for the Dutch women.”

The low illegitimacy rate in the Netherlands was clearly the work of the church and the values it propagated. It tolerated – to a certain extent and in some regions more than others – sexual play before marriage but demanded that a pregnant girl marry. Those who would not or could not because their lover absconded faced severe sanctions. “Illicitly pregnant girls could make no claim on public assistance, and might even be driven from home by their kin. They risked lowered marriage expectations, loss of employment, and social rejection that might result in dire poverty or even prostitution.” But how, then, do we interpret the high illegitimacy rates on Taiwan? Do they indicate a failure of parental authority and therefore argue that *the* proposition is wrong in arguing that fertility in Taiwan was largely shaped by that authority?

This would be the only conclusion possible if one assumed that most illegitimate births on Taiwan were the result of premarital sex of the kind allowed in the Netherlands; they would then stand as flagrant violations of parental authority. The fact is that few, if any, Taiwanese births were of this kind. Women were married so young and were so walled in by restrictions before marriage that there was no opportunity for an illicit pregnancy. What the Taiwanese illegitimacy rates represent is not the failure of parental authority but the determined implementation of that authority. The girls who bore children before marriage were almost all prostitutes sent to work by their parents. The evidence is the fact that knowing a girl’s sibling position at age fifteen, one can predict whether or not she will bear a child before marriage.⁷ In Taiwan prostitution was almost the only way a young woman could earn a substantial amount of money. Consequently, girls who had no brothers or only younger brothers often bore an illegit-

7. Wolf and Huang, *Marriage and Adoption in China*, Table 19.5, 258.

imate child because, lacking sons, their parents needed the money they could earn. Girls with one or more older brothers rarely bore an illegitimate child because they were not needed at home and were therefore married at menarche.

The fifth paper in the volume – the first of our two papers – can also be read as support for *the* proposition. The paper’s comparisons produce a surprise that rivals that of the previous paper. We find, contrary to what we thought were well-founded expectations, that the lowest fertility in any of the cells in our four-fold comparison – urban Taiwan, rural Taiwan, urban Netherlands, and rural Netherlands – was urban Taiwan. The reason is even more surprising than the finding. It is that by age forty-five nearly a fourth of all women in Taipei City had never married. This compares with approximately three percent of all women in rural Taiwan, eighteen percent in the rural Netherlands, and seventeen percent in the urban Netherlands. Urban Taiwan was, then, a striking exception to what might be called Hajnal’s rule. It was, as regards proportions marrying, more European than the Netherlands.

In a paper published several years ago Wolf argued that this was because given the opportunity of wage employment in urban industries, many Chinese women chose to avoid marriage.⁸ His assumption was that they did so in revolt against parental pressure to marry. What then looked like evidence against *the* proposition turned out on closer examination to be just the opposite. He found that just as the probability of a woman’s bearing an illegitimate child depended on her sibling position at age fifteen, so also did the probability of her ever marrying. The women who never married were not the most strong-willed of the many women who had good reason to avoid marriage. They were women who at age fifteen had no brothers or only younger brothers. The great majority of the women who had at least one older brother married at an early age. This can only mean that young women were not deciding for themselves whether or not to marry. Many of them may have been happy to remain unmarried, but the decision was obviously made by their parents. Thus high fertility in the Taiwanese countryside and low fertility in the cities are both attributable to parental authority.

The discovery of a Chinese population with lower fertility than most European populations could stand as evidence for the revisionists’ argument, but in fact it underscores the weakness of that argument. Contrary to their claim that the Chinese controlled their fertility by deliberate birth control, the case in hand argues that in Taiwan, just as in Europe, fertility was conditioned by entry into marriage, not control within marriage. As we put in our paper in this volume, “It took a European-like marriage pattern to produce European-like fertility rates.”

Wolf argues in the first volume in this series that Chinese parental author-

8. Wolf, “Women and tea in the Taipei Basin”.

ity did not depend for its effectiveness on filial piety as an idea.⁹ It was effective because it was backed by the authority, and, when necessary, the force of the Chinese state. The same was at least partly true of clerical authority. The authority of clerics did not depend entirely on the ideas they preached. They were backed by powerful institutions with the ability to withhold resources as well as the ability to shame, ostracize, and, if necessary, excommunicate. The Catholic priest's counterpart in China was not the Taoist priest or Buddhist priest. It was the post-ed official representing the imperial government.

Thus it is a fundamental assumption of *the* proposition that to effectively direct people's life courses, ideas about such matters as marriage and fertility must have institutional support. Ideas as such may influence individuals but they are incapable of influencing populations. The sixth paper in the volume – the work of John Shepherd, Pan Inghai, Jan Kok, Claudia Engel, Theo Engelen, and Melissa Brown – tests this assumption by comparing the effect of religion in the Netherlands with the effect of ethnicity in Taiwan. Whether Catholic, Calvinist, or Dutch Reformed, religion in the Netherlands was strongly institutionalized, more so in the case of Catholicism than in the case of Calvinism and Dutch Reform but always in clear and obvious ways. Ethnicity in Taiwan, in contrast, was not institutionalized. The three groups compared in the paper – Hokkien Chinese, Hakka Chinese, and a non-Chinese minority called the Siraya – spoke different languages and identified themselves as distinct social groups. Culturally, they differed more than the Dutch denominations, but they lacked anything comparable to their churches.

The evidence reported in the paper is loud and clear. In the Netherlands the influence of what the Dutch demographer E. W. Hofstee called “organized confessionalism” was enormous. The various denominations differed as regards age-specific marital fertility, age at birth of first child, age at birth of last child, and the number of children surviving to age five, to name only the most important of many differentiating variables. In the case of Taiwanese ethnic groups, in sharp contrast, the authors could find no significant differences in fertility. “Our overall conclusion with respect to our main question is a negative one. Cultural differences associated with ethnicity in Taiwan do not appear to have a significant impact on demographic indicators in ways analogous to the differences found between Catholics and Protestants in Europe.” To put the point more provocatively, so far as fertility is concerned, ethnicity is “just culture.”

The proposition says that the authorities, clerical or parental as the case may be, usually got what they wanted. What they wanted varied depending on their circumstances, as we have seen in comparing the behavior of Taiwanese parents in the country and the city. It is clear, however, that what Dutch clerics,

9. Wolf, “Europe and China: Two kinds of patriarchy”.

particularly Catholic clerics wanted, was conformity to behavioral norms that resulted in high marital fertility. The question that now occupies many sinologists is what it was that Chinese parents wanted. The accepted view until recently was that they wanted many sons, the more the better, the result being fertility as high as poor nutrition and late weaning allowed. What more than anything else makes the revisionists revisionists is that they reject this view. Though they never specify how many children parents wanted, they argue emphatically that it was well below the maximum possible. This, they claim, was achieved by means of “late starting, wide spacing, and early stopping.”¹⁰ Chinese couples married young but deliberately delayed their first child, deliberately avoided producing a child in their later years, and deliberately spaced their births as widely as possible.

The remaining three papers in the volume all mount direct challenges to this view of Chinese fertility by means of meticulously detailed comparisons of Taiwanese and Dutch fertility. The first of the three – by John Shepherd, Jan Kok, and Hsieh Ying-hui – addresses the revisionists’ claims concerning early stopping. The revisionists interpret data from the Ch’ing imperial genealogy and Manchurian household registers as showing that Chinese women bore their last child six or seven years earlier than European women and had much shorter reproductive lives as a result. This, they argue, is evidence of “marital restraint” in China. Our authors’ comparison of Taiwanese and Dutch populations finds a difference of only two years and shows that this is entirely due to Taiwanese women’s marrying six or seven years earlier than Dutch women. The revisionists’ claim that “whereas on average a European mother had a reproductive span between first and last birth of 14 years, the average Chinese mother had a reproductive span of only 11 years.”¹¹ Our authors find just the opposite – 16.2 years among the Taiwanese women as compared to only 11 years among the Dutch women. They therefore conclude that “claims by Lee, Wang, and Campbell and Zhao that the historical Chinese population is one characterized by deliberate early stopping are...untenable.”

The second paper in the concluding triad – by Jan Kok, Wen-shan Yang, and Hsieh Ying-hui – broadens the attack initiated by the first paper. After summarizing the debate stimulated by the revisionists’ claims (a summary that readers who are not familiar with the literature will appreciate), the paper undertakes two highly refined comparisons of Taiwanese and Dutch fertility. The fact that European total marital fertility rates (TMFR) are generally higher than Chinese rates is critical to the revisionists’ claim that the Chinese practiced deliberate fertility control. The first part of our authors’ paper challenges this evidence by arguing that “comparing TMFRs is too abstract.” To refine the comparison they

10. Lee and Wang, *One Quarter of Humanity*, 88.

11. Lee and Wang, *One Quarter of Humanity*, 88.

apply to their data a decomposition technique developed by Peter McDonald that takes into account starting, stopping, spacing and sterility. Their conclusions are, first, that “when Taiwanese couples remained married until the wife’s menopause, they produced 1.38 *more* children than Dutch couples,” and, second, that where “Dutch couples who completed their marriages realized less than half of their theoretical maximum of 10.2 children, Taiwanese couples realized about eighty percent of their theoretical maximum of 8.13.”

The second part of the paper by Kok, Yang, and Hsieh undertakes a multivariate analysis of Taiwanese and Dutch birth intervals. Their models include, on the Dutch side, mother’s age, marital duration, crude parity, net parity, occupation, religion, and education, and, on the Taiwanese side, all these demographic variables plus form of marriage and proportion of girls among all surviving children. Contrary to the revisionists’ thesis, the authors find no evidence that longer birth intervals among the Taiwanese were due to conscious spacing. Intervals were somewhat longer when a couple already had one or more surviving sons, but the total number of children present had no effect. “Net parity, that is the number of children present, actually tended to shorten the birth interval.” The authors also found that “Taiwanese intervals after the birth of a surviving child were much longer than among the Dutch.” This supports the argument that the difference between Chinese and European birth intervals was due to longer and more general breastfeeding in China rather than to deliberate spacing.

The final paper in the volume – our second effort – generalizes the critique offered in the other papers by returning to Malthus and reformulating the terms of the debate. The most important point made is that the few comparisons the revisionists make between Chinese and European fertility are irrelevant to their anti-Malthusian thesis. The rates they compare are all total marital fertility rates (TMFR). What matters with respect to the Malthusian thesis is total fertility (TFR), not total marital fertility. It may be that marital fertility was higher in Europe than in China, but if total fertility was lower the Malthusian position stands. It could even be that the Chinese practiced deliberate birth control, but if this was not sufficient to offset the impact of their high marriage rate the revisionists have no case. And the best evidence says that in fact total fertility was far higher in China than in Europe – approximately 6.0 compared to 4.0 to 5.0. It is hard to believe that the Chinese tried to limit their fertility and failed so dismally.

The debate initiated by the revisionists has distorted our view of the questions involved by focusing interest on a comparison of Europe and China. We need to return to the global perspective taken by Malthus and Hajnal. When we do, we see that China, with early and nearly universal marriage and a general fertility rate of six or more, was typical of natural fertility populations. It was Europe – as both Malthus and Hajnal realized – that was the exotic case. The claim that the differences between Europe and China have been exaggerated distract atten-

tion from the most important question – why, as Hajnal put it with regard to marriage, was Europe “unique or almost unique in the world”?

The papers in this volume provide considerable support for what we have called *the* proposition. We will therefore conclude by suggesting that what made Europe unique was the fact that it was only there that clerical authority overruled parental authority. In the other old agrarian empires – China, Russia, and India – parental authority ruled as a delegate of state authority. In these societies marriage was universal and marital fertility high because it was to parents’ advantage to maximize their following. In Europe clerical authority interfered with parental authority and deprived parents of the ability to exploit their children. The result was that they saw no advantage in investing their resources in their children’s marriages. The children had to delay marriage until they could accumulate their own resources.

Quantifying the colonized

The History and
Significance of
Demographic Sources
from Colonial Taiwan¹

Paul R. Katz² &

Chiu Cheng-lueh³

Introductory remarks

This paper explores the importance of three demographic sources compiled by the Japanese authorities in Taiwan during the colonial era (1895-1945): 1) Household registers (*huji ziliao*; compiled from 1905 to 1945); 2) Annual demographic surveys entitled *Statistical Data on the Population Currently Living in Taiwan* (*Taiwan genjū jinkō tōkei*; later renamed *Taiwan jōjū jinkō tōkei*; 1905-1943), and, 3) A series of censuses (based partly on the registers) undertaken every five years from 1905 to 1940, perhaps the most complete and best known being the “Second Provisional Household Census on Taiwan” (*Dainichi rinji Taiwan kokō chōsa*).⁴ The paper’s goals are to describe how these sources were compiled, examine the nature of their contents, and consider how they can be used individually or together to research Taiwanese social history.

The demographic sources mentioned above might best be considered as one form of “colonial governmentality” that the Japanese practiced in Taiwan.⁵ Thus, any attempt to understand the contents and historical significance of these texts needs to be grounded in a broad understanding of the colonial policies enacted during the late nineteenth and early twentieth centuries, when the Japanese authorities were busy putting down armed uprisings and trying to extend the colonial state’s control over Taiwan’s natural resources. Governmentality, which has also been described using the concept “internal territorialization”, is particularly notable for categorizing people within boundaries defined by the state in maps, as well as employing taxation, census data, and security forces in order to control what people do inside these boundaries.⁶ As Chakrabarty points out, “one symptom of [the state’s] modernity was that its techniques of government were very closely tied to techniques of measurement”.⁷ As a result, statistics produced for and by the state tend to place people in categories that the state has designed to measure them.⁸ This was also the case in colonial Taiwan, where the Japanese authorities employed modern techniques to measure the land and the populace

1. This paper was originally presented at the conference “Positive or Preventive? Reproduction in Taiwan and the Netherlands”, held at Academia Sinica from December 15-17, 2003. We are deeply grateful to Theo Engelen, Jan Kok, and John Shepherd for their helpful comments and suggestions. Parts of this paper are based on Chapter 1 of my recent book (Katz, *When Valleys Turned Blood Red*).

2. Research Fellow, Institute of Modern History, Academia Sinica.

3. Ph.D. student, Department of History, National Chi Nan University.

4. For more on the history of these sources, see Barclay, *Colonial Development and Population in Taiwan*, 9-12; Chiu Cheng-lueh, “Rizhi shiqi huji ziliao de shiliao tese yu liyong”; Kurihara, “Taiwan Sōtokufu kōbun ruisan ni mieru tōchi shoki no kokō seido ni tsuite”; Wolf and Huang, *Marriage and Adoption in China*, 16-33; Wolf, *Sexual Attraction and Childhood Association*, 42-47.

5. Informative discussions of this concept may be found in Dirks, *Castes of Mind*, 6, 122-123, 313-315, 317; Scott, “Colonial Governmentality”; Yao, “Renshi Taiwan”; Ya, *Governing the Colonised*”.

in order to increase the state's ability to control this island's valuable resources.⁹ In Europe and Japan as well, the implementation of household registration systems accompanied the expansion of state power over local society.¹⁰

We begin by providing background information about colonial policies enacted after the Japanese assumed control over Taiwan, particularly the creation of a modern police force, the establishment of the community policing (*hokō*) system, the imposition of new land taxes, the modernization of the sugar industry, and intensive attempts to exploit resources like camphor found in Taiwan's mountain regions. This is followed by a history of the demographic sources listed above.

Establishment and consolidation of Japanese rule over Taiwan

During the late nineteenth and early twentieth centuries, Japan was engaged in the process of making the transition from feudal bureaucracy to modern state and burgeoning empire. On the domestic front, economic and technological modernization was accompanied by intensive attempts at social control. Under the rule of the Tokugawa Shogunate (1603-1867), Japan was policed and controlled in the cities, but social control in the countryside, where most people lived, was exerted by unpaid and unranked elites who were held responsible for forwarding taxes, keeping registers, etc. The central government had no idea how much land was under the plow, and peasants evaded a great deal of taxes owed to the state, being safe from government retribution as long as they deliv-

6. A growing body of research exists on the ways in which modern states (including colonial governments) attempted to exert their power over local communities. For example, R. Brian Ferguson and Neil L. Whitehead's edited volume entitled *War in the Tribal Zone: Expanding States and Indigenous Warfare* focuses on tensions and conflicts resulting from such state expansion. Peter Vandergeest and Nancy Lee Peluso's research about forest policies in nineteenth and twentieth century Thailand defines internal territorialization as the state's establishment of control over natural resources and the people who use them (Vandergeest and Peluso, "Territorialization and State Power in Thailand", 385-394; see also Scott, "Colonial Governmentality").

7. Chakrabarty, *Habitations of Modernity*, 83.

8. Chakrabarty, *Habitations of Modernity*, 84-87.

9. We are grateful to Paul Barclay, Chang Lung-chih and Antonio Tavares for their guidance in considering the concepts discussed above; see Barclay, "The Taiwanese 'Banfu' in Imperial Japan"; Barclay, "'Gaining Confidence and Friendship' in Aborigine Country"; Chang, "Guojia jiangou, shehui zhuanxing yu zhimin xiandaixing"; Tavares, "Savages, Camphor Crystals and Mountain Fees". See also the papers published by Tonio Andrade, Paul Barclay, Antonio Tavares, and myself in the May 2005 issue of *The Journal of Asian Studies*, one section of which was devoted to the study of Taiwan's colonial experience.

10. For more on the Japanese household registration system, see below. For Europe, see the work of Theo Engelen and Jan Kok, including the papers presented at our conference. Hwang 2003 is a useful study of the Korean system.

ered their rice quotas and stayed out of trouble. In contrast, the Meiji (1868-1912) and Taishō (1912-1926) eras featured increasing state interference in the form of rural taxation, land surveys, and a new household registration system.¹¹ The latter system was established soon after the Meiji emperor assumed the throne, with the Meiji Registration Code (also known as the Household Registration Law or *kosekihō*) being completed in 1871 and fully implemented in 1872.¹² Serving as a kind of census, with emphasis on residence rather than on social standing, the household registration system allowed the Japanese imperial state to keep track of the members of each household, particularly marriages and births. This system was also used to determine whether an individual was a criminal or a vagrant. In 1898, with the issuing of the first modern civil code in Japan, legal status was given to the traditional Japanese conception of the family, in which the head of the household assumed responsibility for all family members. Since then, the household register (*koseki*) has served as a document recording the details of the personal status of an individual and his/her circle of relatives.¹³

At the same time that Japan was modernizing at home, it was also beginning to extend its power overseas. Between 1895 and 1914, Japan acquired Taiwan, Karafuto (southern Sakhalin) (1905), the Kwantung Leased Territory on the Liaoning peninsula (1905), Korea (1910), and former German possessions in Micronesia. Such expansion proved critical to Japan's modernization. As Robert Eskildsen convincingly argues, "...selective appropriation of Western civilization and the projection of military force abroad contributed to the formation of modern identity in Japan".¹⁴ Other research clearly indicates the importance of colonial expansion to modern Japan, especially in terms of gaining long-coveted status as a sovereign nation equal in standing to the great powers of that era. For example, Frederick R. Dickinson maintains that during the Meiji and Taishō eras Japan largely followed the then conventional model of nation building, namely the creation of an empire abroad and the enactment of constitutional monarchy at home.¹⁵

When discussing the growth of Japanese colonialism in Asia, it is necessary to remember that it was a diverse and complicated process. For example, the work of Oguma Eiji points to the ambiguous positions of many Meiji thinkers,

11. Leavell, "The Policing of Society"; Smethurst, *Agricultural Development and Tenancy Disputes in Japan*.

12. In an interesting contrast to colonial Taiwan, Japanese household registers did not include "foreigners" such as Koreans, who constituted a substantial minority in Japan, Taeuber, *The Population of Japan*, 231.

13. Jaffe, "The Buddhist Cleric as Japanese Subject"; Taeuber, *The Population of Japan*, 64, 100-119, 207-209, 231-257; Yamanaka, *Shin-Nihon kindai hōron*, 253-258.

14. Eskildsen, "Of Civilization and Savages", 388. Leo Ching has also argued that colonialism was an integral component of Japanese modernity, Ching, *Becoming 'Japanese'*, 11.

15. Dickinson, *War and National Reinvention*, 21-26; see also Duus, *The Abacus and the Sword*, 11-25.

who, while supporting Japanese expansion, also remembered Western imperialist threats to their own nation's security and fully understood that Whites considered non-Whites to be inferior.¹⁶ Other scholars have noted that while the Sino-Japanese War effectively ended China's dominion over East Asia and led to the establishment of Japanese colonialism in that region, it also forced the Japanese state to grapple with the thorny issue of how to establish modern colonial rule over the advanced societies of Korea and Taiwan.¹⁷ For example, Japan initially chose direct rule over Taiwan and Korea, but subsequently adjusted its policies in Korea to allow more Koreans into upper echelons of government. In contrast, only a few Taiwanese became administrative heads during the colonial era.¹⁸ In terms of the social and economic aspects of Japanese colonial rule, Peter Duus' research has shown that Japan did everything in its power to pry open Korean markets to Japanese goods, while also encouraging Korea to export rice to Japan.¹⁹ This contrasts with Japanese rule over Taiwan, where the export of products like sugar and camphor proved more important, and promoting imports from Japan did not receive as much emphasis.²⁰

Assessments of Japan's early colonial policies and their impact on Taiwanese society vary greatly, but one undisputed fact is that Japan faced numerous difficulties after assuming control over its first colonial territory. Harry J. Lamley correctly points out that Japan was ill-prepared to become a colonial power, and shortly after the invasion of Taiwan had been completed, a number of problems quickly arose.²¹ After the Ch'ing had surrendered Taiwan to Japan, the Japanese government established a Governor-General's Office (Sōtokufu) and appointed the first of seven military Governor-Generals, Kabayama Sukenori (served from May 1895 to June 1896). From 1895-1897, Kabayama and his two successors²² attempted to enhance their authority by a combination of military and legal means. The results of their efforts proved disappointing, and Japan's woes were compounded by having to deal with the ravages of endemic and epidemic diseases. The early years of colonial rule were also marked by a widespread exodus of local gentry between 1895 and May 8, 1897 (the second anniversary of the Treaty of Shimonoseki), during which Taiwan's residents had to choose between returning to China as subjects of the Ch'ing dynasty or remaining in Taiwan and

16. Oguma, "Nihonjin' no Kyōkai", 8-9.

17. Komagome, *Shokuminchi Teikoku Nihon no Bunka Tōgō*, 30-31.

18. Ch'en, "Japanese Colonialism in Korea and Formosa", 144, 157-158; Chen, "The Japanese Adaptation of the Pao-chia System in Taiwan", 47-49.

19. Duus, *The Abacus and the Sword*, 261-296.

20. Chang and Myers, "Japanese Colonial Development Policy in Taiwan"; Ka, *Japanese Colonialism in Taiwan*.

21. Lamley, "Taiwan under Japanese Rule", 203-205, 207, 215.

22. Katsura Tarō (served June 1896 – October 1896); Nogi Maresuke (served October 1896 – February 1898).

joining Japan's colonial empire (albeit not as Japanese citizens). Taiwan's fourth Governor-General, Kodama Gentarō (served February 1898 – April 1906), and his famed Chief of Civil Administration Gotō Shimpei (1857-1929; served February 1898 – November 1906), succeeded in putting down armed resistance, as well as promoting Taiwan's economic development. They also enacted reform measures to improve sanitation and public health, while implementing a new educational system and attempting to attract elite support by awarding gentry medals (*shinshō*) and holding a conference (the “Uplifting Culture Conference” or *Yōbunkai*) to solicit the opinions of Taiwan's former and current ruling classes. These and other policies described below proved instrumental in consolidating Japan's rule over its first colony.²³

The legal system

Once the Japanese military had subdued initial outbreaks of armed resistance by the end of 1895, the colonial government's top priority became enhancing its administrative authority over the island. In order to achieve this goal, the Japanese imperial government granted the Governor-Generals who administered the island a broad range of powers, particularly in terms of their military and legal authority. Perhaps most importantly, in March 1896 Japan's Diet responded to continued outbreaks of armed resistance on Taiwan by giving the Governor-General extraordinary powers to issue and enforce laws (*ritsurei*) without having to first obtain imperial approval. Kodama and Gotō quickly took advantage of this law, known by its title of Law 63 (or *roku-sanhō*), to pass a number of *ritsurei* which had immediate and drastic impacts on the lives of many Taiwanese. For example, in 1898, the colonial government passed the so-called Bandit Punishment Law (*Hito keibare*; (emergency *ritsurei* No. 24), under which people involved in any form of resistance to colonial rule could be labeled “bandits” and sentenced to death. This law's most important feature involved the stipulation of a wide range of offenses that could be punishable by death, including simply joining a “rebellious” organization. The Bandit Punishment Law was applied with full force against men and women who opposed Japanese rule.²⁴ During Kodama's tenure, the colonial authorities also enacted the Fine and Flogging Law in 1904, whereby policemen in Taiwan were granted the authority to pass

23. For overviews of the early years of the Japanese Occupation, see Chen, “Japanese Colonialism in Korea and Formosa”; Huang, *Taiwan zongdifu*; Lamley, “Taiwan under Japanese Rule”; Mukōyama, *Riben tongzhi xia de Taiwan minzu yundong*; Tsurumi, *Japanese Colonial Education in Taiwan*. For more on the impact of contagious diseases, see Fan, “Riju qianqi Taiwan zhi gonggong weisheng”; Katz, “Germs of Disaster”.

24. For more on the Bandit Punishment Law, see Ch'eng, *Taiwan xianxian liezhuan*, 107-109; Mukōyama, *Riben tongzhi xia de Taiwan minzu yundong*, 267-270; Wang, *Legal Reform in Taiwan under Japanese Colonial Rule*, 47-48. For a translation of this law, see Wang, *Legal Reform in Taiwan under Japanese Colonial Rule*, 196-197.

summary judgments on individuals who had been accused of offenses for which floggings were to be authorized.²⁵ The colonial government also tried to control what is considered unsavory elements of the population who were not dangerous enough to be considered as “bandits” by passing the Taiwan Vagrant Discipline Regulations in 1906. Based on these regulations, the authorities set up vagrant camps (*shūyōjo*) in the eastern region of Taitung in 1908. Individuals labeled as “vagrants” could be sent to a camp even if they had not committed a crime, and the police were delegated authority to decide who actually had to go there, although the Governor-General’s Office had to give final approval of all such decisions.²⁶

Apart from establishing a police force and enacting new laws and regulations, the colonial state also enacted a system of criminal justice that in some ways differed radically from that then in existence in Japan. For one thing, during the first decades of Japanese colonial rule over Taiwan Governor-Generals were granted complete power over the organization and function of Taiwan’s judiciary, making the judicial branch of the colonial government effectively subordinate to the executive.²⁷ Moreover, while trials in Taiwan were supposed to conform to the Japanese Code of Criminal Procedure, the authorities enacted special laws for the speedy trials of accused Taiwanese. For example, the Summary Judgment Law of 1904 allowed heads of local governments to immediately adjudicate a broad range of criminal offenses, while the passage of the Special Law for Criminal Litigation in 1905 broadened the powers of police, prosecutors, and judges.²⁸ In the case of individuals who attempted to resist state authority, a particularly important development involved the establishment of temporary courts (*rinji hōin*), which could be set up at any time to try men and women accused of being bandits. Such courts, which were convened five times between 1895 and 1915, featured small numbers of prosecutors and judges who were given great leeway to administer justice to large numbers of suspects. While defendants were granted legal representation, justice was swift and no appeals were allowed.²⁹

25. For more on the history of flogging in colonial Taiwan, see Botsman, “Rediscovering the Lash”; Lamley, “Taiwan under Japanese Rule”, 217; Mukōyama, *Riben tongzhi xia de Taiwan minzu yundong*, 342-344.

26. Wang, *Legal Reform in Taiwan under Japanese Colonial Rule*, 48, 119-120; see also Mukōyama, *Riben tongzhi xia de Taiwan minzu yundong*, 341-342.

27. For more on the Governor-General’s Office, especially its legal powers, see Ch’en, “Japanese Colonialism in Korea and Formosa”, 136-140; Huang, *Taiwan zongdufu*, 217-222; Mukōyama, *Riben tongzhi xia de Taiwan minzu yundong*, 148-153, 267-270.

28. Wang, *Legal Reform in Taiwan under Japanese Colonial Rule*, 47-50.

29. See Ch’eng, *Taiwan xianxian liezhuan*, 109-124; Wang, *Legal Reform in Taiwan under Japanese Colonial Rule*, 107-110.

The colonial police force

Following the failure of the so-called “Triple Guard System”, whereby the army, military police, and police attempted to share responsibility for maintaining law and order, Kodama and Gotō decided to delegate primary responsibility for enforcing order to the police. An elaborate network of police stations was established throughout the island, and Taiwanese were recruited to join the force at the junior grade of assistant patrolman (*junsaho*).³⁰ Policemen did far more than simply enforce the law, however; they also assisted the civil administration in its efforts to govern the populace, collecting taxes, conducting censuses and administering the household registration system (see below).³¹

Community policing

Kodama and Gotō also decided to reshape the late imperial Chinese community policing (*baojia*) system to their purposes. Accordingly, just six months into his rule (Agustus 1898) Kodama promulgated the “Community Policing (*hokō*) Law” and relevant regulations to govern its implementation. In terms of its structure, the community policing system was rather similar to the *baojia*: ten households made up a *kō*, and ten *kō* formed a *ho*. Each *kō* had a headman (the *kōchō*), and each *ho* a higher-ranking headman (the *hosei*), all of whom were required to be household heads over 20 years of age who were chosen by local residents and confirmed by the colonial authorities. The system was also intimately connected to the colonial police force, with police officers in charge of *ho* headmen, who in turn took responsibility for the actions of *kō* headmen. The community policing system encompassed a broad range of responsibilities, which included tax collection, public health, implementing agricultural policies, selecting able-bodied residents to serve as porters, and administering the household registration system.³²

Land taxes

The colonial government’s economic policies were designed to increase revenues from land taxes, modernize Taiwan’s sugar industry and open mountain areas for intensive exploitation. Chang Han-yu and Ramon Myers have convincingly demonstrated that the Japanese viewed the possession of Taiwan as vital to its own survival and self-protection, with the development of Taiwan’s resources

30. Lamley, “Taiwan under Japanese Rule”, 212-215.

31. Shiomi, “Riju shidai Taiwan zhi jingcha yu jingji”, 136-142.

32. For more on the community policing system, see Chen, “The Japanese Adaptation of the *Pao-chia* System in Taiwan”, Chen, “Police and Community Control Systems in the Empire”; Hung, “Riju shiqi Taiwan de baojia zhidu”; Hung, “Rizhi chuqi Taiwan shehui xin lingdao jieceng de chansheng”; Lamley, “Taiwan under Japanese Rule”, 213-215; Ts’ai, “One Kind of Control”.

being one of their top priorities.³³ Accordingly, once the administrative systems described above had begun to function according to plan, the Japanese turned their attention to the local economy. The first stage of Taiwan's economic modernization program involved taxation. In a clear example of the process of colonial governmentality mentioned in the Introduction, a comprehensive land survey was carried out from 1898 to 1903, and resulted in large amounts of previously untaxed "hidden land" being registered and included on the tax rolls.³⁴ The fact that the colonial government effectively employed the community policing system to collect taxes made tax evasion all the more difficult, and this caused the local populace's land tax burden began to increase significantly. The state also raised significant amounts of revenue from new excise taxes after it had established government-run monopolies in opium, salt, tobacco, and camphor. As a result, by 1905 the Japanese government no longer had to subsidize the civil administration of Taiwan.³⁵

The sugar industry

Sugar had been an important component of Taiwan's economy during the Qing dynasty, but during the chaotic first five to six years of colonial rule local sugar production fell 63%. In order to remedy the situation, the Japanese government decided in 1901 to allow the colonial administration to keep revenues from sugar taxes, thereby providing a great incentive to increase production. Thereafter, Kodama and Gotō strove to attract Japanese capital and create an infrastructure to support Japanese investment. The colonial authorities went so far as to guarantee profits for new Japanese investors, and also provided generous subsidies and loans. Bank loans to the sugar industry (mostly by the Bank of Taiwan) increased from 2.7 million yen in 1903 to 335 million yen by 1920. The colonial government also created exclusive territories for modern sugar factories to control procurement of sugar cane. This meant that such factories enjoyed effective monopoly power, with cane farmers unable to bargain or sell to lower bidders. By 1915, five monopolistic sugar companies accounted for 76.11% of Taiwan's sugar refiners and 74.81% of capital invested in the sugar industry. The government prospered as well: by the 1910s, sugar constituted more than 70% of Taiwan's total industrial output, and over 50% of the colonial administration's tax revenues.³⁶

33. Chang and Myers, "Japanese Colonial Development Policy in Taiwan", 433.

34. For more on the significance of land surveys as a means by which modern states could assert their authority over local society, see Dirks, *Castes of Mind*, 67-69; Scott, *Seeing like a State*, 48-49; Yao, "Renshi Taiwan".

35. For more on the tax policies and monopoly systems of the colonial era, see Chang and Myers, "Japanese Colonial Development Policy in Taiwan"; Ka, *Japanese Colonialism in Taiwan*, 54-59; Mukōyama, *Riben tongzhi xia de Taiwan minzu yundong*, 373-384, 424-425.

Forest products

Camphor differed from sugar in that the Ch'ing state had attempted to actively exploit this natural resource as early as the 1880s, when camphor became a hot commodity on the world market due to its use in the manufacture of smokeless gunpowder.³⁷ In the fall of 1895, the colonial state decreed that all mountain forests and wastelands were to be considered state property if those occupying the lands could not produce a certificate or other document issued by the Ch'ing state verifying ownership rights. The colonial state then proceeded to set up the Camphor Monopoly Bureau in 1899, and by the early 1900s Japanese capitalists had begun to take over the management of much of Taiwan's mountain land. This process proved costly to all involved, as in each year between 1898 and 1901 (inclusive) colonial forces suffered over 500 deaths and 100 injuries; the number of Aborigine casualties is unknown. Taiwan's fifth Governor-General Sakuma Samata (served April 1906 – April 1915) subsequently initiated a brutal subjugation campaign from 1909-1914, which featured the use of airplanes as well as naval bombardments from warships stationed off the coast of eastern Taiwan.³⁸

Censuses, surveys, and the household registration system

The demographic sources to be discussed here were created during the early 1900s, at the exact same time as the colonial state was trying to extend its control over local society by means of the policies described above. In 1896, the colonial government attempted to implement its first census, promulgating the “Regulations for Conducting a Household Census of Taiwan's Inhabitants” (*Taiwan jūmin kokō chōsa kitei*) in August of that year. According to these regulations, the military police and police were to conduct censuses of the local population, who were to register by household and provide information about each household member's name, date of birth, etc. The entire process of compiling this demographic data was supposed to last from September to the end of December, but the census was apparently never completed.³⁹ Seven years later, in 1903, Kodama Gentarō and Gotō Shimpei ordered the issuance of Directive (*kunrei*) 104, named the “Household Census Regulations” (*Kokō chōsa kitei*), which stipulated that

36. For more on the history of the colonial sugar industry, see Ka, *Japanese Colonialism in Taiwan*, 56,74-81; Mukōyama, *Riben tongzhi xia de Taiwan minzu yundong*, 395-400, 442-450; Townsend, *Yanaihara Tadao and Japanese Colonial Policy*, 106-107.

37. Gardella, “From Treaty Ports to Provincial Status”, 173.

38. See Huang, *Taiwan zongdufu*, 100, 102-105; Lamley, “Taiwan under Japanese Rule”, 211-212; Mukōyama, *Riben tongzhi xia de Taiwan minzu yundong*, 368-384.

39. For more early attempts to implement the household register system in Taiwan, see Hung, *Rizhi shiqi huji dengji falü ji yongyu bianyi*, 199-200; Yamanake, *Shin-Nihon kindai hÿron*, 314-326, esp. p. 318.

Japanese patrolmen and Taiwanese assistant patrolmen were to undertake a new effort at completing a thorough process of registering all of the island's inhabitants. According to these regulations, all individuals were to be divided into three "social classes" based roughly on status, with members of the first class (mainly members of the gentry and elite) needing to have their records updated every 6 months, members of the second (most inhabitants) every three months, and members of the third (vagrants or people with criminal records) every month. All births, deaths, and moves to new residences were to be strictly monitored.⁴⁰ On October 1, 1905, the colonial authorities initiated the "First Provisional Household Census on Taiwan" (*Dai-ichi rinji Taiwan kokō chōsa*) (see below), and two months later issued a revised series of the "Household Census Regulations", also known as Directive 255. These regulations provided further detail on how the registration process was to be undertaken, while also relaxing the requirements for updating the records of the first two social classes listed above. According to the new rules, members of the first class only needed to have their records updated once a year, while for members of the second class the time was extended to every six months. Members of the third class were still required to have their records updated on a monthly basis. The entire process of compiling the household registers was completed by January 15, 1906.⁴¹

In implementing the household registration system, the Japanese endeavored to compile data on birth and death dates of all household members,⁴² as well as information about marriage, adoption, and migration. In addition, prior to the simplification of registration procedures in 1935, the household registers also contained information about each individual's ethnic or sub-ethnic affiliation,⁴³ occupation, foot binding, opium addiction, and vaccinations. In order to effectively administer this system, the police delegated responsibility for registering events like births, deaths, and marriages to the heads of local community policing networks. Thus, household heads or literate members of a household were required to report all such events to their headmen, who then recorded them on a form provided by the police, which was then delivered to the police. In theory, such record keeping was supposed to be completed within ten days after an event such as a birth or death occurred. The colonial authorities kept particularly close watch on population movements, and migrants were only allowed to cancel their original registrations after presenting a receipt proving that they had registered in

40. Hung, *Rizhi shiqi huji dengji falü ji yongyu bianyi*, 205-206.

41. Hung, *Rizhi shiqi huji dengji falü ji yongyu bianyi*, 205-212.

42. All events were registered according to the Western calendar, not the traditional Chinese lunar calendar.

43. In cases of mixed marriages, the ethnic or sub-ethnic affiliation of each child was based on that of the father. In the few cases when the father's ethnic or sub-ethnic affiliation could not be determined, the child's was then based on that of the mother; see Hung, *Rizhi shiqi huji dengji falü ji yongyu bianyi*, 39, 199.

another district. It is important to note, however, that the household registration system as implemented in 1906 did not cover all of Taiwan's inhabitants, and it took decades for the colonial authorities to compile household registers for all Japanese, Han Chinese (mostly Hoklos and Hakkas), Plains Aborigines, and foreigners (including citizens of the Ch'ing dynasty and later the Republic of China). Some Mountain Aborigine tribes were not included until as late as 1943.⁴⁴

Each page of a household's register consisted of three to six columns, with each member of a household having a column devoted to recording the events of his or her lifetime. As new events occurred, small slips of paper were pasted on top of that individual's column. New pages could be added to a household's register when the number of its members increased. When a member of the household died or departed due to marriage, adoption, or family division, the column containing his or her name was struck out and the circumstances of his/her departure duly recorded. In the event that the head of a household died or otherwise ceased to be able to fulfill his or her duties, a new register was copied for that household and the old register filed with other "dead registers" (literally "volumes [recording] the removal of a household" or *ch'u-hu pu*) from that year. When an individual or household moved to a new location for only a brief period of time, but did not plan to settle in the new location permanently, their records were included in "volumes [recording] temporary residence" (*chi-liu pu*) at that new location.⁴⁵ Despite the comprehensive nature of these sources, however, there are occasional instances of erroneous reporting, particularly regarding dates of birth and death deemed to be inauspicious. The registers also lack complete data on the occupations of household members, only providing such information on a reasonably consistent basis for household heads, and only for registers compiled prior to 1935. Finally, while the registers list the date of an individual's demise, they provide no detail as to cause of death.

Because the colonial police force was in charge of compiling and updating the household registers, most Household Registration Offices in Taiwan today are located inside or next to police stations. Such offices contain three sets of volumes: one set for permanent residents who still lived in the area by the end of the colonial era, one set of "dead registers", and one set of registers recording the activities of sojourners. The contents of all volumes are usually arranged by address, with each volume having an index listing the names of all household heads. Today, one can also use computers in local Household Registration Offices to search for individuals by name.

While both Japan and Taiwan had household registration systems, there

44. Ts'ai, "One Kind of Control".

45. A detailed description of the contents of the household registers, as well as sample pages, may be found in Wolf and Huang, *Marriage and Adoption in China*, 18-24.

were some important differences between the two. Japan's system was governed by the Household Registration Law (see above), with household registration being managed by civil bureaucrats. In contrast, the police and leaders of the community policing system ran household registration in Taiwan. Moreover, the Japanese refused to legally recognize the legitimacy of Han Chinese family heads (*chia-chang*), requiring instead that the head of a family register according to the Japanese concept of household head (*koshū*). Thus, the household or *ko* might best be viewed as an administrative unit defined by the state for use in controlling local society, while the family or *chia* was a locally defined socioeconomic unit. It is also interesting to note that the colonial authorities' insistence on registering Taiwanese by household instead of family appears to be a striking exception to the general trend of not interfering in local customs, particularly during the early years of colonial rule. The fact that Japanese and Taiwanese were registered according to different systems could pose difficulties for Japanese who wished to marry a Taiwanese spouse or adopt a Taiwanese child; such relationships were technically illegal until the relevant regulations were revised in 1935.⁴⁶

In attempting to assert firm control over the people and resources of Taiwan, the colonial authorities wanted to do more than simply record the activities of individuals and households. Therefore, apart from compiling the household registers, the state endeavored to measure the demographic transformations of local communities on a regular basis. In September 1905 the Governor-General's Office promulgated the "Regulations on Reports about Population Movement" (*Jinkō dōtai hōkoku kitei*), which required the police to keep track of all births, deaths, marriages, divorces, and population movements in their districts on a monthly basis. Based on these records, the colonial authorities compiled annual reports on demographic change in Taiwan entitled the *Statistical Data on the Population Currently Living in Taiwan*. These reports were designed to measure total population, sex ratios, births, deaths, inward migration, and outward migration. Compiled on an annual basis from 1905 to 1943, they contain aggregate demographic data for Japanese, Taiwanese (including Han Chinese and Plains Aborigines), and foreigners (including citizens of the Qing dynasty and the Republic of China). Relevant demographic data was presented by prefecture, county, township, and village, with that year's data being listed alongside data from the previous year.⁴⁷ Thus, scholars can use the *Statistical Data* in order to measure both short-term and long-term demographic changes in local communities, although one occasionally encounters difficulties resulting from the redrawing of administrative districts.

46. Hung, *Rizhi shiqi huji dengji falü ji yongyu bianyi*, 218-249; Ts'ai, "One Kind of Control".

47. For more on the *Statistical Data on the Population Currently Living in Taiwan*, see Tomita, "1905 nen Rinji Taiwan rinji Taiwan kokyō chōsa ga goru Taiwan shakai?".

The colonial authorities also kept close track of socioeconomic changes affecting local communities by conducting a total of seven detailed demographic surveys every five or ten years. The first such survey, which was initiated by Gotō Shimpei in the autumn of 1905, was known as the “First Provisional Household Census on Taiwan” (*Dai-ichi rinji Taiwan kokō chōsa*).⁴⁸ A second and even more detailed survey was conducted in 1915, and subsequent surveys were undertaken in 1920, 1925, 1930, 1935, and 1940 respectively (see Appendix 1). The first two surveys did not contain data on Mountain Aborigines, who were not included in until 1920. Beginning in that year, censuses in Taiwan began to be undertaken as part of the National Census (*Kokusei chōsa*) conducted both in Japan and its colonies. Under the National Census system, simple surveys were to be completed every five years, with more detailed surveys to be done every ten years. Accordingly, the 1925 and 1935 surveys were done according to the simpler format, while the 1920 and 1930 surveys contain far more thorough records of Taiwan’s demographic structures, particularly occupational patterns. Because the 1940 survey was carried out during wartime, the colonial authorities were unable to publish their results, although the Taiwan Provincial Government eventually published much of this data in 1953.⁴⁹

The seven censuses described above are far more detailed than the *Statistical Data*. In addition to listing aggregate data on total population and sex ratios for all Japanese, Taiwanese, and foreigners in each prefecture, county, township, and village, they also provide invaluable information on ethnic or sub-ethnic affiliation, occupation, foot binding, opium addiction, physical handicaps, widows and widowers, etc. Thus, they allow scholars to see a cumulative picture of a given area that could only be otherwise obtained by painstakingly going through the household registers on a case-by-case basis. Their only drawback is that they do not show whether changes in total population were due to births, deaths, inward migration, or outward migration; for such information, one must rely on the *Statistical Data*.

Both the colonial authorities and the people of Taiwan were well aware of the fact that population surveys were a key measure of state control. For example, during an anti-Japanese uprising during the summer of 1915 known as the Ta-pa-ni Incident,⁵⁰ the police threatened uncooperative suspects with being exclud-

48. Detailed and highly useful maps displaying data from this survey have recently been posted on the “Taiwan History and Culture in Time and Space” website; see <http://thcts.ascsc.net/template/sample12.asp?id=rd11>.

49. Tomita, “1905 nen Rinji Taiwan rinji Taiwan kokō chōsa ga goru Taiwan shakai?”

50. The Ta-pa-ni Incident is also commonly referred to as the Yü Ch’ing-fang Incident (in memory of the rebelion’s leader) or the Hsi-lai An Incident (after a temple in Tainan City where much of the organizing and recruiting took place). For more on this incident, see my recent book (Katz, *When Valleys Turned Blood Red*) and article in *The Journal of Asian Studies*.

ed from that year's census, which was to be concluded in October. The fear of having one's name removed from demographic records was quite real, and there are reports of people throughout Taiwan who had nothing to do with this incident jamming into trains in order to make it home in time to be registered, and worrying that those who were not counted would be labeled as co-conspirators.⁵¹

Concluding remarks

Based on the evidence presented above, it should by now be readily apparent that the various demographic records compiled during the colonial era constitute invaluable primary sources for scholars wishing to do research on Taiwanese society. The household registers preserve detailed records the life courses of the island's inhabitants, including birth, adoption, marriage and death, meaning that they are perhaps the single most important source for researching the history of the Taiwanese family. They also provide key information about social class, crime, the handicapped, vaccination campaigns etc. The registers allow us to learn more about Taiwanese customs during the colonial era, including different forms of marriage and adoption, but also concubinage, opium addiction, and foot binding. One can also research how events such as typhoons, floods, epidemics, and armed uprisings shaped demographic patterns in local communities. Scholars interested in the history of urbanization and industrialization in modern Taiwan can use the registers to find data on migration patterns and the ways that family structures changed over time, while those researching Taiwanese local elites can also mine the registers for data on how elite families used marriage as a strategy to cultivate networks of power. In terms of gender studies, scholars working on the history of Taiwanese women can use the registers to compile data on marriage, adoption, and fertility, as well as problems such as the relationship between economic development and a woman's age at marriage.

In-depth demographic or social historical research on Taiwanese society during the colonial era need not rely solely on the household registers. Other demographic records provide important information on local social and economic structures, as well as the ways in which they could change over time. For example, the *Statistical Data* allow scholars to measure demographic changes at the prefectural, county, township, and even village levels due to factors such as fertility, mortality, and migration, while the censuses conducted every five or ten years provide detailed pictures of an area's socioeconomic structures, including gender, ethnicity, occupation, etc. Thus, by taking full advantage of the three types of demographic sources discussed above, we can view snapshots of a particular community at a given point in time, as well as study that community's social history in both the short and long term.

51. Ch'eng, *Taiwan xianxian liezhuan*, 90; Lü Shao-li, *Shuiluo xiangqi*, 56; Yao, "Renshi Taiwan", 170-171.

Regrettably, however, relatively few scholars have taken full advantage of this invaluable body of primary source material. To date, the leaders in this field have been Arthur P. Wolf, Chuang Ying-chang, and Hill Gates, who have used the household registers to conduct in-depth research on the history of marriage and adoption in colonial Taiwan.⁵² More recently, a growing number of scholars researching Taiwan's Plains Aborigines, particularly Hung Li-wan, John R. Shepherd, Pan Ing-hai, and Yeh Ch'un-jung, have begun to use demographic sources to study Aboriginal social structures and their transformation over time.⁵³ Scholars like Lin Sheng-ch'in and Shih T'ien-fu are now using these records to study Taiwan's economic development during the colonial era, especially along the island's eastern coast⁵⁴, while Chuang Pei-jou has relied on household registers to explore the ways in which industrialization shaped demographic structures in mining communities located in northern Taiwan.⁵⁵ Hill Gates has been doing path-breaking work on the Taiwanese women during the colonial era, especially in urban areas of the island⁵⁶, while I have used demographic records to study elite marriage patterns and the links between occupation and age at marriage in the southern fishing port of Tung-kang.⁵⁷

In short, the existence of Taiwan's colonial-era demographic sources provides us with a unique opportunity to use demographic data along with information collected from other sources and during fieldwork in order to better understand local social structures, customs, and the lives of the island's men and women. These sources are particularly important because in postcolonial Taiwan the colonial past does not rest in peace. In particular, attempts to address events that took place during the period of time when Taiwan was a colony of Japan frequently spark controversies between scholars and politicians embracing vastly different ideologies and historical perspectives. Postcolonial debates about the significance of a nation's colonial experience are hardly unique to Taiwan,⁵⁸ but I would argue that controversies and/or debates among intellectuals and politi-

52. Chuang and Wolf, "Marriage in Taiwan"; Wolf and Gates, "Marriage in Taipei City"; Wolf and Huang, *Marriage and Adoption in China*; Wolf, *Sexual Attraction and Childhood Association*; Wolf, *Women and Tea in the Taipei Basin*.

53. Hung, "Dang'an liyong yu Pingpuzu yanjiu"; Pan and Shepherd, *Marriage and Ethnicity: Hakka, Hokkien and P'ing-pu*; Shepherd, *Demographic Studies of Plains Aborigines*; Shepherd, *Siraya Marriage Practices and Yeh*, *Zuqun yu tonghun*.

54. Lin, "Rizhi shiqi huiji ziliao de neirong ji qi shiliao jiazhi"; Shih, "Ribei zhimin zhuyi xia de dong Taiwan".

55. Chuang, "Rizhi shiqi kuangye fazhan yu difang shehui".

56. Gates *China's Motor*; Gates, "Owner, Worker, Mother, Wife"; Gates, "Girls' Work".

57. Katz, "Commerce, Marriage and Ritual"; Katz, "Social Structure and Marriage Patterns in East Haven".

58. See for example Chatterjee, *The Nation and its Fragments*; Said, "Intellectuals in the Post-Colonial World"; San Juan, "Postcolonial Theory versus the Revolutionary Process in the Philippines".

cians surrounding the nature of Taiwan's colonial past, while constituting an integral and significant aspect of postcolonial discourse, nonetheless tend to distort the past, with historical events and their impact on men and women frequently being molded or manipulated to serve a wide range of agendas. The result is that we often tend to overlook the real-life experiences of typical 20th-century Taiwanese (rural wage earners, petty entrepreneurs and laborers) whose voices rarely can compete with the hubbub raised by politicians and academics. The demographic sources described above have the potential to give some voice to these men and women. Furthermore, inasmuch as these sources constituted part of Japan's colonial governmentality over Taiwan, scholars using these texts can also consider the ways in which research on Taiwan's colonial experience can contribute to our knowledge of colonialism as a historical phenomenon worldwide. These two goals are interrelated, and achieving the first goal has the potential to help us rethink the second. The opportunities are available; the only question is whether scholars will take advantage of them.

Appendix 1 – The seven household censuses

調查次別	調查年份	簿冊名稱	冊數	統計表數	出版單位	出版日期	備註
第一次	明治三十八年 (1905)	臨時臺灣戶口調查職業名字彙	1		臺灣總督官房臨時戶口調查部	明治四十年 (1907) 刊行	文字說明
	明治三十八年 (1905)	臨時臺灣戶口調查要計表(街庄社別住居及戶口等)	1	15	臨時臺灣戶口調查部	明治四十年 (1907) 刊行	
	明治三十八年 (1905)	臨時臺灣戶口調查集計原表(地方之部)	2	48	臨時臺灣戶口調查部	明治四十年 (1907) 刊行	
	明治三十八年 (1905)	臨時臺灣戶口調查結果表	2	123	臨時臺灣戶口調查部	明治四十一年 (1908) 刊行	
	明治三十八年 (1905)	臨時臺灣戶口調查類末	1		臺灣統督府官房統計課	明治四十一年 (1908) 刊行	文字說明
	明治三十八年 (1905)	臨時臺灣戶口調查記述報文	1		臺灣統督府統計課	明治四十三年 (1910)	文字說明
第二次	大正四年 (1915)	第二次臨時臺灣戶口調查概覽表	1	9	臺灣總督官房臨時戶口調查部	大正六年 (1917) 刊行	
	大正四年 (1915)	第二次臨時臺灣戶口調查集計原表(全島之部)	2	32	臺灣總督官房臨時戶口調查部	大正六年 (1917) 刊行	
	大正四年 (1915)	第二次臨時臺灣戶口調查集計原表(地方之部)	2	47	臺灣總督官房臨時戶口調查部	大正六年 (1917) 刊行	
	大正四年 (1915)	第二次臨時臺灣戶口調查結果表	2	123	臺灣總督官房臨時戶口調查部	大正七年 (1918) 刊行	
	大正四年 (1915)	臨時臺灣戶口調查類末	1		臺灣統督府官房調查課	大正七年 (1918) 刊行	文字說明
第三次	大正九年 (1920)	國勢調查結果概數	1	1	臺灣總督官房臨時國勢調查部	大正十年 (1921) 刊行	
	大正九年 (1920)	第一回臺灣國勢調查(第三次臨時臺灣戶口調查)住居世帶及人口	1	1	臺灣總督官房臨時國勢調查部	大正十年 (1921) 刊行	
	大正九年 (1920)	第一回臺灣國勢調查職業名字彙	1		臺灣總督官房臨時國勢調查部	大正十一年 (1922) 刊行	文字說明
	大正九年 (1920)	第一回臺灣國勢調查(第三次臨時臺灣戶口調查)要覽表	3	9	臺灣總督官房臨時國勢調查部	大正十一年 (1922) 刊行	
	大正九年 (1920)	第一回臺灣國勢調查(第三次臨時臺灣戶口調查)集計原表(全島之部)	2	38	臺灣總督官房臨時國勢調查部	大正十二年 (1923) 刊行	

	大正九年 (1920)	第一回臺灣國勢調查(第三次臨時臺灣戶口調查)集計原表(全島之部)	2	48	臺灣總督官房臨時國勢調查部	大正十三年 (1924) 刊行	
	大正九年 (1920)	臺灣國勢調查類末書	1		臺灣總督官房臨時國勢調查部	大正十三年 (1924) 刊行	文字說明
	大正九年 (1920)	第一回臺灣國勢調查記述報文	1		臺灣總督官房臨時國勢調查部	大正十三年 (1924) 刊行	文字說明
第四次	大正十四年 (1925)	國勢調查結果概數	1	1	臺灣總督官房臨時國勢調查部	大正十五年 (1926) 刊行	
	大正十四年 (1925)	國勢調查結果便覽	1	1	臺灣總督官房臨時國勢調查部	昭和二年 (1927) 刊行	
	大正十四年 (1925)	國勢調查結果表	2	7	臺灣總督官房臨時國勢調查部	昭和二年 (1927) 刊行	
	大正十四年 (1925)	國勢調查類末書	1		臺灣總督官房臨時國勢調查部	昭和二年 (1927) 刊行	文字說明
第五次	昭和五年 (1930)	國勢調查結果概報	1	2	臺灣總督官房臨時國勢調查部	昭和六年 (1931) 一月	
	昭和五年 (1930)	國勢調查結果中間報	49	17	臺灣總督官房臨時國勢調查部	昭和八年 (1933) 二月十五日發行	
	昭和五年 (1930)	國勢調查結果表州廳編	5	45	臺灣總督官房臨時國勢調查部	昭和八年 (1933) 二月十五日發行	
	昭和五年 (1930)	國勢調查結果表全島編	1	87	臺灣總督府	昭和九年 (1934) 刊行	
第六次	昭和十年 (1935)	國勢調查結果概報	1	3	臺灣總督官房臨時國勢調查部	昭和十年 (1935) 十二月刊行	
	昭和十年 (1935)	國勢調查結果表	2	15	臺灣總督府	昭和十二年 (1937) 三月三十日發行	
第七次	昭和十五年 (1940)	臺灣第七次人口普查結果表	1	31	臺灣省政府主計處	民國四十二年 (1953) 三月	

Glossary

- pao-chia* 保甲
chu-hu pu 除戶簿
dai-ichi rinji Taiwan kokō chōsa 第一次臨時台灣戶口調查
dainichi rinji Taiwan kokō chōsa 第二次臨時台灣戶口調查
gotō Shimpei 後藤新平
guandong 關東
hito keibarei 匪徒刑罰令
hokō 保甲
hosei 保正
hu-chi tsu-liao 戶籍資料
chia-chang 家長
chi-liu 寄留簿
Jinkō dōtai hōkoku kitei 人口動態報告規程
junsaho 巡查補
kabayama sukenori 樺山資紀
katsura tarō 桂太郎
kodama Gentarō 児玉源太郎
kōchō 甲長
kokō chōsa kitei 戶口調查規程
kokusei chōsa 國勢調查
koseki 戶籍
kosekihō 戶籍法
koshū 戶長
kunrei 訓令
liaoning 遼寧
nogi maresuke 乃木希典
rinji hōin 臨時法院
ritsurei 律令
roku-sanhō 六三法
sakuma samata 佐久間左馬太
shinshō 紳章
shūyōjo 收容所
sōtokufu 總督府
taiwan genjū jinkō tōkei 臺灣現住人口統計
Taiwan jōjū jinkō tōkei 臺灣常住人口統計
Taiwan jūmin kokō chōsa kitei 臺灣住民戶口調查規程
ta-pa-ni 噍吧哖
xilai An 西來庵
yōbunkai 揚文會
yu Qingfang 余清芳

3

41

**Sources for the
historical demography
of the Netherlands in
the 19th and early
20th centuries**

Jan Kok

In the past, as well as today, every system of population administration was informed by preconceived notions of social reality, notions that are reflected in the categories created to simplify and structure relations and behavior. For example, individuals were supposed to belong to one specific household; each household had to have an official 'head' and members of households were ordered administratively by their 'relationship to the head'. Also, every individual needed to have one official place of residence, even when he or she was an itinerant worker or was living on a boat. The categories and definitions employed in records and registers ensued from the purposes that the administrations served. For what legal, political or scientific goal were they recording, counting and categorizing people? This question is relevant for those who seek to distil knowledge on family life in the past from bureaucratic records. They must be aware of the potential conflict between simple categories and complex realities as well as of the biases inherent in any system.

This chapter discusses the most important sources for family historians and historical demographers in the Netherlands. These are the vital or civil registers (certificates of birth, death and marriage) that were initiated in 1811, the population registers, initiated in 1850, and the ten-yearly censuses held from 1829 to 1971. For each source, I will discuss its origin and function, describe its content as well as potential biases, and finally remark on its accessibility for researchers.

The civil registers

As a consequence of the annexation of the Netherlands by the French Empire, French civil law was introduced in 1810. The Code Napoléon provided for the compulsory, standardized recording of vital events by means of certificates. These certificates served a legal function by recording the changes in individual status occurring through birth, marriage, divorce, and death. They were and are crucial documents for settling disputes concerning inheritance. Also, vital registers played an important role in the control and regulation of marriage, as will be discussed below.¹

The certificates were drawn up in the municipality where the vital event occurred. Persons who declared a birth or death, or couples who declared their intention to marry, presented themselves to the registrar. The registrar then noted the required information in a preformatted document, to be signed by the declarant(s) as well as by witnesses. The witnesses did not make any declaration themselves. They simply had to be present when the declaration was made before the registrar and, afterwards, when the certificate was read aloud. In a strict legal sense the witnesses did not bear testimony to the truth of the declara-

1. This paragraph is based on Vulsma, *Burgerlijke Stand en bevolkingsregister*.

tion itself. Obviously, in the case of a birth, they were not expected to have been present at the delivery. Yet, to a certain extent they were supposed to affirm the contents of a declaration. The registrars were therefore urged to take care that witnesses were friends or relatives of the informants. They could refuse untrustworthy persons. In practice, however, and particularly in the case of birth certificates, the witnesses were frequently either clerks or other municipal officials, or even persons who made a living by signing certificates for a small fee.

The registrars had to note the names, ages, occupations and (actual) place of residence of the informants and witnesses. This information served the correct identification of individuals. For other persons mentioned in the certificates, the required information was less detailed. For instance, it was not necessary for the registrar to state the age of parents in a birth certificate.

The birth certificates

Each birth was to be reported to the Registrar of the municipality in which it had taken place. The birth had to be declared within three days, the day of the delivery itself not included. After this time limit, no notification could take place, unless authorization was granted by the public prosecutor. In addition, a considerable fine had to be paid.

The declaration ought to be made by the father, or, in his absence, by the midwife or someone else who had been present at the delivery. In the certificates the name, occupation, place of residence, and age of the declarant are usually mentioned first. The Registrar asked the declarant for the day and hour of birth, the place within the municipality in which the child was born, sex, and Christian name of the child. For the parents, items to be recorded included surnames and Christian names, occupation and municipality of residence. The names and marital status of the parents had to be registered in such a way that the legal status of the child was clear. Until 1935, a person who declared a newborn child to the Registrar had to be accompanied by two witnesses, which meant that their ages, addresses, and occupations were recorded as well. The witnesses and the persons who declared the child were obliged to sign the certificate. In case they could or would not sign, the reason had to be made explicit.

Illegitimate children were children born outside legal marriage. Their mothers were generally unmarried or their former marriage had ended at least 300 days before. Children resulting from adultery by a married woman were registered as legitimate, unless her husband had refused the notification and had started a complicated procedure to dispute the legitimacy of the child. The birth certificates of illegitimate children differed in important respects from those of legitimate children. The registrar was not entitled to state the name of the father, unless the father officially *recognized* the child. He could only do so when he could show a document proving that the mother consented to the recognition.

Recognition was a voluntary act on the part of a begetter of an illegitimate child, creating legal ties between him and the child. The father acknowledged his paternity, thereby admitting his obligation to provide for the child. The child received its father's last name and could from then on inherit from him, albeit only a third of what a child would have received if he had been legitimately born. Only 'natural' children could be recognized, that is, children whose parents were both unmarried. Children begotten in incestuous or adulterous relationships could never be recognized. Until 1947 children could in principle be recognized only by their biological father. Recognized children were automatically *legitimated* (that is, become equal to legitimate children) when their parents married. Often, the recognition took place just prior to the marriage celebration and was stated in the marriage certificate. The fact of recognition had to be noted in the margin of the birth certificate. Because legitimization of recognized children automatically ensued from the marriage of their parents, no specific mention of this fact needed to be made on the birth certificate. This means that the information on legitimizations is less complete than on recognitions.²

The death certificates

Deaths had to be reported to the Registrar of the municipality in which they occurred. The notification could only be done by someone who had personal knowledge of the death of the person concerned. In the nineteenth century, the declarant was generally a relative or an acquaintance of the deceased. Later on, most notifications were done by undertakers. For each deceased person, Christian names and surname, age, occupation, municipality of birth and residence, and hour and day of death were recorded. Age was generally expressed in (completed) years; however, for persons younger than two at the time of death, ages were expressed in months; for persons younger than two months, in weeks; for those younger than two weeks, in days; and for children less than two days old, in hours. Stillbirths were also recorded in the death certificates.

Place of residence was usually a detailed address, which was required by the collector of death duties. In case the deceased was married or widowed, the name of his husband or wife had to be mentioned. Until 1935, this concerned only the present or last partner of the deceased. After 1935, all former partners had to be mentioned in chronological order, without the reason of marriage dissolution. Christian names and surnames, occupation and place of residence of the parents of the deceased had to be mentioned as well. If they were deceased, only their names and the fact that they had died were noted. Before the introduction of the population register (see below), information on the parents of the deceased was often incomplete.

2. See also Kok, *Langs verboden wegen* and the chapter by Gates, Kok and Wang in this volume.

The law did not stipulate a time period within which notification had to take place. But no burial could take place without written permission from the registrar, who was not entitled to give this permission before 36 hours after the death had occurred. Because it was most convenient to deliver the permission at the time of notification, registrars were strongly advised not to register a death before the 36 hours had passed.

The marriage certificates

To comply with Dutch family law, couples that intended to marry had to provide detailed information on themselves and their relatives. This makes the marriage certificates a rich source for family historians. The law fixed minimum ages of marriage. From 1838 the minimum ages were 18 for boys and 16 for girls. Persons were only allowed one marriage at a time and they were not allowed to marry relatives in the ascending or descending line, which applied to in-laws as well as blood relatives. This means that, for instance, a man could not marry his cousin (or even second cousin) and a widow could not marry her brother-in-law, at least not without dispensation. Before 1922 one was not allowed to remarry a partner one had been divorced from. After that, only one such "marriage of reparation" was allowed.

Perhaps more important than the legal minimum age, was the required consent to the marriage, which had to be given by the parents and which was to be noted on the certificate. A distinction has to be made between persons who had come of age and those who had not. The Dutch Civil Law of 1838 stated that persons who had come of age (23 years) had to ask permission to marry until their thirtieth birthday. A refusal of (one or both of) the parents would lead to a case before the cantonal judge. If the judge approved the marriage, the wedding could take place even if the parents persisted in their refusal but not until three months after the session. Persons younger than 23 always needed their parents' consent. If both parents had died, the grandfather on the father's side would be consulted, in his absence the grandfather on the mother's side and so on. An illegitimate child needed the consent of its mother, and of its father as well if he had recognized the child.

In order to be sure that no illegal marriages were contracted, intended marriages had to be proclaimed publicly on two Sundays following the couple's giving notice of their marriage. This was done by reading aloud the proclamation in front of the town hall. The proclamations had to be made in the place(s) of residence of bride and bridegroom, even if they had lived there less than six months.

Because of these regulations, the registers contain information on numerous persons. The couple had to submit excerpts from their own birth certificates, as well as of the death certificates of deceased parents, grandparents, or previous partners. In the registers, we find the Christian names and surnames of bride

and bridegroom, their ages, occupations and places of residence. It is also specifically mentioned whether they had reached the age of majority or not. Further, the names, ages, occupations and place of residence of living parents are given or the names of already deceased parents. When both parents had died, consent to the marriage had to be given by the grandparents. For the wedding ceremony, at least four witnesses were required in the period 1811-1913. Their names, ages, occupations and places of residence were given as well as the (family) relationship between the witnesses and the bride or groom. Finally, when the marriage ended in a divorce, this had to be noted in the margin of the marriage certificate. Until the late nineteenth century, it was very difficult to get an official divorce in the Netherlands.³

By and large, the civil registers are a very accurate record of vital events in the Netherlands. Apparently, people were well aware of the troubles caused by not reporting as required. Under-registration of births was significant only in the early decades of the nineteenth century. Complying with administrative regulations was difficult for itinerant workers and immigrants. Indeed, some couples chose to live in consensual unions as a way of avoiding bureaucratic trouble, at least temporarily.⁴ Nonetheless, civil records still pose problems to the unwary researcher. For instance, the common method of estimating social mobility by comparing the occupations of grooms and their fathers is problematic because only living fathers can be identified.⁵

Almost every certificate of birth, marriage and death ever made in the Netherlands is still available, because each was made in duplicate. The original remained in the municipality and the copy was sent to the registry of the county court after the closing of the register on December 31st. The duplicates have been assembled in the provincial archives, at least for the nineteenth and early twentieth centuries. The certificates have been made accessible by alphabetical indexes on births, deaths and marriages that occurred in each municipality per ten-yearly period. Thus, family reconstitution is quite feasible, provided one is satisfied with a local study.⁶ However, in particular in the western part of the Netherlands, many municipalities were small in size, causing a great loss of persons through out-migration. Even more serious, strong out-migration diminishes the quality of the calculations of demographic rates for the sedentary population as well.⁷ Fortunately, the ongoing digitization of the indexes – stimulated by

3. Van Poppel, *Trouwen in Nederland*; Van Poppel, 'Family breakdown'.

4. Kok, "Passion, reason and human weakness".

5. Delger and Kok, "Bridegrooms and biases".

6. E.g. Noordam, *Leven in Maasland*; Hendrickx, *In order not to fall into poverty*.

7. Ruggles, "Migration, Marriage, and Mortality".

a surge of popular interest in genealogy – will allow researchers to expand the search for out-migrants enormously. We expect that within a few years all Dutch marriage certificates in the period 1811-1922 can be traced and even linked automatically using the names of the parents. Very likely, the automatic indexation of birth and death certificates will follow suit.

The civil records are an indispensable source for historical demography in the Netherlands. The Dutch contributions in this volume are either based primarily on the civil records (Engelen) or on combinations of population registers and civil records (Kok). A number of recent studies have already experimented with the automatic indexes of the marriage certificates.⁸

The population registers

The Dutch population registers are household registers in the sense that the unit is the household. They record the same vital events as the civil registers, which spares the researcher the trouble of linking certificates of birth, marriage and death. Even more important for the family historian is that people are recorded in their primary social surrounding, that is within their household or family. And last but not least, the registers record migration as well. Thus, it is in principle possible to trace persons to their subsequent domiciles and even to reconstruct their entire life course. This type of administration is rare for historic populations. Although the system has its shortcomings, it is one of the best sources for historical (micro-)demography in the world.

In Europe, historical population registers exist only in Belgium (from 1846), the Netherlands (from 1850) and Italy (from 1864). In part, this occurrence can be explained by the personal influence of the famous Belgian astronomer and statistician Adolphe Quetelet (1796-1874). In the Kingdom of the Netherlands (which comprised Belgium as well during the period 1815-1830), he laid the foundation for the ten-yearly censuses, which began in 1829. The decrees actually suggested, but did not stipulate, that the censuses would be kept up-to date by recording changes. Quetelet was also a key figure in the International Statistical Conferences. The Italian representatives to these Conferences adopted Quetelet's ideas for the administration of their newly unified state. Not accidentally, all three countries had been occupied by the French and had chosen to retain French civil laws and bureaucratic principles of a centralized state. In these countries, the relations between local and central government were organized along the same lines, allowing the population registers to perform a double function as a local bureaucratic tool and a provider of aggregate statistics. Ironically, the French themselves rejected the implementation

8. Bras and Kok, "They live in indifference together", Van Poppel, Monden and Mandemakers, Intergenerational transmission of age at marriage.

of population registers, although they were prescribed in a revolutionary decree of 1791.⁹

Quetelet was devoted to an accurate population administration because this would allow social scientists to study the propensities of the average man (*l'homme moyenne*) and, eventually, to discover the laws regulating society. In his view, recognizing and acting upon these laws was essential for good government. In the Netherlands, the system was introduced on the eve of municipal reform (1851). The registers were to provide the population data needed to calculate the franchise and the local shares of conscripted soldiers. In due course, the population registers were to become indispensable in the implementation of social policies at the *individual* level. For instance, they would be used to note disablement, pensionability, etc. The accuracy of the government's knowledge of individual citizens was increased constantly. Although this did lead some to protest that individual privacy was being violated, no one foresaw what a dangerous tool the registers could become in the hands of a totalitarian regime. During the Second World War, the occupying German forces could locate the Dutch Jews with deadly efficiency.

The administrative principles governing the population registers were changed several times. At first, the system recorded people on the basis of their *legal* place of residence. This meant to facilitate administration of poor relief, which was based on legal domicile. However, recording people who were not actually residing in a particular place soon proved impractical, and the system was dropped in 1862. After that, people were registered in the municipalities where they actually lived. The municipalities were free to choose how they organized the registers: in alphabetical order by family name or by address. The revision of 1862 also allowed for separate registers for the extremely mobile domestic servants who were overburdening the main registers. However, residential mobility created a formidable administrative burden, requiring the constant crossing-out of persons or whole families and entering them elsewhere. Already in the late nineteenth century, officials began to propose a loose-leaf system of cards for individual persons that could be ordered by families. Although this proposal was rejected, many municipalities changed their registers around 1910 into a system of loose cards for (nuclear) families. In 1939, these cards were replaced by a system of personal cards that lasted until 1994, when a fully automatic administration system was introduced.

The population registers contain a wealth of information. For each individual the registers provide the surname and Christian name(s), sex, date and place of birth, relation to the head of the household, date of entry in the register, civil status (unmarried, married, widowed or divorced) and changes therein, church

9. Randerad, "Negentiende-eeuwse bevolkingsregisters".

affiliation, occupation, date and municipality of provenance, date and destination of out-migration, place of legal residence, and, finally, date of death.¹⁰

The quality of the registers was safeguarded in various ways. First of all, the registers were crosschecked with the results of the census, which was held every ten years. Generally, the census formed the starting point of the new register. In quite a few instances, we find persons deleted because they were no longer present at the census date or entered because they had apparently immigrated without registering. In the period between the censuses, the local authorities were responsible for the upkeep of the registers. In Amsterdam, for instance, this job was consigned initially to 263 unpaid wardens who kept registers for their own neighbourhoods. However, already in 1855 the wardens were replaced by paid officials. After that, full-time clerks and inspectors were responsible for the Amsterdam administration.¹¹ In the countryside, checking and correcting the registers was often assigned to the constables. Registering a residential move was obligatory and neglect could be fined. However, a legal basis for the system was not provided until 1887 and people often shirked reporting their new place of residence. In particular, heads of households neglected to report the coming or going of their servants. Since the servants did not pay taxes, the officials were not very diligent in rectifying these omissions that were often only noticed at the time of the census. Thus, estimates based on the registers tend to underestimate the mobility of working adolescents. Also, their information on occupations is of limited use, because changes in occupation were not (systematically) recorded. Generally, vital events were as accurate in the population registers as they were in the civil registers. However, in some areas this was not the case. Particularly in the northern provinces births were added only when the family was entered on a new page. Using the registers for family reconstitution would result in an underestimation of both infant mortality and fertility. Finally, researchers have to be aware of the changes in the administrative units. Until 1862, entire households were recorded, including servants. The household – without the servants – remained the administrative unit until 1910, when it shifted to (nuclear) families. Often, this was strictly limited to married couples and their children. In the city of Rotterdam, for instance, co-residing relatives were moved to their own cards. In fact, even unwed mothers and their children were not considered a family and thus recorded on separate cards. Reconstituting households is feasible, but very time-consuming.¹²

Notwithstanding these biases and problems, the population registers have been used extensively for family and migration history.¹³ They are kept in the

10. Knotter and Meijer, *Gemeentelijke bevolkingsregisters 1850-1920*.

11. Meijer, "De negentiende-eeuwse 'papieren mensch'", 383.

12. See Gordon, *The bevolkingsregisters*.

municipal archives and are freely accessible before 1940. In addition, for persons deceased between 1939 and 1994, the personal cards can be retrieved from the Central Bureau of Genealogy, albeit without information that might infringe on privacy. Currently, the popularity of the registers is even increasing, due to advances in computer technology. On the one hand, local archives are improving the accessibility of their population registers by publishing indexes on the web and by scanning or even digitizing the entire registers. On the other hand, researchers are avidly exploring new opportunities, for instance by creating public-use sets of historical micro-data. The most important initiative in this respect is the Historical Sample of the Netherlands. This database, under construction since 1992, will contain the complete life courses of about 40.000 randomly picked individuals. These individuals are traced from birth to death in all their subsequent households across the country.¹⁴ Several Dutch contributions to this volume make use of the first completed parts of the Historical Sample.

The censuses

The goals of the ten-yearly censuses were to check the information in the population registers and to collect statistical information on the size and composition of the population. Soon, they were combined with other censuses, on respectively occupations (from 1849 onward) and housing (from 1899 onwards). Although the original census forms were not preserved, most of the information on individuals and families can be found in the population registers.

The population censuses were primarily concerned with the demographic structure of municipalities and provinces. That is, for (subdivisions of) municipalities, we find numbers of persons by sex, civil status and age. We also find a division between households and single persons. Thus, we can calculate the average size of households. The definition of household was based on the (economic) criterion of house keeping unit. This means that the censuses were less fixated than the population registers on kin or marital relations.¹⁵ From 1849 onwards, persons living in institutions such as convents or prison were counted separately. Thus, in the censuses around 1900 we find the following categories: heads of households, spouses, children, other relatives, employed persons, other households members (boarders, lodgers), single living persons and persons in institutions. The censuses also recorded and tabulated place of birth and nationality, as well as religious affiliation.

In a number of censuses, additional information was requested that,

13. E.g. De Vries, *Landbouw en bevolking*; Janssens, *Family and social change*; Kok, "Choices and constraints";

14. Mandemakers, "Historical Sample of the Netherlands", see also <http://www.iisg.nl/~hsn/> and <http://www.lifecoursesincontext.nl/>.

15. Van Maarsseveen, "Volkstellingen 1795-1971", 34.

unfortunately, can no longer be traced to the individuals involved. This includes questions regarding physical handicaps (blindness, deaf-muteness, clubfeet), level of education, and marital fertility. The latter implied that married women were asked when they had married, how many children had been born in the existing marriage, and how many children under six years had died. This information has been used in a number of demographic studies, as well as in the contribution of Engelen to this volume.¹⁶

Even for historical demographers primarily interested in micro-data, the censuses contain indispensable information. They are needed to place individuals and families in their proper contexts. On the basis of the census, one can answer questions such as: what is the population size and density of a particular locality, what proportion of the population is native to the locality, what is the dominant religion, what is the sex ratio of the unmarried etc. By using subsequent censuses, long-term trends can be determined as well. The occupational census provide important information on the labour market of a given locality or region.

Currently, scientific access to the data contained in the censuses is very good. A public-use database with a selection of census data (such as church affiliations per municipality per census-year) is available.¹⁷ Also, all censuses are being digitized, which means that the original tables can be downloaded in a format that allows the researcher to perform his combinations and calculations.¹⁸

16. Van Poppel, Differential fertility; Van Poppel, "Late fertility decline"; Engelen en Hillebrand, "Fertility and class".

17. Beekink et al, *Nederland in verandering*.

18. See the website <http://www.volkstelling.nl/nl/>.

**Two ethnographies
of reproduction**

Hill Gates &

Marloes Schoonheim

The problem: Antinatalist attitudes among pronatalist people

In the 1960s, sudden and unexpected drops in fertility occurred in both the southern part of the Netherlands and Taiwan: in the Dutch province of Limburg, from 217 births per 1000 women in the 1951-55 marriage cohort to 95 in 1971-75; in Taiwan, from 211 births per 1000 women in 1951 to 99 by 1976.¹ In the Netherlands, Catholics living in Limburg and Noord-Brabant lagged several decades behind other confessional groups in this important aspect of demographic modernization. In Taiwan, the fertility decline was relatively uniform across population sectors. In neither group were people pushed by systematic, state-mandated birth control programs such as the one that continental Chinese were beginning to experience. In both, powerful local ideologies and institutions were strongly pronatalist, and families appeared to accept and internalize pronatalist goals. How, then, could the transitions in the Netherlands and Taiwan come about so rapidly?

In both societies, this socially-welcomed fertility decline has been thoroughly documented and analyzed.² Scholars have suggested many causes ranging from changes in labor force participation to urbanization to the greater accessibility of reliable contraception to (in the Netherlands) secularization and individualization of decisions concerning birth control. These and other factors marked a global loosening of social controls that was dramatically visible in the political turbulence that gripped Europe, East and Southeast Asia, Latin America, and North America. Perhaps, then, we need no further explanation for the remarkable changes in fertility that occurred in Taiwan and among Dutch Catholics. Yet this global *zeitgeist* left other regions untouched: the Islamic world, India, and Africa. There, fertility declines began much later. Some peoples were ready for revolution and some were not. In this paper, we probe the period just prior to the Dutch and Taiwanese transitions to look for evidence that women, and occasionally their husbands, may have been less single-mindedly pronatalist than is generally supposed.

For both societies, antinatalist attitudes, customs, and secondary values have been found in interviews with people who lived through their countries' respective fertility transitions. They indicate the presence in the pre-transition period of a strong unmet desire to reduce fertility and considerable unobtrusive cultural support for such antinatalism in each case. Women especially were eager to reduce the burden of bearing and caring for large families of children. This evidence has the weakness of oral history, a necessarily retrospective description of changed conditions, but it has the benefit of hindsight, the oppor-

1. Hofstee, *Korte demografische geschiedenis van Nederland*; Republic of China, Ministry of Interior, *Taiwan Demographic Quarterly*, various years.

2. Freedman and Takeshita, *Family Planning in Taiwan*; Sun, *An Overall View of Fertility Control Policies*.

tunity to reassess and foreground experiences that were once culturally unacceptable. It also gains strength from our effort to look both at factors that were apparent to the participants and to background variables that they might have perceived only dimly, if at all.

We also recognize that similar drops in fertility in Taiwan and the Netherlands can have been stimulated by different forces. John and Pat Caldwell offer an example of such a contrast in intention in contexts where both indigenous African and Islamic influences shape fertility behavior.³ African religion focuses on the reproduction of the lineage, with living descendants ensuring the survival of ancestral spirits and the persistence of the lineage. High fertility is both virtuous and spiritually sanctioned, with intentional birth control viewed as malicious and childlessness as a punishment from vengeful ancestors. Moral disapproval of low fertility is heightened by pragmatic concern for disruption of the intergenerational wealth flows that typify sub-Saharan African societies.

By contrast, the pronatalist influence of Islam is indirect. Theological objections to birth control are absent, yet belief supports a strong code of ethics, morality, and behavior subordinating women to men. Fertility is stimulated because women are married early and discouraged from higher education and employment. Women necessarily favor high fertility because the sons they bear are their best insurance against poverty in the case of divorce or abandonment. Religious motivations affecting African demography are inextricably intertwined with social, economic, and cultural factors. Regions in which traditional beliefs are strong and areas where most Africans are Muslim both have high fertility.⁴ In each region, however, its religious and cultural motivations differ greatly.

The dramatic differences between early 20th century Dutch and Taiwanese culture and society will be readily visible in this analysis. But so will some perhaps unanticipated similarities. Some of the latter derive from the effects in each society of their passage through comparable political-economic transitions. In both, many families were moving from traditional but highly commercialized agriculture to industrialization that, in world terms, came late. Economic historians have documented the unusual slowness of the Dutch to turn to industry when compared to such neighbors as the English and the Belgians.⁵ We might also consider Dutch and Taiwanese culture from a longer perspective, one in which both had been formed from several centuries of state-building and historically extraordinarily deep market penetration brought about by early commoditization.⁶

3. Caldwell and Caldwell, "The cultural context of high fertility in sub-Saharan Africa".

4. Jones, *Population Geography*, 144-149.

5. Van Zanden and Van Riel, *The Strictures of Inheritance*.

6. De Vries and Van der Woude, *The First Modern Economy*; Hill Gates, *China's Motor*.

After sketching the fertility transition in Taiwan and among Dutch Catholics, we explore three areas of experience where antinatalist attitudes may have been especially salient: courtship patterns that conduce to a comfortable and open sexual relationship between the couple; availability and use of preventive methods of family limitation; and authoritative pronatalist influences coming from outside the couple relationship. The most striking differences between the two societies are those created by religious and customary worldviews. Christian denominations, and particularly Catholicism, formulated, propagated, and sanctioned pronatalist reproductive belief and behavior in the Netherlands. Taiwanese popular religion was syncretic, mutable, lacking in authoritative headship, and thus not a barrier to the adoption of antinatalism. As will be seen below, Taiwan couples were culturally preadapted to shift smoothly from a quantity-of-children to a quality-of-children approach. From comparison of the similarities and differences that lie behind the sudden drop in fertility in our two societies, we hope to prompt more attention to uncovering submerged and repressed antinatalist attitudes and practices in ostensibly strongly pronatalist societies.

The fertility decline among Taiwanese and Dutch Catholics

In Taiwan, fertility remained high from the late imperial through the early Japanese period, and during the first decades of Guomindang rule. In 1963, 38 percent of wives 35 to 39 years old had borne more living children than they had wanted, with only 24 percent having fewer.⁷ Between 1959 and 1962, pilot projects to make birth control more acceptable and accessible were initiated, extended island-wide in 1964. Across the occupational spectrum, the 1960s saw Taiwan couples beginning to limit the size of their families. In 1952 the crude birth rate was 46.62. By 1972, it was 24.15.⁸

An effective method of conveying social approbation of and assistance in family limitation was built by the Kuomintang government on the network of local health stations put in place by the Japanese. The registration of a new baby triggered a visit from a public health nurse who brought information about birth prevention and spacing to the mother at a psychologically powerful moment when the child made its social debut, 30 days after the birth. The visitor came directly to the mothers, bypassing mothers-in-law who might be unwilling to see contraception implemented. Women who had already borne four children were encouraged to consider sterilization for themselves or their husbands. Billboards advertising the benefits to couples (especially wives) and children were ubiquitous. Propaganda in many forms underlined the equal worth of daughters and sons. Household

7. Freedman, *Family Planning*, 44, 47 (Table II-7), 89 (Table IV-19).

8. *Taiwan Demographic Fact Book*.

heads were bombarded with birth control literature. These official efforts were effective, but not because they were heavy-handed or integrated with economic life, as China's program was to be. Families retained control over childbearing decisions, and women's agency may have been slightly strengthened.

As among Taiwanese, during the late 19th and early 20th centuries, fertility was high among Dutch Catholics and then fell with unusual rapidity. After 1850, the Dutch birth rate first increased from 35.2‰ in 1851 to 37.3‰ in 1876. After that year, the birth rate experienced a steady decline. At 33.1‰ in 1890, the birth rate dropped to under 30‰ after 1900 and 20‰ after 1938. Only the end of the Second World War interrupted the decline with a rise in fertility. The birth rate leveled out at under 20‰ in the late 1960's and 70's. Although the Netherlands joined in with the European fertility decline, the Dutch birth rate decreased later and slower than those of other European countries during the late 19th and early 20th centuries.

The retardation in Dutch fertility decline was mainly caused by the southern part of the Netherlands. In the northern and western provinces, fertility started to decline some decades before the decline reached the southern provinces Noord-Brabant and Limburg. These provinces were predominantly Catholic: in 1930, 95% of the Limburg population and 87% of the Noord-Brabant inhabitants were Catholic. In the nine other Dutch provinces at the time, the majority were members of the Protestant Dutch Reformed Church or other Protestant denominations and inhabitants with no religious denomination.⁹

While in these predominantly Protestant provinces marital fertility passed its zenith in the last decades of the nineteenth century, fertility started to decline in the two Catholic provinces only after 1900.¹⁰ The birth rate per 1000 women (aged 15-45) married between 1901 and 1905 was more than 30% higher in Limburg and Noord-Brabant than in the other Dutch provinces. For the marriage cohort 1931-35, when Noord-Brabant and Limburg counted 256 births per 1000 women against an average of 159 in the other Dutch provinces, the difference had increased to more than 61%. After 1960, however, Catholic birth rates suddenly tumbled below those of Protestants. By the mid 1970s, Catholic Limburg had the lowest birth rates of the whole country. Between 1971 and 1975, married Limburg women had only 95 births per 1000—19% less than in the Protestant west and north.

Considerable research has shown how religion influenced Catholic demographic behavior.¹¹ The pronatalist Catholic Church not only restricted birth con-

9. Historische Databank Nederlandse Gemeenten (HDNG), database on cd-rom included with Beekink, Boonstra, Engelen and Knippenburg (eds), *Nederland in verandering*.

10. Boonstra and Van der Woude, "Demographic transition in the Netherlands".

11. Schoonheim, *Mixing Ovaries and Rosaries*.

trol and banned effective means of limiting family size. It also preached about the purpose of sexuality and marriage and about the division of tasks between man and woman. Nevertheless, Catholic women harbored antinatalist thoughts and wishes that helped them to legitimate changing their fertility even before the 1960s. In a body of interviews to be explored below, we see evidence that Dutch women's attitudes toward unrestricted fertility were in fact mixed: as among the Taiwanese, private uncertainty preceded public action.

Infanticide, abortion, and contraception

At the start of the demographic transition when fertility was still high, children still served a useful economic purpose in both the Netherlands and Taiwan. By 1870, roughly 10% of Dutch industrial employees were 13 years or younger; in agriculture, these rates were much higher. In the last decades of the 19th and 20th centuries, child labor was checked and finally prohibited in the Netherlands. When a first effort to forbid child labor was made in 1874, opposition, mainly by sectarian politicians, curtailed employment only of children younger than twelve. The Labor Law of 1889 restricted the labor of children between 12 and 16 and imposed its observance. In 1901 the law on compulsory school attendance was passed and the fight against child labor was completed with the Labor Law of 1919. Parallel efforts were effective in Taiwan only by the 1960s.

With these governmental regulations, the economic benefit of children decreased rapidly. In fact, compulsory education made children expensive and encouraged family limitation. But in spite of motivations for birth control, means to limit the number of children were few. Antinatalist tendencies among Dutch Catholics as well as among Taiwanese can be inferred only if infanticide and/or usable methods of abortion and/or contraception were part of the cultural repertory. While infanticide is technically possible in any population, safe, effective abortion and contraception other than abstinence from intercourse are much harder to achieve. What role did they play in fertility management in the Netherlands and Taiwan?

a. Infanticide

James Lee and his colleagues have recently argued that late imperial Chinese society was uniquely successful in limiting births by cultural means. Among other things, Lee et al. claim that infanticide was common.¹² We doubt this. For continental China, the evidence for infanticide is largely anecdotal, sharply regional, or inferred from unbalanced sex ratios. Such evidence is inconclusive for a variety of reasons. Parts of China attracted disproportionate numbers of male migrants who labored in brine wells, coalmines, or as porters and boat-pullers

12. Lee and Campbell, *Fate and Fortune in Rural China*; Lee and Wang, *One Quarter of Humanity*.

along major transport routes. Cities in Taiwan, and perhaps on the continent, drew disproportionate numbers of young women as servants, sex workers, and in handicraft.¹³ Apparent unbalanced sex ratios cannot be proven real without factoring in gender-differentiated flows of labor and the cultural bias that made for under-recording of girl children.

In Taiwan, if infanticide occurred, it would surely have been sex-specific, favoring males. Some evidence supports this. The sex ratios at birth of children born to (officially registered) concubines are higher than those of children born to wives: in 1930, the ratio of wives' boys to girls was 105, while sons of concubines outnumbered daughters 112 to 100. Concubinage, though culturally salient, was statistically infrequent, however, and the contribution of such deaths to population figures is insignificant.¹⁴ Illegitimacy was common, and illegitimate children might have been at risk of infanticide at least in urban places.¹⁵ The sex ratio of *all* Taiwan illegitimate children was normal, however.¹⁶ Taiwanese daughters had only a slightly higher mortality rate than Taiwanese sons, with one significant exception. Adopted girls died by age five at almost twice the rate as biological daughters.¹⁷ The effects of son preference were visible mainly among adopted girls who through adoption had already lost the protections normatively due to daughters: to be reared at home, married at puberty, and provided with sufficient dowry to assure her of dignity in her husband's home. In north Taiwan, where adoption of girls was so very prevalent, the neglect of some little girls did alter sex ratios in a way not seen in the central and south regions. This cannot be "infanticide," because adopting families had made positive efforts to acquire these girls.

High rates of illegitimacy among Dutch stillbirths suggest that infanticide did take place there. Low throughout the 17th and 18th centuries, by 1900 Dutch rates of illegitimacy (extra- and premarital pregnancies) were among the lowest in western Europe and continued to be so until the 1960s.¹⁸ Illegitimacy being extremely rare in the Netherlands during our period, infanticide of legitimate children was even more so and had no statistical influence on Dutch family size.

b. Abortion

The effectiveness of pre-scientific methods of family limitation has been the subject of considerable debate. It is an ethnographic truism that pre-industrial

13. Wolf and Gates, "Marriage in Taipei City: Reasons for Rethinking Chinese Demography".

14. See also Katz and Chiu, this volume; Barrett, "Short-term Trends in Bastardy in Taiwan".

15. Kok, "The Moral Nation: Illegitimacy and Bridal Pregnancy in the Netherlands from 1600 to the Present"; Gates, Kok and Wang, this volume; Gates and Hsieh, *Willful Women: Taipei Single Mothers and their Children*.

16. Barrett, "Short-term Trends in Bastardy in Taiwan", 301-302.

17. Wolf, *Sexual Attraction and Childhood Association*, 305.

18. Kok, *Langs verboden wegen*.

forms of abortion were usually either ineffective or killed the woman as often as the fetus. A well-documented exception to this rule, ironically, was found among Taiwan's Aboriginal people during the period of Dutch rule in the south, prior to extensive contact with Chinese.¹⁹

Of course, abortion may have been attempted in desperate cases in both Taiwan and the Netherlands. Non-biomedical abortion was the subject of considerable folklore in northwestern Europe. Drinking a pint of gin in a hot bath, or jumping from a rooftop were probably more discussed than implemented, and almost certainly ineffective. Surgical abortion was illegal in the Netherlands, but did occur frequently, especially in large cities. In the first decades of the 20th century, about 10% of miscarriages in hospitals were ascribed to criminal abortion, about half performed on unwed mothers. Though evidence on abortion rates prior to its legalization is scarce and unreliable, there is no cause to believe that the Dutch numbers were higher than anywhere else in Europe.²⁰ During the second half of the twentieth century, however, Dutch abortion levels were strikingly low: about 110 abortions per thousand live births per year, half the European average.²¹ Distinctively, since 1971 when legal abortions were first available, Dutch women aborted much earlier during their pregnancy than women abroad.²² Differing 19th century levels of illegitimacy in Catholic and Protestant provinces also suggest that abortion was more rare among Catholics.²³ Since abortion was both costly and risky, it was not available to most unwed mothers or to poor married women anyway.²⁴

Contra Lee et al., indigenous abortion seems unlikely to have played a role in limiting family size in the Chinese world, including 19th century Taiwan. Chinese gynecological knowledge passed down orally and in writing was especially strong on the use of emmenagogues – medicines to induce menstruation in women whose menses were delayed or irregular.²⁵ Early 20th century Chinese women are known to have suffered disproportionately from very early menopause – in their 30s – a condition that might have been treated the same way.²⁶ Some scholars have argued that emmenagogues could induce

19. Shepherd, *Marriage and Mandatory Abortion*; Harris and Ross, *Death, Sex, and Fertility*.

20. De Bruijn, *Geschiedenis van de abortus in Nederland*, 57-58.

21. Coleman and Garssen, "The Netherlands: Paradigm or Exception in Western Europe's Demography?", 442.

22. Ketting, *Van misdrijf tot hulpverlening*, 179-180.

23. Kok, *Langs verboden wegen*, 136.

24. De Bruijn, *Geschiedenis van de abortus in Nederland*, 101.

25. Furth, *A Flourishing Yin*.

26. Wolf, "Is There Evidence of Birth Control in Late Imperial China?"

27. Lee and Campbell, *Fate and Fortune* (1997); Lee and Wang *One Quarter of Humanity* (1999); Bray, *Technology and Gender*.

abortion as well,²⁷ but no empirical evidence has been adduced for this claim. That Chinese farm wives regularly purchased sophisticated herbal medicines from elite practitioners seems unlikely. Effective abortifacients may have existed, known to specialists and used by wealthy women and prostitutes. If so, they have been forgotten. Anthropological fieldwork has turned up no evidence for indigenous methods that actually produced abortions in Taiwan or elsewhere in the Chinese world. In the late 1950s as part of a movement to make full use of local medicines, Chinese officials experimented with folk abortifacients. None seemed to work, although research did uncover the anti-spermatogenic properties of cottonseed oil, commonly used for cooking, of which local people were quite unaware.²⁸ Prior to the advent of surgical methods, abortion seems unlikely to have played any role in limiting family size in the traditional Chinese sphere.

Surgical abortion was illegal in Taiwan once reasonable standards of legality were established under Japanese rule in 1895. The Japanese presence, however, brought increased abortion, often provided discreetly (although without anesthesia) in small, family-run clinics of a doctor/husband and nurse/wife. It remained illegal and therefore undocumented, but widely accessible until its legalization in 1985 – only a year after the law on the termination of pregnancies had been effected in Netherlands.

c. Contraception

Though variety in birth control methods expanded in the Netherlands after the Second World War, Catholics initially respected their Church's ban on most of these and renounced barrier methods like condoms and diaphragms. Though strictly forbidden by the Catholic Church as an 'unnatural' method of birth control, many of its Dutch members practiced withdrawal. Periodical abstinence was also widespread among Catholic couples, who often practiced it without the required permission of their priest.²⁹ A survey amongst 500 newlywed Catholic couples in the western mining district of southern Limburg showed that more than half of the respondents had practiced periodical abstinence.³⁰

In 1965 the Dutch magazine *Margriet* questioned its readers on love and marriage and showed that differences in appreciation for certain contraceptives were still apparent between denominations. Though the majority of the Catholic readers (65%) considered the pill acceptable, only 52% thought so about the condom. Both proportions were much higher among Protestants. Moreover, Catholic readers of the magazine still mostly used periodical absten-

28. Wolf, "Is There Evidence of Birth Control in Late Imperial China?"

29. Schoonheim, *Mixing Ovaries and Rosaries*, 188.

30. Timmermans, *Huwelijksbeleving van katholieke jonggehuwden*.

tion (44%) and withdrawal (41%); among liberal Protestants these percentages were 37% and 69%.³¹

In 1961, interviews with 400 married women living in the province of Utrecht in the centre of the Netherlands confirmed the results of the *Margriet* survey.³² Periodical abstinence appeared the most widely used form of birth control among Catholics (51%) compared to orthodox Protestants (44%) and liberal Protestants (24%). Withdrawal however was more common among orthodox Protestants (41%) than among Catholics and liberal Protestants (21% and 27% respectively). Condoms were used by almost half of the liberal Protestants (48%) and less by orthodox Protestants and Catholics (35% each). The pill was used by slightly over a third of the Catholics and orthodox Protestants and by 42% of the liberal Protestants. Respondents without a religious denomination mostly used the condom and the pill (44% and 43% respectively).³³ These surveys indicate that only a small part of the fertility decline in the period under consideration may have been caused by the spread of barrier methods of birth prevention; instead, the practice of withdrawal and periodical abstinence were significant.

Contraception in Taiwan, like infanticide and abortion, should be viewed in relation to the debate over the significance of deliberate family planning in traditional Chinese contexts. Lee et al. have argued that couples both wanted to and could limit the number of their children through traditional means. The most important of these was sexual abstinence. Marital restraint was a well-known cultural norm, particularly among the educated, and widely known texts, including almanacs proscribed sex on more than half of the days of the year.³⁴ Marital abstinence was supported by indigenous medical beliefs about male health; too many ejaculations led to physical weakness and general degeneration, indeed, precisely to the loss of virility. Sexual effort was to be carefully paced in order to *ensure* continued fertility. We question the effectiveness of this norm. It may have persuaded middle-aged parents, eager to maintain their own health and longevity. It seems less likely to have influenced young husbands and wives who encountered one another primarily in the highly sexualized marital bed. Among women with whom Gates has discussed this topic, the consensus holds that only two folk methods of contraception are effective. In younger couples, a reluctant wife brings a child to bed to deter her husband's advances; among couples that already have all the children they want, a permanent separate sleeping arrangement is the best choice. The implication is clear that marital restraint is difficult and unreliable. Even con-

31. Dupuis, *Sex in Nederland*.

32. Heeren and Moors, *Gezinnen in groei*.

33. *Ibid.*, 82.

34. Eberhard, *Guilt and Sin in Traditional China*, 76-80.

siderable restraint, when unguided by accurate knowledge of female reproduction, can lead to regular pregnancies.

We agree with Lee and his colleagues that traditional Chinese, and by implication, Taiwanese culture had antinatalist elements in place. Controlling family size by infanticide, abortion, and folk contraception, however, was probably no more effective in the 17th and subsequent centuries than it was in the late 19th and early 20th. Ultimately, although an antinatalist attitude may have been culturally present among both Dutch Catholics and Taiwanese, unless effective birth limitation mechanisms existed, we cannot infer its operation in either population.

d. Courtship

The generalities of the northwestern European marriage regime were displayed particularly well in the Netherlands during our period. Its characteristics were: spending six or seven years after puberty in wage labor, marriage in the late 20s, rates of celibacy of 15 to 20 %, and frequent, rapid childbearing after marriage. This schedule affected the sexual experience of both sexes, creating customs and institutions that were unknown in any other pre-industrial agrarian society.³⁵ Notably, unchaperoned premarital pairing for dancing, games, and limited sexual play were valued and socially accepted. Premarital pregnancy was viewed less positively, especially among Catholics, whose religion allowed sexual intercourse only within marriage.

During the most sexually vigorous years of young adulthood, Dutch boys and girls enjoyed mixed-sex sociability, even considerable couple privacy, and engagement to marry gave them yet more behavioral latitude. The rate of bridal pregnancy was substantial.³⁶ Ideally, the girl came to her marriage still virgin after several, perhaps many years of limited but still clearly sexual experience. Though abstinence by the unmarried must have been difficult, particularly during the long engagements, the social abhorrence of pregnant brides and unmarried mothers kept many from sexual intercourse before marriage. In 1986, interviews held with 65 Catholic women from around the Limburg town of Roermond showed how the Catholic milieu still regarded it as thoroughly shameful in the 1950s – particularly for women, who were expected to be “chaste”. After having become pregnant before her marriage, one respondent recalled:

“I was married in a different village, because of the disgrace. The pastor wanted to marry me in his own parish [but only at] 6 o’clock in the morning, but my father did not want that. That’s how it went those days. The girl was blamed and the boy was innocent... If I had killed somebody, it would not have been worse... You thought you

35. Engelen and Wolf (eds), *Marriage and the Family in Eurasia*.

36. See also Gates, Kok and Wang, this volume.

were the worst person in the world... It was as if our family fell back a step on the social ladder. A nun told my mother: "throw her out on the streets with nothing, as you make your bed, so must you lie on it" and the pastor called me a street girl."³⁷

Frustrated orgasm might have caused considerable distress during an engagement. On the other hand, a period of happy courtship with a future marital partner may have accustomed each to the other in other forms of communication than sexually. At marriage, Dutch brides and grooms knew one other reasonably well.

The contrast with Taiwan could hardly be sharper. Taiwanese parents not only idealized virginity at marriage, most ensured it by keeping close watch on growing daughters and marrying them as promptly as possible after puberty. A future bride usually did not meet her groom before marriage (even at an engagement ceremony held by the parents); dating was unthinkable. The right to control the marriages of their children was a foundational aspect of the state-mandated Chinese kinship system. Parents did not take risks with this right. The premarital courtship that was "traditional" in northwest Europe became a daring innovation in Taiwan only late in our period. Vulnerable to passion as any other people as traditional arts and ethnographic research attest, courtship sometimes bloomed within arranged marriages and in the glamorous world of high-status sex workers, but its power was not left in the hands of the young.³⁸

External pronatalist pressures: Dutch Catholic women and their priests

In the Netherlands, religious belief was a powerful social force until the end of the twentieth century. Whether multid denominational Protestant or unified Catholic, each church represented an entire institution, engaged in politics, economy, and society. Formally, the Dutch Reformed Church remained the state religion to which until recently members of the Royal Family must belong. Churches, especially the Catholic Church, for centuries derived vast economic power from possessions in land, buildings and other material wealth. The ideologies of Christian denominations as well as secular ideologies such as socialism vertically stratified – "pillarized" – Dutch society until long after the Second World War. As most towns were built around the church as a concrete edifice, so was a large part of the Dutch social, economic, cultural and political life structured around religious belief.

Protestant and Catholic theology differ considerably, finally resulting in divergent attitudes towards family planning. Both denominations acknowledge

37. Lentz, *Vrouwen uit Roermond en omgeving*, 47.

38. Wolf, "Women, Widowhood, and Fertility in Pre-Modern China"; Jankowiak, "Romantic Passion in the People's Republic of China".

that God knows and sees all and can punish sins with damnation in the afterlife. As their churches have no authorities who can arrange for the absolution of sin, Protestants have only God's judgment to fear. A sinning Catholic on the other hand can confess to a priest who has the authority to give absolution. While Protestants believe in a more individual, unmediated relationship with the deity, Catholics expected that their communication with God runs via the church and its representatives. Both have spiritual authorities on earth to fear, but the actions of Protestants, including decisions regarding family planning, are a matter of individual conscience. If a couple lacks financial resources to provide for another child, or one of the spouses is physically or mentally unable to care for a child, they are allowed to use contraceptives. In some cases even abortion is an acceptable means to family planning. Moreover, in allowing contraceptives Protestantism leaves room for purposes of sex other than procreation.

In 1987, the journalist Marga Kerklaan published a book on the female experience of Catholic marital life, entitled *Thus women were just supposed to be child-bearing beings*. Her material came from 300 letters written by Catholic women in response to her radio and TV guide request for accounts of Catholic life. The eldest respondent was 91; the youngest 50, which meant that they were born between 1894 and 1934. The majority had attended only elementary schools. While not fully representative of their denomination, they provide an intimate glimpse into devout, conscious Catholic families that wanted to experience their marriage according to directives from the church. "Men made the decisions about their duties and that's why they [the respondents] were eager to write down their experiences and particularly their emotions," Kerklaan observes in her introduction to her book, "resulting in long letters up to sixteen pages."³⁹

Kerklaan's respondents were all raised 'with with the sixth and ninth commandments', referring to the prohibitions learned as children on practicing and even desiring forbidden sexual acts. Priests, aware of the temptations of married life, drew out the exact duties of husband and wife, leaving no room for sinful interpretations. They provided premarital instruction and marriage manuals that included mandatory guidance of great specificity.

"Shortly before our marriage we received 'marital education' [on sex] from the pastor of our parish, both of us separately. The pastor read something, very fast, from a small book. After doing so he handed me a small blue book that I had to read and had to observe (...). The most important points were:

- a. No male semen was allowed to be wasted;
- b. During ejaculation the woman had to lie on her back;

39. Kerklaan (ed), *Zodoende was de vrouw maar een mens om kinderen te krijgen*, 7.

40. *Ibid.*, 66.

c. For women only three K's existed, being: Kids, Kitchen and Cellar [*Kelder* in Dutch, ms] (probably food provision, primarily preservation)."⁴⁰

Sins existed in various kinds: venal sins, which do not prevent going to heaven, and mortal sins, among which was the practice of prohibited means of birth control. Abortion was absolutely forbidden in the belief that all human life was intrinsically holy. The regulation that no semen was to be wasted on non-coital activities resulted in the prohibition of all barrier methods and of withdrawal.

Whether or not a married couple was obedient to such instruction was easily checked. Confessing meant telling a priest about all sins, even the most private ones. "When you went to confession", a respondent recalled, "now I still don't understand that we put up with what we were told, you often had to tell that pastor exactly how you did it in bed."⁴¹ A priest could punish an engaged couple's sinful behavior or even intentions by refusing to marry them or by marrying them in an inferior and shameful ceremony:

"I got married in 1936, we knew each other for three years. (...) Three weeks before the marriage, it was announced in church from the pulpit. In such cases it rang: "Entering into a Christian [underlining by respondent] marriage are announced... (and then the name of the man and woman). That happened for three Sundays, and on the fourth the marriage was performed. But woe betide you if you were pregnant before you got married. Than you were proclaimed softly, [you were announced] to enter into a marriage instead of a Christian one. And not in front of the big altar, oh no, in front of the small altar. Nor [did you get] a Mass with songs or organ music, no, everyone had to see and hear how inferior the bridal couple was."⁴²

Once she was married, a woman should be prepared for motherhood at any time: "We had to pledge on the Bible to have as many children as God wanted to give us."⁴³ Nurse-nuns making post-partum visits stressed a wife's duty always to be sexually available to her husband, and priests checked up on households where children were not born at appropriate intervals.⁴⁴

In this worldview, "holy matrimony" was the only mode of cohabitation in which procreation is permitted and the only function of the physical act of love is to reproduce. Any sinning against this standard should be confessed, and will be punished. Small wonder, then, that Catholic women conformed to the doctrines of their church that required them remain virgin until marriage, not to oppose a

41. *Ibid.*

42. *Ibid.*, 65.

43. *Ibid.*, 68.

44. *Ibid.*, 33, 78.

husband's wish for sexual intercourse at any time, to regard sex only as a means of procreation and not for intimacy or passion, not to use any contraceptive method, and to bear as many children as this lifestyle would give them. The fact remains, however, that from 1900 onwards fertility among Catholic women declined to drop suddenly in the 1960s. How do the Kerklaan letters voice anti-natalist tendencies reflecting the decline in Catholic birth rates?

Antinatalist tendencies in Dutch Catholic women

As many of the Kerklaan letters show, Catholic women and couples clearly struggled to reconcile religiously and personally motivated desire for children with an often urgent desire to limit their numbers.

“My mother had six children, absolutely not because she wanted to but because she was supposed to. I have five children and that was an absolute obligation too. Having a baby in every two years. (...) No, these strict morals did not chase me out of the church, but still I found it very difficult.”⁴⁵

In spite of the pronatalist pressure of the Catholic Church and the various means it had to impose rules of behavior on believers, women managed to elude the laws of their religion and limit their fertility. Sometimes doctors wanted to cooperate by offering information about periodical abstinence or even offering a prohibited contraceptive:

“During my marriage we lived with the parents of my husband. With two unmarried sisters. (...) We were fighting huge financial problems. (...) When there were three children, I asked the doctor for advice. He referred me to the pastor. “You are such a brave woman, I hear that from all sides, you can easily have a few more”. After the fifth child (we then had a very young doctor), he gave me one of the first ‘pills’. He understood our situation, also because I visited him with the others with symptoms that resulted from the stress of the cohabitation of two generations and the business.”⁴⁶

If a doctor refused to help practising birth control, Catholics had no choice but to turn to their priest and ask for permission to practise family planning. Members of the clergy, however, differed in their attitudes towards family planning and many respondents indicated to have looked for a liberal “father confessor”:

“Taking a different doctor back then was not very easy, but you could always choose a different father confessor. That was a blessing in disguise: you were not obliged to con-

45. *Ibid.*, 71.

46. *Ibid.*, 104.

fess at your own parish and you could look for someone who shared your ideas for as long as you wanted. But you had to be somewhat adventurous and in a village it was a little bit harder than in a city, where more parishes were situated.”⁴⁷

Though many Catholics adopted a middle course between their Church’s regulations concerning fertility behavior and their own wish to limit their family size, a few of the Kerklaan respondents seemed not to have cared about the opinion of the Catholic Church. Like Protestants, they considered their decision to practise family planning to be a matter of their own conscience and a matter between their God and them. “Oh no, we committed very many sins,” one respondent wrote, “but we didn’t need an intermediary for that, we could take care of that ourselves, with Our Lord.”⁴⁸

Of course, the realization of family planning depended on the cooperation of a husband. For some respondents, their “chaste” engagement offered the possibility to discuss ideas about family size:

“My husband as well as I came from a very traditional Roman-Catholic family. (...) Yet this from my perspective rather cramped attitude to life did not appeal to me. (...) Luckily I could discuss that with my husband, then my fiancée. He had a more liberal attitude than his parents. Very pious though, but thinking that his brains were given him to use them (...) Prior to our marriage we agreed how to arrange it when we would get married.”⁴⁹

Catholic principles concerning sexuality and marriage were not only a matter of the Church: they were merged with the general norms and values of Catholic communities. Priests were not the only people who interfered with the moral behavior of believers and who obstructed the practice of family planning. Social pressure from the all-Catholic environment discouraged many women from deviating from behavioral rules. In that respect, the most important role was reserved for the upbringing. Parents watched their children, and particularly their daughters, and prevented them from forbidden sexual acts:

“I’m of devout Catholic descent, a family of eight children with a good upbringing, very conscientious. (...) My parents were very pious and we got married in that atmosphere. Often in our family it sounded: “If any of my children had to get married... [i.e. was pregnant before marriage, ms] rather see you dead.”⁵⁰

47. *Ibid.*, 103.

48. *Ibid.*, 68.

49. *Ibid.*, 167.

50. *Ibid.*, 151.

Though several women acknowledged having refrained from practising birth control because of the way they were brought up, others remembered having been advised by their mothers to take matters into their own hands and to limit family size:

“When we visited the presbytery to give notice of the intended marriage and the pastor elaborated on the marital life, I was completely stressed out: such a task. But I had a mother who looked ahead and who said: “God told us to be fruitful, but didn’t add a specific number. One [child] is nothing, two [children] is something, three is plenty.” But she also said that that was a secret between man and woman.”⁵¹

Though the economic benefit of children ceased when child labor was prohibited and compulsory education increased their costs, fertility among Catholics dropped below the level of Protestants only in the 1960s. The demographic transition in the Netherlands witnessed not only the convergence of Catholic and Protestant fertility rates but also their inversion. During the 1960s, the increasing economic stimulus to practise family planning coincided with anti-authoritarian movements in the Dutch Catholic Church as well as in the broader society. Characteristically, in 1963 the Dutch bishop Bekkers declared on television that the use of the pill was not a Church matter, but one of personal conscience.⁵² Tendencies to limit Catholic family size could then be combined with efficient means to do so.

External pronatalist pressures: Taiwanese family authority

In Taiwan, new couples remained embedded in larger households where parental authority over even married children has remained strong until the present. Because traditionally parents expected to command the work and wages of children and grown sons (and their wives), loosely enforced prohibitions on child labor and compulsory elementary education during the 1950s did not eliminate parental reliance on future economic benefit from their children. Non-kin, even state officials, had no authoritative role in intimate family matters. Supervision of a couple’s sex life by ritual specialists of the sort that existed in the Catholic Netherlands was particularly unthinkable.

For readers unfamiliar with religion in Taiwan, a brief sketch may convince the skeptical. The scope of religious activity in the two societies is almost non-comparable, and the totalizing practices of Christianity influenced only a few percent of Taiwanese during our period. In popular religious life, authoritative clergy were unknown, and religion was largely focused on worldly well-being

51. *Ibid.*, 70.

52. Schoonheim, *Mixing Ovaries and Rosaries*, 248.

and almost entirely open to local interpretation. Buddhism, Daoism, and Confucian philosophy do not parallel Christian sects, and do not form distinct congregations. According to anthropologist C. K. Yang,

“In popular religious life it was the moral and magical functions of the cults, and not the delineation of the boundary of religious faiths, that dominated people’s consciousness. (...) Centuries of mixing gods from different faiths into a common pantheon had produced a functionally-oriented religious view that relegated the question of religious identity to a secondary place.”

Buddhist and Daoist ritual specialist make sharp and text-based distinctions between their traditions,⁵³ but during our period these were very blurred in popular practice. Religion played a pronatalist but limited role in daily life.

Birth goddesses were ubiquitous, often worshipped at an altar standing in a side chapel of another god’s temple. They were approached by women (mothers-in-law as well as young wives) for the gift of sons and grandsons. Persistent failure to conceive might be rectified by a spirit medium who visited the underworld to inspect a woman’s “fertility fate,” represented as a flowering shrub. The number and colors of the flowers might reassure the woman that the future would bring children, or the medium might water, fertilize, and prop up a failing plant in hope of better results. In general, people assumed that deities had no opinions about their sexual conduct save one. Sexual relations (along with menstruation and childbirth) polluted people, making them unfit to approach the gods in temples or on domestic altars. A room with a family altar – a “hall” – should not be used as a bedroom for a sexually active couple. Paradoxically, women did not request help in bearing children from ancestors, perhaps because it would involve a woman in a sexualized transaction with her husband’s male kin.

Although Taiwanese reproductive behavior was under no authoritative religious governance, the society had an abundant body of pronatalist ritual and folklore. Marriage was haloed with fertility symbolism: lavish wedding foods, peanuts or dates that punned “sons” in the bridal bed, the exaggerated femininity of a heavily-made-up bride. Perhaps unique to Taiwan was the lovely custom of laying a bouquet of scarlet canna lilies under the bridal bed, for joy. When a woman’s fertility was not being promoted, it was being protected. Young fertile women should be especially cautious around coffins and at funerals. Food and drink that might impede reproductive health were elaborately specified, and careless girls were sharply reminded of their dangers. Any traditional study of Chinese marriage customs turns up an archive of evidence for the importance of a pronatalist worldview of great cultural power. While culture applauded and

53. Yang, *Religion and Chinese Society*, 205.

approved of families with numerous children, however, neither gods nor non-kin had authority over fertility choices.

In Taiwan, the closest analogue to Dutch Catholic clerical power over a couple's sexual life was parental power, especially that of the husband's parents. Most couples lived patrilivilocally at least in the first years of marriage, economically dependent and subject to considerable behavioral monitoring. Parents were deeply interested in the fertility of their sons and daughters-in-law; mothers-in-law were outspoken and even punitive toward brides who were slow to conceive, or whose birth intervals were unusually long. Overbearing parents bullied unwilling couples into initiating sexual relations when they were reluctant partners.⁵⁴ Kindly mothers-in-law might criticize overly eager sons who, by sexually approaching their wives too soon after childbirth, could interfere with nursing and hence with the health of the newborn. In reality, however, their authority stopped at the bedroom door. A couple's bedroom was the receptacle of the bride's dowry goods, home of the fertility-assisting Bed God, and ideally completely private to the budding nuclear family. Couples wishing to limit their childbearing, and who had the will power or material means, were alone in bed. The choice to prevent or begin a pregnancy could boil down to whether mother-in-law or daughter-in-law was more determined and could muster better arguments. A Taiwanese woman with a profitable snack business held off her mother-in-law's constant requests for more grandchildren, saying "If a woman had 5 girls but no boy, her mother-in-law might force her to have another child." Having born two boys, the snack-seller held good cards in this game, and seemed to be winning. As we will see below, daughters-in-law can also lose.

Couples themselves were strongly motivated to bear at least some children, even after the fertility decline. As a Taiwanese market vendor told Gates in 1988, "If I didn't want to have children, why would I have got married?"⁵⁵ Only one woman in a sample of 100 planned to have none. A large literature attests to the importance to a Taiwan woman of forming a "uterine family" of children who will support her emotionally and financially even, if necessary, against her husband.⁵⁶ Between motivation and conception, however, stand both knowledge and desire. Arranged marriages do not always succeed in promoting sexual attraction, and Taiwan's youths were raised with strongly negative feelings about female sexual organs, potent sources of physical and spiritual pollution.⁵⁷ This distaste, shared by men and women, inhibits the use of some barrier methods of

54. Wolf and Huang, *Marriage and Adoption in China*, 89.

55. Gates 1988 fieldnotes, cases 18 and 23.

56. Wolf, *Women and the Family in Rural Taiwan*.

57. Seaman, "The Sexual Politics of Karmic Retribution".

contraception, limits sexual activity other than intercourse, and may have lessened coital frequency. Couples married in the sexually unattractive minor form (where husband and wife were reared together as brother and sister) bore 25 to 30% fewer children than couples who met as young adults.⁵⁸ Taiwan's high fertility rates early in our period prove, however, that most couples, whether motivated by filial piety, youthful hormone levels, or longing for one's very own baby to cuddle successfully surmounted all barriers to pregnancy.

Cultural support for birth limitation in Taiwan

Traditionally, Taiwan couples rarely limited their fertility. Did they want to? If they did, and had the means, could they have found any cultural support for birth limitation in their apparently pronatalist world? Some evidence suggests they did. In 1988, Gates interviewed 100 women⁵⁹ who were currently owner-operators of small business, or had previously had such businesses. They were almost all of north Taiwan extraction, educated to lower-middle and upper-middle levels, and aged between 25 and 75. Their adult experiences thus were informative about both the high-fertility late Japanese and early Kuomintang periods and the declining-fertility years after 1970.

Their enmeshment in hierarchical and authoritative households created many openings for arguments against unending childbearing. The complex behavioral codes of Taiwan kinship contain many contradictions and logical loopholes that can be drawn on to support different positions. Arguing against further pregnancies with her mother-in-law, the snack seller quoted above emphasized her success in meeting a valued family gender norm by having borne two boys. The gentle husband of an entrepreneurial restaurant-owner thought two children (both girls) was enough because "I have ten brothers and sisters. It was very hard for my mother bringing us up." He wanted to spare his wife, whom he obviously adored, such a life.⁶⁰ Using respect for his wife as mother as a means to block his own mother's wishes is a neat trick, beautifully consistent with the honor due to mothers. The customary exchanges of services between women in the same household could also be leveraged to deny parental demands for more grandchildren. A fish seller's mother-in-law did not even press for more than a few children because she felt unable to help with the increased child care that would customarily fall to her lot. The most common argument adduced for limiting births, however, was that, for the good of all, families should consider their economic sit-

58. Wolf and Huang, *Marriage and Adoption*, 166-169.

59. Lu Hana and Chen Xiaowei were my able assistants for the majority of these interviews; Li Anru, Lin Meiyuan, and Chen Weihsin helped get the dozen necessary to make up a round 100. The project was supported by the Rockefeller Program on Women and Fertility, and by Central Michigan University.

60. Gates 1988 fieldnotes, case 16.

uation before having a child.⁶¹ A particular aspect of such careful calculation emerged as a key theme in these women's lives.

Once reliable contraception was available, women who had opportunities to contribute to their families in ways other than by bearing children could sometimes negotiate culturally acceptable tradeoffs between having numerous children and adding to household wealth. These opportunities increased through the decades of industrialization that began in the 1960s, and were especially abundant for women who became entrepreneurs rather than waged workers. Each of the 100 women in Gates' Taipei sample had founded or helped found a small family business such as restaurants, beauty parlors, day-care centers, an automotive repair garage, a false teeth manufactory, and a couple of florist shops. Most ran their businesses themselves, some in partnership with their husband (usually in name only), or with a woman relative. Capital in all cases was got from the informal sector; banks were neither trusted nor accessible at this small scale. Savings from previous work, cash and gold gifts to women at engagement, marriage, and childbirth, interest on investment in tiny rotating-credit associations, and, occasionally, loans from kin gave the women their initial capital. It was best to take on debts only from consistent supporters.

Domestic power flowed from these enterprises. Co-resident daughters-in-law with returns from their own invested capital had much stronger claims to that money than did waged workers. The latter were expected to turn over earnings to mother-in-law, and ask for money when they or their children needed it. The profits of a business were easier to claim, and, should the claim fail, easier to conceal. Whenever possible, a woman used her initial profits to subsidize the division of her marital nuclear family from that of her parents-in-law. Separate residence and finances enhanced, though it did not entirely insure, her (and her husband's) independence of parental supervision. Capital-based profits also allowed a young mother to strengthen ties with her children by using her own money for their needs and pleasures. Evidence from the interviews suggests that these petty capitalists also used their economic power to constrain the number of children they bore.

The businesswomen consistently wanted fewer children than they had, and fewer than their husbands had wanted. Clearly, then, they were not totally in charge. However, those who had contributed more than 50 per cent of the founding capital of their businesses had fewer children than women who had contributed less than half. This was true for both the older group, whose business and reproductive careers had been lived prior to the changes of the 1960s, and for the younger, who benefited from Taiwan's expanding economy and newly available contraceptives. Twenty-four younger majority owners had an average

61. Gates 1988 fieldnotes, case 25.

total marital fertility rate of 4.3; 21 younger minority owners averaged 5.07; 21 older majority owners had a higher fertility than either of the younger groups, at 6.5; the highest average, 8.3, was achieved by older minority owners.⁶²

To legitimize their efforts to limit children to “two or three,” many women argued that earning incomes and building capital to help the family’s and their children’s futures met their marital obligations as well as bearing additional children would have done. Independent earnings allowed them to support (and to insist on) more education and advantages for their children than hard-pressed husbands or parents-in-law might have agreed to. Until well into the 1960, many older people saw little need for schooling beyond the elementary level, especially for girls. But by the last years of Japanese rule, educational accreditation was becoming a necessity. This trend stagnated during World War II and during the early Kuomintang period, when the economy fell back to pre-1930s levels. In Taiwan’s 1960s development both state and factory jobs required a minimum of junior middle school graduation. That children were increasingly expensive to rear for successful futures made the businesswomen-mothers’ trade-off of family “quality” for “quantity” a rational one.

Ms. Hsieh: A Taiwanese woman and her family

Family interactions over marriage, marital economic exchanges, and expectations about a woman’s duty to bear children provide a complex context for demographic trends in 20th century Taiwan. Many of these are visible in the experiences of Ms. Hsieh, her husband, her mother-in-law, and her mother, all interviewed in 1988.⁶³ Multiple descriptions of the same events show dialectical processes well, and are especially helpful in interpreting small samples. These four people’s stories illustrate many of the conflicts of interest, negotiations to resolve them, the factors that create power in Taiwan family fertility negotiations.

Hsieh, born in 1956, was married while a conservative family tradition remained dominant. Unusual in the sample of 100 Taipei City businesswomen, Hsieh and her husband, Wang, were both college graduates. Her family was a prosperous Tainan City household doing business with Japan, his were farmers from the surrounding county, comfortable but not rich enough to exempt his mother from agricultural work. As a student, Hsieh studied Japanese, worked full-time in the family business for three years after graduation, and continued to help her brothers with client contacts after marriage. Tainan people give daughters large dowries, and ideally refuse the return gift of brideprice that is formally offered in the marriage agreement. Marrying a daughter, they say, is “like having your house robbed.” When she married in 1981, Hsieh’s unusual

62. Gates, “Cultural Support for Birth Limitation among Urban Capital-owning Women”.

63. Gates 1988 fieldnotes, case 46.

contributions to her natal family were rewarded with a lavish dowry. From her mother she received 150,000 NT\$ (US\$ 5,000), "several ounces" of gold jewelry, a motor bike for her husband, and a rental house worth 3,500 NT\$ (US\$ 117) each month. Hsieh's attribution of this gift to her mother, rather than to her parents, is a hint of the separation of finances between husband and wife characteristic of better-off Taiwan families. Other relatives gave Hsieh 10,000 NT\$ (US\$ 333) worth of gold jewelry. She retained all this for herself and her husband rather than pooling it with his parents' funds.

After the marriage, to meet the symbolic requirement of patrilocality, Hsieh and her husband lived with his parents for a week, then returned to Taipei where Wang worked as a civil engineer. Their home there was a well-built apartment in a quiet street (though in an unfashionable neighborhood) paid for entirely from the bride's personal money, leaving her with little financial independence. This bothered her. "A woman has to have her own business lest she be looked down upon; a woman should be independent in economic matters so she will be respected by her husband's family," she said. This statement can be legitimately interpreted as meaning "so her choices, her decisions, will not be opposed" by them.

After a year, Hsieh and Wang had a little boy, although she would have preferred to wait a few years. But "my mother-in-law cried and cried," so she gave in. When the boy was a year old, Hsieh borrowed 100,000 NT\$ (US\$ 3,333) from a private money lender, bought the necessary equipment, and set up a hair dressing business in her living room. Thereafter, she remained adamant: no more pregnancies "until my business is stable."

Hsieh would have preferred an outside job more in keeping with the expertise she had developed in her family firm, but her husband's face was at stake. Working almost invisibly at home and with women clients was their compromise, one that also eased the problem of child care. Three or four hours a day brought her enough income to deposit 5,000 NT\$ (US\$ 167) each month in a rotating credit club paying about five percent a month; and she had 50,000 NT\$ (US\$ 1,666) lent out privately at a somewhat higher rate. The rent payments for her Tainan house remained in her mother's hands, and one assumes that her mother too was assiduously building capital for Hsieh to draw on without paying interest and without attracting the attention of her husband or parents-in-law.

Hsieh's relationship with her husband, Wang, appears to be the medium-cool seen in many marriages that have been entered for reasons of practicality rather than passion. Wang had borrowed money from relatives and set up in the construction business after graduating as a civil engineer. He had promptly gone broke. Thereafter, he worked on salary in others' companies. His penchant for business ownership, unrealized in his own life, was revealed when he talked about the future: "No matter what my children's sexes are, I would like them to have their own business." We estimated his monthly salary at about 25,000 NT\$

(US\$ 833). His income, not likely to increase greatly in future, was not much more than hers. The possibility for wifely challenges to husbandly power was plainly present, although tactfully elided by all. Each mother made the fault line clear. Hsieh's mother complained gently that her daughter "followed her husband's family tradition as best she can. Our house and her parents-in-law are near each other, but their tradition is that she can't stay in her parents' house overnight. So every New Year she can come home only for lunch or dinner. I don't want to oppose them, so I just let my daughter go." Hsieh's mother-in-law wanted more grandchildren, and tried to induce obedience in her daughter-in-law through insistence on ritual subordination.

This couple's family backgrounds exemplify a contradiction at the heart of Chinese political economy. On Wang's side stood the authority of the patriline, land and farming, rural life, and mobility through education; on Hsieh's were a woman's maternal resources, money capital and business, urban life, and pragmatic investment in daughters. Each version of the good life had value for Taiwan people, but their logics often ran at cross-purposes. From one point of view, kinship and gender status were fixed and rewards for contributions inherently unequal. From the other, the accumulation of family property could outweigh kinship/gender position as a basis for domestic power. This is especially evident in the choices families made about how a married woman employed her time and talents.

In conventional view, a marriage was a contractual arrangement between two families in which the bride, in return for life-long support, bore enough children to continue the groom's patriline. Implicitly, too, she was to contribute to the limits of her ability to the prosperity of her husband's branch of the line. In practical terms, all she had at marriage became theirs: every dowry dollar, any productive property, and her labor, to be allocated entirely as her husband and his parents saw fit. In this idealized structure that can be called tributary kinship, women had sexual power and strength of will for leverage, but lacked economic and legal power almost entirely.

Another view of Chinese kinship was widespread, too. "From each according to her accumulation" epitomizes an emphasis on the immense value of capital goods in highly commercialized parts of China. This view was more obvious in south than in north, in city than in countryside, in the economic activities of women (proverbially accused of having mean, grasping natures, incapable of understanding the philosophical soundness of hierarchy) than of men (supposed to care more for the status of face, and the face of status, than for niggling profit). If a woman could bring not only labor, but capital into her married life, she brought "respect" as well. Her independent funds obliged her husband's people to treat her well, enabled her to give her children extras, and supplied bargaining points with her husband. Where the power of liquid assets was well indi-

genized through regional culture, and when a woman could keep assets under her own control, she was positioned very differently from the tributary daughter-in-law who bore children in exchange for a frugal living. And this was particularly true for a woman with a smart and loving mother.

This two-facedness of the Chinese kinship/gender system is an immense subject. Here, we need only note that it is the context within which Taiwan's women have made their childbearing choices. Women who have nothing but children to offer their marital families see more of the tributary face than women who bring additional resources. Ms. Hsieh and Mr. Wang both wanted another child, a girl this time. Her mother thought this would be fine; his mother would like more grandchildren, although "not too many." Hsieh has met, minimally, her tributary duty to patriline continuity and then insisted (for six years!) on improving her business before she tried for a daughter. In hair dressing, money-lending, rent income, backing from the brother for whom she still works, and heaven knows what other cabals and conspiracies with her mother (and two sisters? and elementary, high school, and college girlfriends?) she is fully invested in the petty capitalism that has made Taiwan a world economic player. While unusual, this couple is not uncommon in its tradeoffs for women between childbearing and financial accumulation.

Conclusions

During the first half of the 20th century, Dutch Catholic and Taiwanese lives were spent in different cultural, institutional, and political-economic contexts. Inevitably, they moved through their respective fertility transitions very differently. In the Netherlands, the Catholic Church's regulation of fertility within marriage, expressed by preparations for a gendered division of tasks during the upbringing and a long and chaste courtship, emphasized the overwhelming significance of a couple's sexual relationship while creating considerable anxiety about pregnancy. By contrast, Taiwanese couples married young and promptly after an arranged and distant engagement. In the west as well as the east, most men and women began their sexual lives within marriage. In Taiwan though, marriage began with a heady mixture of hope for early conception, shyness and perfect sexual freedom. That mixture may often have precipitated ardent marital courtship, but it was courtship that had no public expression or cultural support. Social and family interest in the couple was mainly for fertility, not *jouissance*.

Modern mechanisms of family limitation were in place in the Netherlands, but until the 1960s Dutch Catholics opted to eschew them. In Taiwan, such mechanisms became available, cheap, and convenient only when government policy encouraged them. The Dutch Catholics had had time to observe the advantages of family planning among their Protestant fellow citizens; Taiwanese leaped with little concrete knowledge but great enthusiasm into a new kind of family life.

Another difference of considerable importance was the locus of authority over fertility that lay beyond the couple relationship. Traditionally, Dutch Catholics founded new nuclear households at marriage, and married only after the couple had the means to support themselves and their future children. Kin took an interest in new families, but had neither authority nor economic power to influence childbearing decisions. The church, however, claimed a God-given power to depute parish priests to monitor childbearing and punish couples who appeared to be limiting their own fertility. While many couples internalized church teachings and struggled to conform to them, others conformed mainly for fear of being shamed, or to maintain their membership in a culturally dominant institution. Cooperative and loving couples sometimes had more faith in their own moral standards than those of the church, a stance that called clerical authority into question and supported private antinatalism. When regional church leaders shifted ground, it found their followers ready implement that attitude.

In Taiwan, pronatalist pressure came from parental authority and the internalization of a deep sense of obligation to contribute to the welfare of the extended family. When what was good for the family changed, and when the state gave a general benediction to family planning, Taiwanese quickly reinterpreted kinship ideology and lowered their fertility.

Although structured differently, these transitions also depended on similarities between the two cases. If the Dutch emphasized the opportunity for a more expressive marital life and the Taiwanese stressed sound domestic economy, these emphases owed much to the cultural acceptability of the reasoning. Taiwanese are intensely private about sexuality; the Dutch may be equally private about money matters. They are probably more alike than they would have observers think. The greatest similarity, however, almost certainly stems from a fundamental human commonality. Pregnancy, lactation, and childcare are exhausting. In whatever cultural context, some rates of childbearing will result in maternal depletion and high rates of infant mortality. As a close Taiwan friend told Gates, "I had six children, four girls and then finally two boys, but my mother-in-law wouldn't let me get my tubes tied. So when I had the last two girls, I didn't even have the strength to push them out." A Dutch Catholic woman put the point with a sharper gender analysis:

"It would have been good if every Catholic male or pastor, even during an inconvenient time, would have had to deliver every year: than he would have known what worrying means, and hunger, and pain."⁶⁴

64. Kerklaan (ed), *Zodoende was de vrouw maar een mens om kinderen te krijgen*, 66-68.

The sudden drop in birth rates among Taiwanese and Dutch Catholic women did not imply a mental revolution regarding family planning. In both, antinatal tendencies, long submerged, were developed and intensified during the 20th century to meet and merge with changed ideological, social, and economic conditions. In high fertility societies, women, at least, will endlessly reinvent antinatalism.

Burden or opportunity?

Illegitimate births in
the Netherlands and
Taiwan

*Hill Gates, Jan Kok &
Sping Wang*

Because people are passionate, and because contraception, abortion, and infanticide played little role in Taiwan and the Netherlands until well into the 20th century, illegitimacy occurred there, although at strikingly different levels of propensity during the late 19th and early 20th centuries. We compare the rates, changes, and probable motivations for bearing and rearing illegitimates in these two societies at the poles of the Hajnalian dichotomy.

In the literature dealing with interregional comparisons of illegitimacy, four factors stand out: kinship systems, courtship patterns, female employment and religion. How important are they for an understanding of Dutch-Taiwanese differentials? Before exploring these factors, we discuss our sources and compare the definitions of illegitimacy in the two countries. Because the status of marriage was not similar, illegitimate births are not perfectly comparable. Next, we examine general levels of illegitimacy and its development over time, trying to explain why Taiwanese unmarried women were so much more likely to give birth out of wedlock than Dutch women. In conclusion, we attribute these differences to family formation and courtship, to the value attached to children and to the economic position of single mothers.

The guidance of previous research

Previous research, much of it in continental Europe and Britain, shows that the *spatial* distribution of illegitimacy is not susceptible to easy explanation. Regional differences are important in ratios of illegitimates to total births and to the rates of births per 1000 unmarried women. In 1892, Albert Leffingwell found geographic patterns of considerable significance in 19th century Great Britain as the statistician Jacques Bertillon had seen for France.¹ These differences were not related to urbanization, which was less influential in promoting illegitimacy than might have been expected, urban rates being sometimes the same or lower than rural ones.² Differences between regions continue to be more important.³ Michael Mitterauer's impressive effort to understand regional variation of European illegitimacy shows that high or low regional levels can only occur when several independent variables reinforce one another.⁴ The most important explanatory variables are religion, systems of kinship and family formation, courtship customs, and the availability and character of women's work.

1. Leffingwell, *Illegitimacy*, 54-55. Leffingwell, like many of his contemporaries, mingled biological and cultural heredity in his explanation of regional variation in illegitimacy in a way that now seems racist; excepting this now-outdated interpretation, his early essay stands the test of time well.

2. Knodel and Hochstadt, "Urban and rural illegitimacy"; Laslett, "Introduction", 30; Blayo, "Illegitimate births"; Van de Walle, "Illegitimacy in France".

3. Adair, *Courtship, Illegitimacy and Marriage*, 55.

4. Mitterauer, *Ledige Mütter*.

Popular culture in the northwestern part of the continent was often remarkably tolerant of prenuptial sexuality. In various parts of 19th century western Europe, a *minority* of first-born children was conceived after the wedding. In many areas of central and northern Europe, adolescents had sexual rights even before official engagement. Scottish *bundling*, Dutch *kweesten*, Swiss *kiltgang*, and German *fensterln* were all customs that allowed village boys access to nubile girls' bedrooms. Girls could have a succession of these visitors before finally settling on a marriage partner. These customs were strictly controlled by the village boys who did not allow strangers to visit the girls and who checked up on couples during the night. The excitement of customs like these might have compensated for the long period before marriage was possible. In periods of stable social relations, these youth cultures did not necessarily engender high levels of illegitimacy. Disruptions of communities traditionally tolerant towards prenuptial relations may be one of the reasons behind the 19th century increases witnessed in various areas in Europe. In other areas of western Europe (southern France, Ireland) parents exerted a much stricter control on their daughters.⁵ In such cultures, the balance was less easily broken.

An important subset of illegitimacy studies has explored the possibility of "a series of bastard-producing women, living in the same locality, whose activities persisted over several generations, and who tended to be related by kinship or marriage." Some had repeated illegitimate births. Yet "the concept of a bastardy-prone sub-society becomes complicated when pursued".⁶ In some places, these groupings contribute heavily to peaks in illegitimacy rates,⁷ and they may cluster tightly within urban settings. This appears to be the case for the Netherlands⁸ and for Taiwan, where Taipei City and perhaps Penghu's capital of Makung include localized populations with high illegitimacy. In recent studies, objections have been raised against the suggestion that repeaters passively suffered their fate, being 'prone' to illegitimacy. Several authors point to the 'functionality' of illegitimacy. In the absence of social welfare arrangements, illegitimate children may have been an old-age insurance for their mothers.⁹ Without some sort of arrangement for child care and employment options for women and thus a basic tolerance towards bastardy, repeatership would be impossible.

The existence of self-reproducing "sub-societies" suggests the importance of structural and institutional causes for illegitimacy. In a broad-ranging concep-

5. Fine, "Enfant et normes familiales"; Connell, "Illegitimacy before the famine".

6. Laslett, "The bastardy prone sub-society", 217.

7. Laslett, "The bastardy prone sub-society", 239.

8. Kok, *Langs verboden wegen*.

9. Gandy, Illegitimacy in a Handloom Weaving Community; Viazzo, "Illegitimacy and the European marriage pattern"; O'Neill, *Social inequality in a Portuguese hamlet*; Blaikie, *Illegitimacy, sex, and society*.

tual inquiry, Jenny Teichman summarized the problem by observing that “its formal causes are the institutions which generate the legitimate/illegitimate distinction, and its immediate causes are almost as multifarious as human motives and loves and hates”.¹⁰ The birth of an illegitimate child created problems in both the Netherlands and Taiwan, but their different institutions and values may have given unmarried Taiwanese parents more reason than Dutch ones to tolerate and even value such children. Unlike the Dutch, the Taiwanese did not need to view illegitimacy as Leffingwell put it, with fine Edwardian flair: an “annual harvest of sorrow and shame” requiring “the extreme penalty of ostracism...mercilessly inflicted”.¹¹

For our comparison of the Netherlands and Taiwan, we begin with the factors distinguished by Mitterauer: kinship systems, courtship patterns, labor relations and religion. The differences between the kinship systems in our respective countries are huge. In the Netherlands the risks associated with the nuclear household formation are compensated for by an elaborate system of communal supports that strongly discouraged extramarital reproduction. Taiwan families, with strong kin but no social supports, were much more tolerant towards additional children, however acquired. Similarly, strong differences existed in courtship as a potential background of illegitimacy. The predominance of early and arranged marriage makes this a much less important factor in the Taiwan case. Where labor relations are concerned, we concentrate on the ‘risky’ female occupations and on options for unmarried mothers to sustain themselves. Finally we treat religion as a background variable here. In the Netherlands, the Christian churches, in particular the Roman Catholic and orthodox Protestant ones, were fairly effective in enforcing their moral codes.¹² In Taiwan, the spectrum of folk religious practice offered no boundaries of belief or behavior that might affect illegitimacy rates. (See Chapter 4 of this volume).

In addition, we want to know to what extent repeatership accounts for overall levels (and differences) in illegitimacy. How can we explain repeatership? Can it be ascribed to a family building strategy of women?

The data

In this paper, a variety of data have been used. Because in the Netherlands, individual sites yielded too little information, we have used censuses and published statistics to present the general levels and trends. For our detailed analysis we use an analysis of illegitimacy in the coastal province of North-Holland, based in particular on civil records¹³ although its format does not allow for direct compar-

10. Teichman, *Illegitimacy: A Philosophical Examination*, 22.

11. Leffingwell, *Illegitimacy*, 7, 83.

12. Kok, “The moral nation”.

isons with the Taiwanese household registers. We also employ the Historical Sample of the Netherlands (HSN), a large database under construction that will eventually contain the reconstructed life courses of 77,000 individuals with known background, literacy, occupations, eventual marriage(s) and migratory moves. The database is built from a random sample of a half percent all persons born in the Netherlands between 1812 and 1922.¹⁴ Here, we use the birth certificates (N=42,695) for the period 1860-1919. Finally, we incorporate a legal study of paternity suits in the eastern, rural province of Drenthe between 1909 and 1940.¹⁵ This study has never been used in historical demography, yet it contains many important findings on the backgrounds of illegitimate births.

For Taiwan, we use census data, secondary evidence and the household registry database of 14 field sites from the Institute of Ethnology, Academia Sinica.¹⁶ The household registry data reveal the life course of individuals and households, allowing researchers to follow life events such as household formation, birth, marriage, migration, recognition, etc. The household registry database currently consists of data from two urban (Taipei) districts, townships of intermediate size, and rural townships, approximately 250,000 individuals.

Situating our evidence in the respective local contexts is not our goal here. Illegitimacy ratios for the Netherlands were much lower than those in most other European countries¹⁷; Leffingwell noted long ago that the Dutch levels of illegitimacy ranked at the low end of the general northwest European profile.¹⁸ That Taiwan has a higher-than-typical rate for Chinese regions has been both asserted and refuted.¹⁹ In this paper, we are not comparing regions that are convincingly representative of larger areas. They represent only themselves.

The general levels and trends of illegitimacy in the Dutch and Taiwanese populations are presented using illegitimate birth ratio and age-specific fertility

13. Kok, *Langs verboden wegen*.

14. Mandemakers, "Historical Sample of the Netherlands".

15. Overdiep, *Rechtsbescherming*.

16. Wolf and Huang, *Marriage and Adoption in China*; Wolf, *Sexual attraction and childhood association*; Barrett, "Short-term trends in Bastardy in Taiwan".

17. Kok, "The moral nation"; Barrett, "Short-term trends in Bastardy in Taiwan".

18. Leffingwell, *Illegitimacy*, 51-52.

19. The reliability of the household registry data, described elsewhere (Wolf and Huang, *Marriage and Adoption in China*) allows researchers to study illegitimacy in a Chinese society better than through any other sources. Taiwan illegitimacy rates have been described as much higher than those on the mainland of China where Lee and Wang ("Malthusian Models and Chinese Realities", 45, n. 42) have suggested it was virtually non-existent. However, these figures are derived from records that generally did not register children until the age of 16 and were compiled by elite family members. Genealogies normatively ignored sexual irregularities, for they served as claims to inheritance. We continue to rely on Taiwan data as the most accurate for investigations such as this.

rates for never-married and widowed/divorced women. Coale's index of non-marital fertility (Ih) in Taiwan and the Netherlands was also used for contrast.²⁰

Definitions of marriage and illegitimacy

The Netherlands

Compared to the Chinese institution, European marriage was elegant in its monogamous and legal simplicity: only an officially married couple could produce legitimate offspring. In the legal definition of illegitimacy in the Netherlands the civil status of the mother was crucial. Mothers of illegitimates were either unmarried or their former marriage had ended at least 300 days before the birth. Thus, children resulting from the adultery of a married woman were registered as legitimate, unless her husband had refused the notification and had started a complicated procedure to dispute the legitimacy of the child.

Under certain conditions, an illegitimate child could be recognized. Only 'natural' children – those of parents who were both unmarried – could be *recognized* – an official status between legitimate and illegitimate. Children begotten in incestuous or adulterous relationships could never be recognized. The registrar was not entitled to record the name of the biological father unless he officially recognized the child. An unmarried father could only recognize his child by producing a document attesting to the mother's consent to the recognition. Recognition was a voluntary act by the begetter of an illegitimate child that legally acknowledged paternity and admitted his obligation to provide for the child. The child received its father's last name and a right to inherit one-third of what he might have been given as a legitimate child. Until 1947, children could in principle be recognized only by their biological father. However, it was likely that illegitimate children were often recognized by a new partner of their mother, who in this way adopted the child.

Recognized children were automatically *legitimated* (they became equal to legitimate children in inheritance rights) when their parents married. Finally, parents who had missed the opportunity to legitimize their children on the marriage certificate could apply for so-called 'Royal letters of legitimization,' which were granted by the King after an inquest by the Supreme Court of the Netherlands. These letters could also be granted when one of the parents had died before their (already) recognized children could be legitimated by marriage.

In the early 19th century, when French civil law was adopted in the Netherlands (1809) the traditional *paternity suits* were abolished. In these suits, the authorities made the begetters of bastards liable for the consequences, at least to the degree of paying child support. In them, single mothers could try to regain their lost respectability by demonstrating how their lovers had betrayed

20. Barrett, "Short-term trends in Bastardy in Taiwan".

their marriage promises. The restoration of a woman's honor was very important in subsequent attempts at finding a marriage partner. For the single mothers, therefore, the abolition of paternity suits increased their vulnerability. In 1911, however, paternity suits were reintroduced. Unwed mothers could not sue a putative father themselves; a special representative (e.g. the village constable) had to act on their behalf. The request for child support implied a lengthy procedure, in which finally a court could judge a man to be responsible for the procreation and sustenance until the age of majority of an illegitimate child. For one Dutch province, it has been calculated that between 1911 and 1940, in 47% of relevant cases of illegitimacy an unwed mother took legal proceedings against the father. About a third of these suits (35.7%) resulted in conviction.²¹

During our period, the Dutch state not only enabled marriages. It could also prohibit them, not only in the obvious cases of bigamy or incest, but also when a prospective groom was serving in the military, when he wanted to marry his sister-in-law, when he could not procure the necessary documents or when he met with the disapproval of his parents.

Taiwan

Chinese marriage when defined most strictly was simple, and produced legitimate offspring. When "marriage" is glossed more expansively to include concubines, the simplicity of the concept begins to blur (Freedman 1950). The accepted sexual liberty especially of rich Chinese men produced many offspring who were not necessarily illegitimate in the Chinese continuum of negotiable marriage practices. Once a frontier region with few elites, Taiwan became a Japanese colony where late imperial Chinese family law was implemented with little modification. Historically, the Chinese state controlled many aspects of kinship²², but rarely intervened in marriage except to prohibit as incest all marriages between people of the same surname. During the last three hundred years, imperial edicts enjoining ever more rigid chastity for women of all classes made their sexual conduct a matter "of highest import, as if the state were enlisting them as guardians of the fragile boundaries of normative family order".²³ The outcome of a non-marital birth could have wide-ranging consequences for the mother: promotion from bedmate to concubine, even to wife, was possible. But so was being prostituted as a state slave.²⁴ The statuses of attachment of a woman and her children to a man were multiple.

A Chinese marriage was formed through a civil contract between the heads

21. Overdiep, *Rechtsbescherming*, 214-232.

22. Gates, *China's Motor*.

23. Sommer, *Sex, Law, and Society*, 306.

24. Jaschok, *Concubines and Bondservants*; Sheieh, *Concubines in Chinese Society*.

of two households, usually on behalf of their children. A woman who entered her husband's household as a bride, a *hsin niang*, gained the status of wife, *fu*. The boys she bore were *ti-tzu*, automatically heirs to their father's property, and to hers, if she had any. The girls she bore, *nu-tzu*, ideally were owed a future marriage, to be arranged by her parents. If a wife engaged in adultery that gave scandal, the most likely outcome would be divorce. Her husband's children would remain behind; fruits of an adulterous union would be registered as *szu-sheng-tzu* in her official household, with her registered as mother, and no father's name given.

Some women entered households as concubines, *chieh*. Unlike in the Netherlands, where concubinage was socially and legally unacceptable, in Taiwan concubines had recognized civil status. A concubine's husband need not yet have a formal wife; she might be added later, or the concubine promoted to this status. The north China proverb, "A bedroom is not a (formal reception) hall; and a concubine is not a wife" underlines the inequality between the two. Nor was concubinage a single status with precisely defined rights and duties, as Sheieh Bau Hwa has so richly documented for Ming China.²⁵ A woman's social background, the ritual style of her entry into the husband's household, her skill at negotiating both power and authority, and whether and in what time frame she bore male children made for more or less powerful concubines who could more or less effectively assure their children of their rights as heirs or marriageable daughters. Struggles among women in complex households to gain favor for their children from the children's common father are the very stuff of Chinese drama and fiction. In Taiwan, a concubine's children were registered as *shu-tzu*, but would be promoted to *ti-tzu* should the husband promote his concubine to wife.

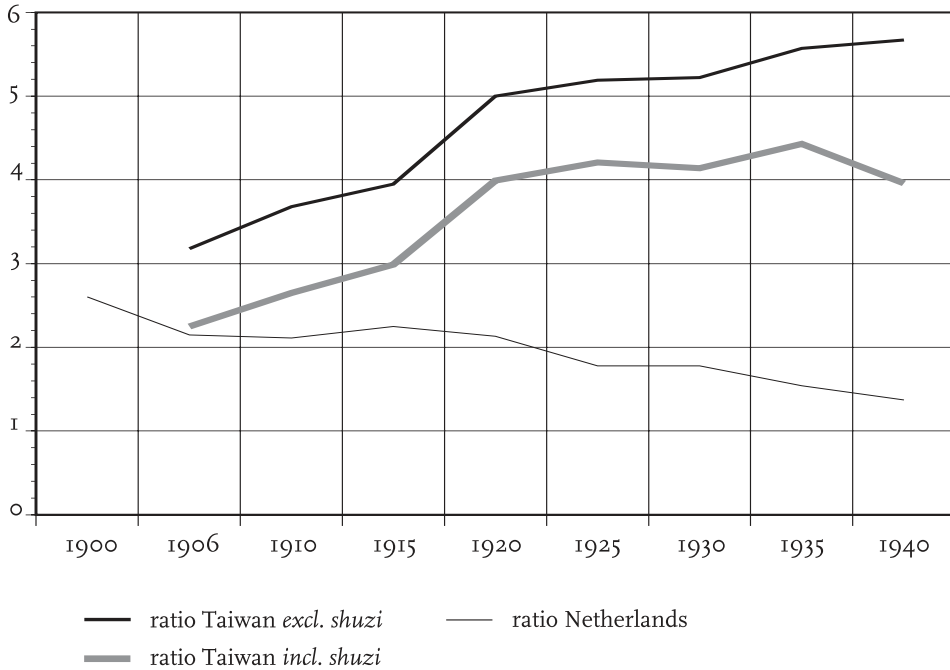
A man might (and should) regularize a sexual relationship with a resident maid should she bear him a son by promoting her from bedmate to concubine (perhaps one of lowly status) and the child from *szu-sheng-tzu* to *shu-tzu*, perhaps later to *ti-tzu*. The status of irregularly born daughters depended on the whim of the household head.

Szu-sheng-tzu, not registered as sons of their father, were not his heirs. *Ti-tzu* were automatic (and legally mandated) heirs, while *shu-tzu* might find their claims to their father's property contested on various grounds by their half-brothers or by the full wife. Another aspect of heirship, responsibility for ancestral tablets, was typically passed to a main heir, usually the first son of a man's wife. In Taiwan, he customarily received an extra portion of property to cover the expenses of worship that he and his wife performed on behalf of his siblings. A concubine's son was only chosen for this responsibility when the wife had born no son, and then was promoted from *shu-tzu* to *ti-tzu*.

A woman's civil status affected her role in ancestor worship whether she

25. Sheieh, *Concubines in Chinese Society*.

Figure 1. Illegitimate births as a percentage of all births, Taiwan and the Netherlands, 1900-1940



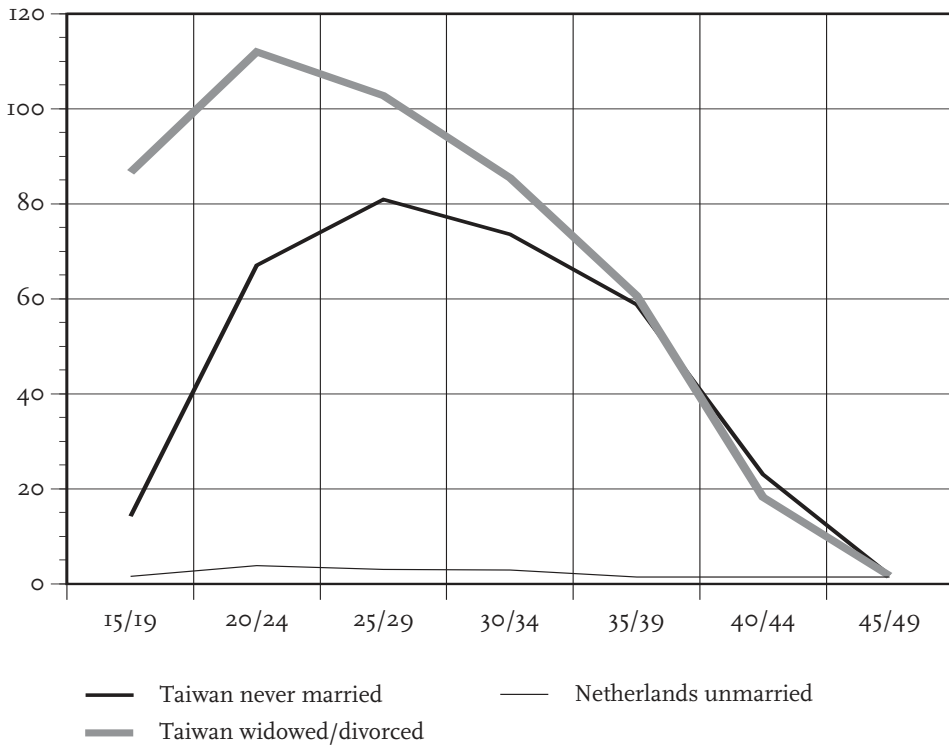
Sources: Barrett, "Short-term trends in Bastardy in Taiwan", 295, Historical Ecological Database and Centraal Bureau voor de Statistiek, *Buitenechtelijke geboorte 1840-1973* ('s-Gravenhage 1973)

bore children or not. Unlike a wife, a concubine could not worship her husband's ancestors, nor did she become a family ancestor after death. "Only her own son offered sacrifices for her," and never in an ancestral temple.²⁶ A concubine's son was the legal descendant of his father's full wife, whose spirit he paid reverence to after her death.

The cultural chasm between Dutch and Taiwanese practice is not as great as the previous materials may suggest. In Taiwan, concubines and their offspring represent cultural categories against which the more normative statuses were defined, but they were statistically trivial. Only 1.2% of all Taiwan births were *shu-tzu*, compared with 2.4% as *szu-sheng-tzu*; and only 2.0% were promoted from *szu-sheng-tzu* to *ti-tzu* and 13.3% from *szu-sheng-tzu* to *shu-tzu*. Paternal recognition cut down sharply on the number of formal illegitimates in both populations, and adoptions increased the effect. The percentage of recognized was 15.3% and adopted was 16.9%. In the Taipei subsample, of 1,053 illegitimates

26. Ch'u, *Law and Society in Traditional China*, 125.

Figure 2. Age-specific fertility rates for never-married and widowed/divorced women, Taiwan and for unmarried women, the Netherlands (births per 1000 woman years)



Sources: For Taiwan Household Registry Database of 14 field sites in 1906-1940, for the Netherlands Centraal Bureau voor de Statistiek, *Buitenechtelijke geboorte 1840-1973* ('s-Gravenhage 1973) data pertaining to 1936.

who were born, 13.5% were recognized and 13.2% were legitimated by being adopted out. In the second half of the 19th century, it can be estimated that 30 to 40 percent of all Dutch illegitimately-born children were recognized and subsequently legitimated by marriage. As mentioned above, official adoption was ruled out. However, we estimate that about half of all recognitions were done by stepfathers, which amounts to adoption.²⁷

Levels and trends

Figure 1 shows the ratio of illegitimate births to all (live) births, the simplest measure of the incidence of illegitimacy, for both societies. For Taiwan, the first

27. We base our estimation on the Drenthe survey. In the first half of the 20th century, 1474 illegitimate children were recognized by men. Only 721 of these men were the biological fathers of their children, Overdiep, *Rechtsbescherming*, 384.

Figure 3. Age specific fertility of never-married women and widowed and divorced women, Taiwan, by Birth Cohort



ratio counts the children of concubines (*shu-tzu*) among the illegitimates and the second counts them among the legitimate children. Netherlands and Taiwan trends in illegitimacy clearly diverge, continually declining in the former and rising steadily in the latter. Levels were not very different, however. In both countries, only a small minority of children (2-5%) were born out of wedlock. They only differed in the propensity of unmarried women to bear children. With the relative proportion of unmarried women in Taiwan so much lower than in the Netherlands, their non-marital fertility was much higher (Figure 2).

Taiwanese not-married women can be further classified into the never-married (before bearing the child) and the widowed/divorced. The divorce rate was relatively high. For all age groups non-marital fertility was higher for Taiwanese than for Dutch women: 1.5 to 3.9 per 1,000 women for the Netherlands but 14.2 to 80.9 for the never-married women and 18.2 to 102.8 for the widowed/divorced (age groups 45/49 excluded). For the 20-34 age groups, the risk of an illegitimate birth is 17 to 30 times higher for the Taiwanese than for the Dutch women. Figure 2 also shows that the non-marital fertility of young widows/divorcees was markedly higher than that of young, unmarried women. This is consistent with the argument on the comparative value of children below. The low fertility of unmarried teenagers testifies to the strict sexual segregation of adolescents in Chinese society, at least those not married in the minor fashion.²⁸

Did levels of illegitimacy change over time in the Netherlands and Taiwan? According to Barrett using Coale's Index of Non-marital Fertility (I_n), there has been a decline in non-marital fertility for the Netherlands and a continued rise for Taiwan, a pattern consistent with patterns seen in Figure 1 based on illegitimate

28. Fricke, Chang and Yang, "Historical and Ethnographic Perspectives", 43.

birth ratios.²⁹ Nevertheless, in the birth cohort analysis of age-specific non-marital fertility using household registry data, the increase in illegitimacy is not found. As shown in Figure 3, women from the younger cohorts do not necessarily have higher non-marital fertility than women from the older cohorts. Only 16-24 year-old widows and the divorced from the later birth cohorts had slightly higher non-marital fertility than the counterparts from the younger cohort.

Courtship and control

Western European and Chinese family systems sought marriage partners differently. In Chinese societies, practically all marriages were arranged. Even when the future spouses were known to one another, they spent little unsupervised time together except in minor marriages. In Europe, only marriages in the elite were more or less arranged and meetings between the fiancées were chaperoned. In other social groups, adolescent children found their own partners within the range set by their social or religious group, workplace, and customary local public gatherings such as church and local festivals. European illegitimacy may have increased during the nineteenth centuries because couples willingly took more risks during their courtship. However, many authors have pointed to the corrosion of the mechanisms surrounding premarital courting by the mobility associated with the agrarian and industrial revolutions.³⁰

The Netherlands

Premarital courtship that includes sexual intercourse contains the risk of illegitimacy. When a child was on the way, a frustration or delay of marriage plans could then lead to the child being born illegitimate before the parents married. It could then be legitimated by the marriage of the parents and carried little stigma. If, before he could marry the mother, the father died, became unemployed, absconded, or was still in military service, the child remained illegitimate.

How much illegitimacy resulted from couples who were planning to marry, but began sexual intercourse before the wedding? We can look at the relationship between illegitimacy and 'ordinary,' sexually permissive, premarital courtship by comparing the ages at which first children were born both within and outside marriage. At the time of their first birth, single mothers in the province of North-Holland (western Netherlands) were roughly of the same age (around 24 years) as married mothers whose first child was prenuptially conceived.³¹ Thus, their (first) pregnancies may have occurred during 'normal' courtship. In the 19th century, about a third of North-Holland illegitimates were

29. Barrett, "Short-term trends in Bastardy in Taiwan", 39.

30. Kok, "Passion, reason and human weakness".

31. Kok, *Langs verboden wegen*.

legitimated by the marriage of the parents, about two-third of them below age two. It seems likely that a number of planned marriages had been postponed.

Prenuptial pregnancies were very common. In particular in Protestant areas, they often involved the majority of first-born children. However, illegitimacy was a rare phenomenon. Clearly, premarital license did not result in high levels of illegitimacy. We only find such a link between courtship behavior and illegitimacy when pregnant couples were not subject to social pressures to marry. Social control ensuring marriage was particularly effective when exerted by peers, neighbors and employers. Thus, geographical mobility or secrecy of lovers led to an increased chance of an illegitimate birth among itinerant workers or soldiers who could easily abscond, or among living-in servants, including agricultural workers, who tended to hide their affairs from their employers from fear of being dismissed. When women became pregnant in such circumstances, there were no witnesses to put pressure on a hesitant lover. Illegitimacy in the Netherlands typically occurred when large groups of unmarried male and female workers were employed and housed together, without supervision from the farmers or factory owners. Even these instances were quite rare due to the small-scale nature of Dutch economy.³²

An analysis of all paternity suits for one Dutch province enables us to probe somewhat deeper.³³ In the sparsely populated province of Drenthe, in the eastern part of the Netherlands, 2,721 illegitimate children were born between 1910 and 1940. Of these children, 223 died within a fortnight, 375 children were legitimated shortly, 367 children were born in a consensual union (see below), and 4 children were recognized by the father without a subsequent marriage. Thus, in principle, a paternity suit could be started on behalf of the 1,752 remaining children. The mother did so in only 818 cases. The files of these cases disclose that only 141 out of 721³⁴ relationships can be characterized as a stable union with a clear prospect of marriage. In other words, on the basis of the files we can calculate the share of stable unions as 19.6%. Another calculation is possible. We have seen that 375 children were legitimated soon after their birth. Mothers who did not file paternity suits probably were aware that they would fail. Perhaps they could not even name a father. Those who did not litigate (N=934) had probably not formed stable courtships. Another calculation of the stable courtships reads: [legitimations(375)+ recognitions(4)+ stable courtships according to files(141)]/[total(2721)- infant deaths(223)- unknown relationships in files(97)]=21.7%. Both methods suggest that only about a fifth of illegitimate children were born to couples that had intended to marry.

32. Kok, "The moral nation".

33. Overdiep, *Rechtsbescherming*.

34. 97 remain unqualified.

Table 1. Premarital births and prenuptial pregnancy by type of marriage.
All field sites Taiwan.

	1891-1900	1901-1910	1911-1920	1921-1930
<i>major marriages</i>				
% prenuptially pregnant	8.1	9.6	11.6	10.1
% premarital births	5.5	4.9	5.0	4.8
<i>minor marriages</i>				
% prenuptially pregnant	20.8	24.5	24.8	24.1
% premarital births	7.8	3.8	2.2	2.3
<i>uxorilocal marriages</i>				
% prenuptially pregnant	13.9	16.3	26.0	26.0
% premarital births	7.2	7.7	9.1	13.2

The province of Drenthe is not representative of the rest of the Netherlands. Until the late 19th century remote, underpopulated and agrarian, reclamations and peat digging attracted itinerant workers and fomented grave social problems and high levels of illegitimacy. Perhaps frustrated marriage was a less important background of illegitimacy there than elsewhere. The majority of the paternity suits were associated with 'unstable' relationships that had already broken up before the pregnancy was discovered. In a secret affair, it was difficult for the girl to have her ex-lover sentenced.

Taiwan

In Taiwan, prospective spouses in major marriages met rarely, if ever before marriage. Youngsters engaged in the minor fashion, living together as brother and sister, had easy sexual access. Parents often waited to register a minor marriage until couples had accepted the match; a clear sign of this was pregnancy.³⁵ Thus, between a fifth and a quarter of all brides in minor marriages were pregnant.³⁶

Daughters in families that lacked male labor often remained with their parents, and husbands joined them there. Uxorilocal marriages were sometimes preceded by courtship, for brides who married uxorilocally were often

35. Wolf, "The women of Hai-shan", 103n.

36. Bridal pregnancy in minor marriages does not necessarily contradict Arthur Wolf's aversion hypothesis that early childhood association between prospective spouses rendered them sexually uninteresting to each other.

This phenomenon was relatively weak in children raised together after their first few years of life, and is, like all biological responses, subject to much individual variation (Wolf and Huang, *Marriage and Adoption in China*; Wolf, *Sexual attraction and childhood association*).

pregnant, and single mothers who married tended to do so uxorilocally. This is especially apparent in the birth cohorts of 1901-1920 (see Table 1). Some daughters from families without sons worked in prostitution to help sustain the family. On becoming pregnant, the woman might return home, making an uxorilocal marriage of her own or her parents' choice. When the marriage was not arranged in time, the child would be born illegitimate. Alternatively, she might bear an illegitimate child (or two or three), returning to sex work until her price dropped, and then marry. By this time, she could make an independent marriage choice, having fulfilled her duty to her parents by sending them her earnings. Depending on the couple's financial options, they might choose uxorilocal or neolocal marriage.

Value of children: Taiwanese pronatalism

In Taiwan as everywhere, children and grandchildren brought liveliness, warmth, and joy. Chinese people value children, and especially sons, for the part they have in continuing descent lines and maintaining aging parents. Where inter-village feuding was common, sons made for a strong family that others would fear to bully. Daughters, too, were wanted, though their status ranked below that of their brothers; when necessary they could partially substitute for sons. The economic utility of children for their parents was openly recognized in a way that their emotional significance was not. Elite ideology and popular practice required parents and especially fathers to limit demonstrations of affection to only their very young children. Emotional closeness was expressed in more practical fashion, in gifts and in work.³⁷ Parents were obliged to sacrifice and exert themselves on behalf of their children, and could expect exertion and sacrifice in return when the children reached adulthood. Although most children were born to the parents who reared and later depended on them, adoption was extremely common, as were other forms of fosterage and dependency. Even women who never married, such as nuns, and divorcees and young widows recognized the importance of children to their present and future lives. Many adopted children or bore them out of wedlock.

Taiwan's household registers cannot tell us the intentions of the women who bore illegitimate children. Were their babies the unintended consequence of love affairs, rape, or of bartering their sexuality to bring a man's help to their domestic economy?³⁸ Or were they part of their mother's own family-building strategy? Considerable evidence exists for south China that substantial numbers of women were attracted by the possibility of creating a family of own or adopted children independently of the controls that were imposed by marriage.

37. Potter and Potter, *China's Peasants*.

38. Fricke, Chang and Yang, "Historical and Ethnographic Perspectives", 44.

Table 2. Percentage of widowed or divorced mothers as a percentage of all unwed mothers, by period in which their children were born.

	% widowed or divorced mothers	% illegitimacy	N illegitimate children
Netherlands 1860-1879	10.8	4.8	810
Netherlands 1880-1899	9.4	3.6	552
Netherlands 1900-1919	8.4	2.7	285
Taiwan, 1906-1940	35.8	5.6	4322

Sources: Taiwanese Household Registry Database of 14 field sites and Historical Sample of the Netherlands.

To gain better understanding of whether women simply found ways to survive having born illegitimate children or whether they considered single mother-headed households a positive career move, we may begin with the unexpectedly high fertility of widows. In Taiwan, lineages were comparatively smaller and weaker than those in mainland China, poorly positioned to monitor the behavior of audacious widows. But widows incurred disesteem by threatening the normal father-to-son inheritance of her legitimate children. By marrying again, she lost rights to her husband's children and to any property usufruct she held through them. Widows had significant incentives to expand their families without remarrying.

Widows and divorcees bore almost 36% of Taiwan's illegitimates, as shown in Table 2. A divorced or widowed woman who bore one illegitimate child may simply have had bad luck, but those who bore more than one illegitimate may have found that having a fatherless family was not harshly sanctioned. Ethnographic evidence suggests that for many ordinary, non-elite Taiwanese, this was true, particularly for daughters in families lacking in sons.³⁹ A stronger hypothesis is that the women themselves were building families to what they considered an appropriate size. That younger widows and divorcees were high in illegitimacy suggests that they were following the same family-building strategy as married women.⁴⁰

Repeatership among widows and divorcees was common in our Taiwan field sites: 35.9% of widows and divorcees who had illegitimate children had more than one. One ambitious divorcee in Taipei had twelve.⁴¹ Following the same logic, the 43.3 % of never-married mothers of one or more illegitimates

39. Wolf, *Women and the Family in Rural Taiwan*.

40. Wolf, "Women, Widowhood, and Fertility".

41. Gates and Hsieh, "Willful Women".

may be suspected of pursuing a family-building strategy. If so, the never-married mothers were at a disadvantage compared to widows and divorcees who quite probably already had children.

Value of children: The Netherlands versus Taiwan

Children were valued differently in Taiwan and the Netherlands. Part of this difference can be accounted for by the much longer period of childhood and pre-marital adulthood characteristic of the Dutch. This extended the period of post-puberty sexual abstinence expected of young people to as much as a decade, while Taiwanese girls were typically married shortly after their first menses, at about 16. The consequences for this difference of exposure to non-marital pregnancy are complex. Supervision over the sexual behavior of unmarried Dutch youths was a major cultural problem; in Taiwan, girls and boys were normatively married almost as soon as they were capable of conception. The value of children may have been somewhat undercut for Dutch parents by the enormous concern and effort to inhibit their children's sexual experience throughout the teens and early twenties.

The right to benefit from children's labor and earnings also may have affected the value of children as understood by Dutch and Taiwanese. By the late 19th century, schooling was common for Dutch boys and girls, adding actual and opportunity costs to the parental burden. In Taiwan, schooling was not general for children until two decades into the Japanese period. While many Dutch youths left home for paid employment in their late teens, many did not become economically independent until marriage – indeed, marriage was normatively delayed until such independence was assured. Working “children” remitted their wages to their parents and saved for marriage. Unmarried, wage-earning Taiwanese youths (and these were few, island-wide) also remitted wages, but they did not achieve economic independence through or at marriage. Independence in career choice, use of earned wages, and marital decisions was greater in the Netherlands than in Taiwan. Although they married late, Dutch sons and daughters left the parental economy when marriage occurred. In purely economic terms, it might even be said of Dutch sons and daughters what Chinese say only about daughters: that they are *p'ei ch'ien huo* – “goods on which one loses money.”

Dutch illegitimate children were likely to carry yet more direct economic, social, and religious costs than legitimate ones. Dutch widows and divorced women, many of whom may already have had children, formed only a small minority among mothers of illegitimate children (see Table 2). The lower propensity of Dutch women testifies to the limited economic value in its strictly nuclear-family regime. The structural anomalousness of children born outside a nuclear family lowered their value still further.

Social attitudes toward illegitimates and their mothers also affected behavior, and Dutch and Taiwanese attitudes varied considerably. Given the higher propensity to bear illegitimates among Taiwanese women, we must assume that society more readily made a place for both mother and child. For Taiwanese, patrilineally-anomalous children were problems for the kinship system alone. The social safety net for Chinese who lacked kin did not differ as much from that of Europe as is often supposed. Chinese governments supplied charity in crises such as famine, and permitted private (often Buddhist) organizations to do the same.⁴² Official policy also supported “poorhouses, foundling homes, lepers’ asylums, old age homes, and public cemeteries, [varying] from period to period and...administered at the local county level...unevenly carried out”⁴³, but do not seem to have discriminated systematically against illegitimates and their mothers. Chinese charity was universal, but too intermittent to provide for the predictable stream of unmarried mothers. Kin who had played a role in a girl’s sexual vulnerability did not disown her when it resulted in pregnancy. But her fatherless children had no patrilineal claim to either property or standing. Ethnographic evidence suggests that their status per se was not a serious problem for them or for their mothers, especially among the working classes. Outcomes for mothers and children from Taipei sites are examined in another paper.⁴⁴

In the Netherlands, illegitimates complicated the operation of social institutions that assumed supra-kin responsibility for economic unfortunates. Church, state, and occupational associations wove a safety net that caught propertyless widows, orphans, the childless elderly, veterans of the region’s incessant wars, the ill, and many paupers. Netherlandish charity, however, was typically reserved for the “deserving poor,” and the sexual standard for this was high. Dutch widows, if chaste and thus “deserving,” were prominent receivers of religious and municipal charity and social benefits. Giving birth to a bastard child endangered that privilege.⁴⁵ Illicitly pregnant girls could make no claim on public assistance, and might even be driven from home by her kin. They risked lowered marriage expectations, loss of employment, and social rejection that might result in dire poverty or even prostitution.

A more quantitative approach to answering the question of whether illegitimates were valued or seen as unwelcome burdens is to examine their rates of survival. These figures tell us something, too, about the relative evaluation of boys and girls born under these circumstances. Table 3 shows that illegiti-

42. Will, Wong, and Lee, *Nourish the People*.

43. Schak, *A Chinese Beggars’ Den*, 17.

44. Gates and Hsieh (ms. 2004).

45. Alberts, *Gevallen, niet gebroken*.

Table 3. Infant mortality (percentage of death within the first year) by legitimacy status and sex, Netherlands and Taiwan

	Illegitimates		Legitimates	
	male	female	male	female
Netherlands 1905	23.8	23.4	15.4	12.7
Netherlands 1920	15.5	12.9	8.3	7.2
Netherlands 1935	8.0	4.9	4.5	3.4
Taiwan 1906	24.1	17.8	17.4	18.0
Taiwan 1920	21.0	14.2	18.0	13.3
Taiwan 1935	16.1	12.5	16.0	13.2

Sources: For Taiwan, Vital Statistics of the Population, Taihoku, Government-General of Taiwan, Bureau of Official Statistics. For the Netherlands: Bijdragen tot de Statistiek van Nederland. Loop der bevolking.

mate infants in the Netherlands had much higher mortality rates than legitimate children. Part of this difference has been ascribed to infanticide.⁴⁶ Clearly, the mothers did not favor boys over girls. Illegitimate male infants died more often than the legitimate, but this corresponded with the excess mortality of legitimate boys. By contrast, illegitimate infants in Taiwan overall had about the same mortality rates as the legitimate ones. Illegitimates were seen less as as unwelcome burdens in Taiwan as they were in the Netherlands.

Female economic independence

Taiwan

The desire to build a family, even if outside marriage, was no guarantee that the goal could be achieved, for an adequate economic context for female economic independence remained the limiting condition. Most Taiwan mothers whose children had no social father relied on paid work. Niches for unmarried mothers have always existed in Taiwan; unfortunately, the household registers are usually mute on women's occupations. Seamstresses could survive on their earnings; some households allowed servants to keep their children with them; handicraft production sustained some single mothers; and the entertainment services, including prostitution, hired many more. During the last third of the 19th century, Taiwan's economy expanded on a trajectory that only slowed in the 1930s, creating many new occupations for women. Female niches grew disproportionately in two notable sectors: sex work and the tea industry, both concentrated in Taipei.

Most recruits for sex work were eldest daughters contracted by their par-

46. Kok, Van Poppel and Kruse, "Mortality among Illegitimate Children".

ents for a few years until later-born children could provide the help needed at home. Parents were necessarily responsible for putting girls into prostitution; they had the right and the responsibility to allocate their daughters' labor. Girls working away from home might retain their registration in their parents' household, making use of the "temporary outregistration" (*chi liu*) category to account for their absence there and their presence in that of their employer (where they would be temporarily registered in); or they might be permanently transferred from their parents' to another household when they worked for a brothel-keeper or as a live-in servant. Before the Japanese period, transfers as *cabokana* (bondservants) were legal and not uncommon; under Japanese rule, with bondservanthood made illegal, girls were registered into households that depended on sex work as adopted daughters or adopted daughters-in-law. A young woman who had found a niche that could sustain a family of her own sometimes divided herself from the parental household and lived an independent life of family-building.

Comparisons with other parts of the Chinese world shed some light on the problem of connecting prostitution with illegitimacy. In Shanghai in the 1920s and 1930s, prostitution was an extremely important 'industry'. It has been calculated that about 1 in 42 female residents of appropriate age were prostitutes. However, they were certainly not all unmarried. In 1948, at least 9% of Shanghai prostitutes were married. Also, their fertility was very low due to frequent miscarriages and sterility caused by venereal diseases.⁴⁷ Although research on this subject for Taiwan is still very incomplete, scattered evidence suggests that Taipei, during its boom years from the expansion of the tea trade in the 1860s through its prosperity under Japan until the war began in the 1930s, had an entertainment business roughly parallel to that of Shanghai.

In Taiwan, prostitutes worked alongside women and girls who poured tea and drinks, danced and flirted with customers, sang, and performed, enhancing the sexually-stimulating ambience of bars, coffee shops, dancehalls, and the outer rooms of brothels. Courtesans famous for artistic skills became local stars whose exploits were followed in gossip and tabloid publications. Around these clustered hairdressers, maids, seamstresses, ornament-makers, music and dance teachers, drivers, madams, and pimps. Both famous and lowly were notoriously vulnerable to slipping into illicit sexual relations and to bearing illegitimate children.

Taiwan's towns and cities had extensive entertainment quarters, many of which persisted openly until the 21st century. Cheap hotels functioned as brothels, creating circumstances in which travelers with modest budgets readily observed even if they did not engage in all the available entertainments. "Enter-

47. Hershatter, "Prostitution and the Market", 266, 272.

tainment,” however coarse and commodified, could be found in virtually every large vegetable market in every town and city during our period. As in most similar societies, Taiwan’s sex workers sometimes earned enough in their early years to support children and accumulate the capital for a small business, perhaps in the same sector, for their middle years.

The late 19th century tea boom also expanded the work opportunities for women in the Taipei basin. Girls and women picked and sorted tea before it was processed by male specialists, elaborately tested and wrapped, and transported to the docks of Ta-tao-ch’eng. A few of the region’s large plantations hired women pickers, but most of the leaf was plucked by family members from their own bushes. The market for women’s waged work in tea was the sorting sheds. During the three seasonal pickings, thousands of girls and women came each day from the villages to sort leaf, as did many from Taipei neighborhoods.⁴⁸ Tea sorters are described as well-turned-out, lively, and confident, doing honorable work at decent wages. Other girls and women, invisible in the record but necessary to the smooth functioning of capitalist extraction cooked, did laundry, entertained, and kept boarding houses for the flood of seasonal men workers.

Temporary and permanent migrants into Taipei made for a radical expansion of the city’s population. Between 1920 and 1930, the population increased from 114,140 to 147,620, with an increase of 27% for men and 31% for women, an expansion that opened many opportunities for female independence. To sex work, tea sorting, services for migrants without families, the production of traditional goods (such as spirit money) now in even greater demand were added jobs as teachers, nurses, telephone operators, and, very slowly, clerical workers. With Japanese development, women (and men) found jobs in tobacco, soysauce, and liquor factories. Kaohsiung City was also booming, with growing trade and port facilities that must have created a similar market for women’s paid work met largely by migration from the island’s villages. This female labor force left only slight traces in the statistical records.⁴⁹ We assume that they gave birth to a very substantial proportion of Taiwan’s illegitimates, and that they clustered in parts of Taipei City where cheap rentals were available.

Insight into the conditions that produced many illegitimates comes from the work of Arthur Wolf and Huang Chieh-shan for the Haishan area (1980: 258-259). Of all women who had no brothers, almost 40% gave birth to an illegitimate child, while only 7% of those with at least one older brother did so. Further,

48. Davidson, *The Island of Formosa*.

49. Taiwan’s household registry system allowed for temporary residence away from the household to which the person planned to return: the chi liu. From lists of exits and reentries, we can learn something about such migration behavior. Not all currently existing registers retain these materials, however, and in those that do, some may be missing. Complete analysis may prove impossible.

among women remaining unmarried at age twenty-five, 70% of the 1891-1895 birth cohort bore an illegitimate, and 43% of the 1916-1920 cohort did so. Wolf and Huang's interpretations of these findings are that parents without sons sometimes delayed arranging marriages for their daughters, putting them into the most lucrative lines of work open to them, including sex work. Analyses of larger bodies of data support the logic of this argument. When a girl could earn in a night what her father earned from several days of heavy labor, and when that father faced rearing a growing family with no sons to help him, one can better understand how such decisions were taken.⁵⁰

The Netherlands

Opportunities for women to support themselves and their children were significantly fewer for Dutch than for Taiwanese women. In fact, Dutch female labor force participation rates were very low within western Europe at large, especially in industry. This fact has been attributed to the early demise of cottage industry in the (western) parts of the country as well as to the equally early dominance of the bourgeois cult of the nuclear family in which the wife and mother performed her duties at home.⁵¹ Women workers were concentrated in agriculture and domestic services. However, these jobs could hardly be combined with motherhood. Social rejection of unmarried women and their children was so strong that even those employed as house servants and farm laborers were fired when discovered to be pregnant. Social policy reflected this opprobrium of single mothers. Typically, the Netherlands were the only western European country not to ratify the 1919 International Labor Organisation's Maternity Protection Convention because it allowed unmarried mothers paid maternal leave.⁵² Dutch custom did not tolerate babies being taken along and breast-fed when the mother was working outdoors. Single mothers could not afford wet-nurses. Together, artificial feeding and (willful) neglect resulted in high mortality rates.⁵³ Finally, working women earned about 60% of what men earned in a comparable position; the costs of living were not lower for them than for men. It must have been difficult for them to raise their own family in these circumstances.

In the Netherlands, prostitution was not an important background of illegitimacy. In the countryside it appeared to have been quite rare. In his detailed study of illegitimacy in Drenthe, Overdiep only encountered one instance of prostitution by an unmarried woman resulting in a child. In this area, prostitution was limited to a small number of mostly married women, who sometimes

50. Wolf and Huang, *Marriage and Adoption in China*, 164.

51. Pott-Buter, *Facts and Fairy Tales*.

52. Pott-Buter, *Facts and Fairy Tales*.

53. Kok, Van Poppel and Kruse, "Mortality among Illegitimate Children".

joined forces to form an illicit brothel.⁵⁴ Rural prostitution was rare because of a lack of *demand* for paid sex. Men who wanted sex could simply approach a girl known for her loose morals. Because girls were not supervised by the parents in the evenings, casual sexual encounters occurred quite often. Only men who lacked the network on information on 'willing' girls, such as mobilized soldiers or immigrants to large cities, had to resort to paid sex. Therefore, prostitution was concentrated in the large cities. However, the frequent sexual contacts of urban prostitutes led relatively seldom to illegitimate births. It has been calculated that only about 10-30% of prostitutes in the cities of Rotterdam and Leyden (18th and 19th centuries) had a child at least once in their lives.⁵⁵ Many prostitutes used contraceptive devices or resorted to abortion. Also, they often suffered from venereal diseases.

Toward an explanation

The Netherlands had many single women who rarely became single mothers, but in Taiwan the reverse was true: single women were few in number, and often were mothers as well. The distinctive local family systems account for much of this difference. The nuclearity and neolocality of the Dutch required late marriage. While waiting, adolescents chose their own partners and amassed the resources necessary to founding new households. Because premarital birth could endanger these plans, socialization and social control combined to inspire youths with prudence. Single mothers were not cared for as 'deserving poor,' but faced lives of misery. Courtship and social control are central to the history of Dutch illegitimacy.

In Taiwan, by contrast, marriages were generally arranged at so early an age that sex between unmarried adolescents caused little illegitimacy. However, girls who did not marry young because their earnings were needed at home were remarkably prone to have out-of-wedlock children and then to marry uxorilocally. When daughters were put into prostitution, their illegitimate children were seen as evidence of, and even a reward for the sacrifices of filiality; such grandchildren could not be rejected. In general, Chinese families welcomed additional children, whatever their status. Even when daughters worked at less risky and more reputable jobs, if they lived away from parental supervision, their sexual vulnerability increased along with a likelihood of having an illegitimate child.

Young widows and divorcees were even more prone to have children than single women. Did they also work in 'hazardous' occupations associated with the sex and entertainment industry? Basing his conclusions on census data, Richard Barrett argues that the numerical importance of widows implies that prostitu-

54. Overdiep, *Rechtsbescherming*.

55. Kok, *Langs verboden wegen*, 55.

tion was a less important background for illegitimate children than Arthur Wolf has suggested.⁵⁶ Because we do not know their occupation, we cannot at this stage confirm or reject this hypothesis. Perhaps they were simply not interested in remarriage but instead extending their own uterine families. In particular in Taipei, the urban economy offered plenty of opportunities of women to sustain themselves and their children.

In both countries, illegitimacy was a fairly rare phenomenon that did not pose a threat to the available resources; general fertility levels were hardly affected by illegitimacy. However, this outcome was reached through completely different mechanisms. In Taiwan, near universal marriage for women ensured that illegitimacy was concentrated among widows, unmarried women without brothers and women in cities that offered female employment opportunities.

In the Netherlands, illegitimate fertility was held in check in spite of late and non-universal marriage. All kinds of social control mechanisms backed up the sexual restraint of adolescents and ensured that couples married when a pregnancy occurred. The cultural and social penalties for a single mother were harsh and her opportunities for employment limited. Until 1911, she had no way of putting (legal) pressure on her absconding boyfriend. The threat of losing esteem, work and social benefits kept most single women from entering sexual relationships.

Finally, however, we are left with a paradox. Taiwan girls were not free to begin their sexual careers at will because the right to dispose of their sexual capacities belonged to their parents. Dutch girls were expected to dispose of themselves, but only after a prolonged period of chaste courtship. Female agency operated very differently, giving greater control over her life to a Dutch than to a Taiwanese woman, but also putting her more at risk for illegitimacy. Contradictorily, Taiwan's strong market for women's labor compatible with unmarried motherhood combined with its family system to generate high propensities to illegitimacy. The Dutch, with few such niches available, were less prone to unmarried motherhood despite their immensely greater courtship opportunities.

56. Barret, 'Short-term trends in Bastardy in Taiwan'.

Fertility four ways

Dutch urban and rural
and Taiwanese urban
and rural

*Theo Engelen &
Arthur P. Wolf*

China and Northwestern Europe have long been regarded as prototypical exemplars of two fundamentally different demographic regimes – what are commonly called high and low pressure regimes. In high pressure regimes, exemplified by China, women all married and married at an early age, the short-term result being high fertility and the long-term result being overpopulation, poverty, and high mortality. In low pressure regimes, exemplified by Northwestern Europe, women married late and often not at all, the short-term result being low fertility and the long-term result being slow population growth, a relatively high standard of living, and relatively low mortality.

Our goal in this paper is to reinvigorate this hoary contrast by imposing on it another even older contrast – urban life and rural life. Because of the paucity of data from Chinese cities, the China that is commonly taken to exemplify high pressure regimes is in fact rural China, as known, for example, from John Lossing Buck's famous farm surveys.¹ What, then, of the cities? Where they also high pressure zones? Would the contrast between China and Northwestern Europe appear as sharp if we compared rural China with rural Europe and urban China with urban Europe? The answer is both surprising and revealing.

Europe is represented in our comparison by women born in two municipalities in the Eastern Netherlands, Nijmegen (between 1840 and 1864) and Borne (between 1800 and 1860). Located on the south bank of the river Waal near the German border, Nijmegen has a long history as a garrison town and commercial center, serving as the northern-most outpost of the Roman Empire and later as an important junction in trade between Germany and the Netherlands. In 1810, however, the French occupation cut Nijmegen off from much of Europe, the result being that during the period covered by our data the population was largely employed in the traditional way – agriculture, marketing activities, domestic service, or in the garrison. Industrialization did not get underway until the 1870's after the city walls were torn down and rail lines opened to Arnhem, Venlo and Den Bosch. The city is best characterized as a medium-sized provincial town with market and administrative functions.²

Borne is located in the Twente countryside thirty miles north of Nijmegen. Textile production emerged as a cottage industry in Borne as early as the 17th century and developed as a centralized industry in the 19th century. Many landless and land-poor peasants were forced to supplement their income as laborers in the new industry, but agriculture remained the most the important activity until only recently. Families who lacked the land needed to farm full time continued farming as a sideline.³

1. See Barclay et al., "A reassessment of the demography of traditional rural China."

2. See Engelen, "Leven en dood onder controle".

3. See Hendrickx, *In order not to fall into poverty*.

China is represented in our study by women born in the years 1860-1930 in Taipei City and three clusters of Taiwanese villages. Like Nijmegen, Taipei emerged in history as a river port, but centuries later. It began life as a trading post in 1700's but only came of age with the founding of the famous Lung-shan temple in 1741. Taipei remained a small town until the 1860's when it began to grow so spectacularly that by the time Taiwan was ceded to Japan in 1895 it was the largest, wealthiest city in Taiwan. The stimulus was tea. It was Taiwan's most important export and all of it was processed and packed in Taipei. The tea industry gradually declined after the Japanese occupation but by then Taipei was well-established as Taiwan's largest urban center. It was designated the provincial capital in 1894 and served as the seat of the Japanese colonial government until 1945.

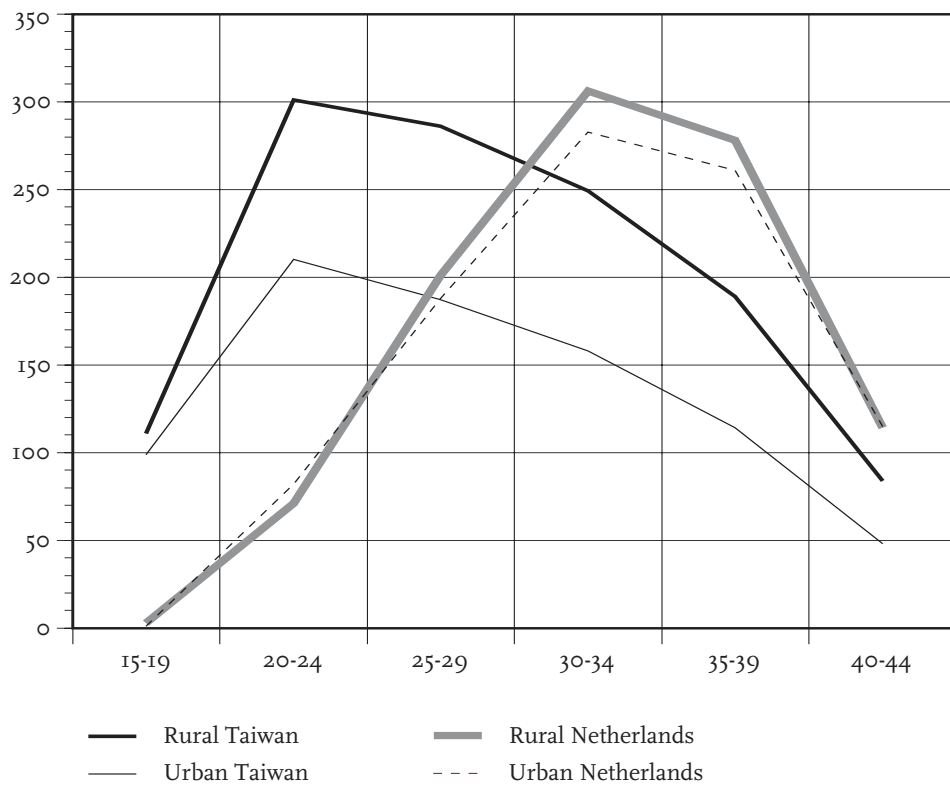
Two of three clusters of villages representing rural Taiwan are located in northern Taiwan (one close to Hsin-chu City and the other on the hills overlooking the city), and the third, in central Taiwan at the foot of the central mountain range. The primary activity in all three was agriculture, but not subsistence agriculture. Even if they had to eat sweet potatoes at home, everyone produced for the market. The major crops were rice, tea, tobacco, sugarcane, bananas, bamboo, and an enormous variety of fruits and vegetables. There was some cottage industry but nothing as important as Borne's textile production.

We will start by comparing our four populations in terms of age-specific total fertility. Figure 1 (based on Table 1) shows that the fertility of Dutch women rose slowly, peaked at ages 30-39, and then fell sharply. There was no significant difference between rural and urban women. The fertility of Taiwanese women, in sharp contrast, peaked at ages 20-24, remained high at age ages 25-29, and then gradually declined. There was, however, a striking difference between the rural and urban women. At all ages after 19 the fertility of the rural women was markedly higher than that of the urban women. The surprising result is that while they presented very different age profiles, the fertility of urban Taiwanese women fell below that of both samples of Dutch women. The total fertility rates for the three samples were 4.08 for the urban Taiwanese, 4.25 for the rural Dutch, and 4.87 for the urban Dutch. The only one of the four populations with high fertility was the rural Taiwanese. Their total rate was 6.10.⁴

Figure 2 (based on Table 2) compares the probability that the women in each of our four populations married by ages 15 through 45. Not surprisingly, the overall pattern resembles that displayed in Figure 2. The figure shows that Dutch women did not begin marrying until age 17 and did not reach the .500 mark until age 25. The urban women married earlier than the rural women, but again

4. The world average for natural fertility populations is also 6.1. See Wood, *Dynamics of Human Reproduction*, Figure 2.1, p. 48.

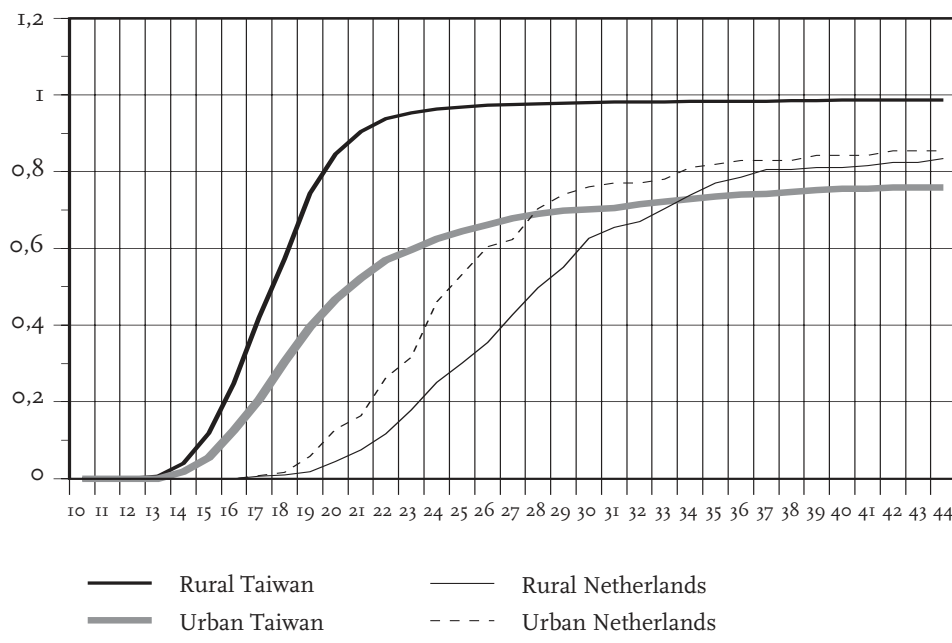
Figure 1: Age-specific general fertility in Taiwan and the Netherlands



the rural/urban difference was not large. Taiwanese women, in contrast to the Dutch women, began marrying at age 12 and had already passed the .500 mark by age 21. But again there was a striking difference between rural Taiwanese and urban Taiwanese. Where the probability of marriage among the rural women was .963 by age 25 and .983 by age 45, the probability among urban women was only .644 by age 25 and only .761 by age 45. The surprising result is that urban Taiwanese were less likely to marry than urban Dutch or rural Dutch.

Thus we appear to have a high pressure system in rural Taiwan and a low pressure system in the Netherlands and urban Taiwan. This is not, however, the only surprise our data has to offer. Figure 3 (based on Table 3) compares our four populations in terms of age-specific marital fertility. The first surprise is that while general fertility was higher in Taiwan than in the Netherlands, marital fertility was substantially higher in the Netherlands than in Taiwan. The second is that while marital fertility was much the same in the rural and urban Dutch populations, it was markedly higher in the rural Taiwanese population than in the urban Taiwanese population. The total marital fertility rates for our four popula-

Figure 2: Probability of marriage by age in Taiwan and the Netherlands



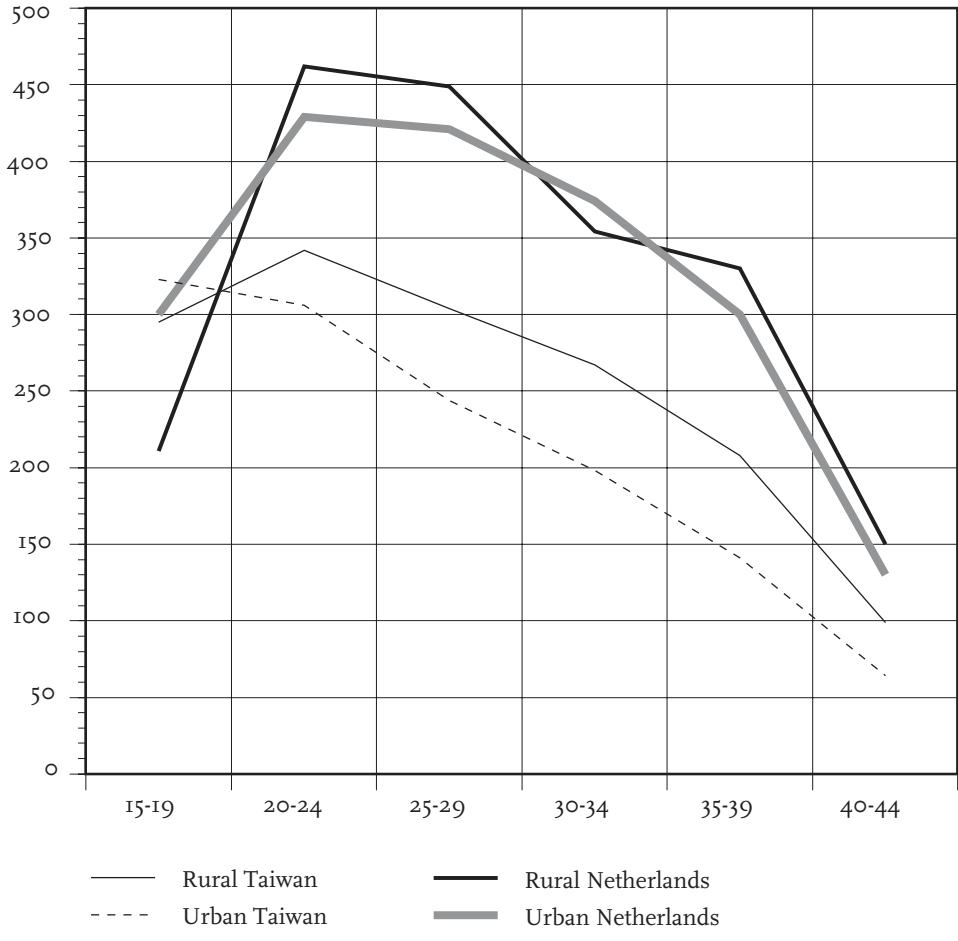
tions were 9.78 for the rural Dutch, 9.77 for the urban Dutch, 7.57 for the rural Taiwanese, and 6.38 for the urban Taiwanese.⁵

The low pressure/high pressure contrast – implicit in Thomas Malthus’ famous distinction between “positive” and “preventative” checks – rests on two claims. One, made explicit by John Hajnal, is that the only part of the world in which low pressure regimes ruled was Northwestern Europe. In this respect, Europe was “unique or almost unique in the world.”⁶ The other claim is that the critical difference between historical demographic regimes was age at marriage and proportions marrying. They were what made a regime low pressure or high pressure. As Tony Wrigley put in commending John Hajnal’s construction of the European marriage pattern, “marriage is at the center.”⁷

5. In one of the three forms of marriage found in Taiwan the wife was adopted as an infant or small child and raised with her future husband. Because of the sexually inhibiting effects of early association, the fertility of this form of marriage was substantially lower than that of the other two forms.(see Wolf, *Sexual Attraction*). We have therefore set aside all these marriages and recalculated our results to show that the rural/urban difference was not due to a difference in the relative frequency of the three forms of marriage. The results showed that with marriages involving early association removed, there is an even larger difference between our rural and urban populations. The total marital fertility rate for the rural women was 7.94 as compared with only 6.48 for the urban women.

6. Hajnal, “European marriage patterns in perspective”.

Figure 3: Age-specific marital fertility in Taiwan and the Netherlands

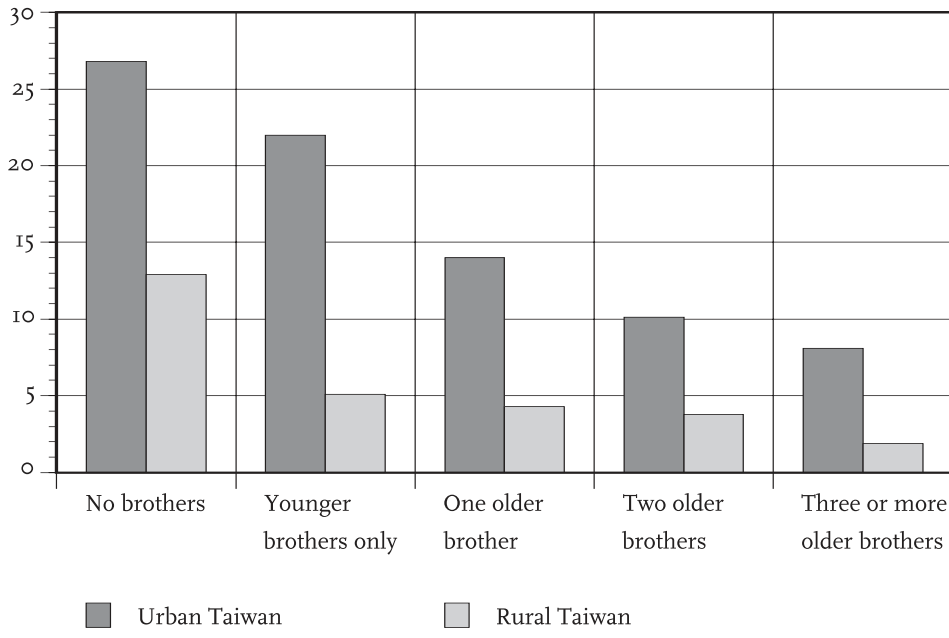


In 1920 only 10.5 percent of all Taiwanese lived in the island's nine major cities and only 4.9 percent in the two cities with populations of 50,000 or more.⁸ Thus the evidence comparing rural Taiwan and the Netherlands confirms the first of the two claims underlying the low pressure/high pressure contrast. The Taiwanese and Dutch demographic regimes were – taken as wholes – very different regimes. One was characterized by high general fertility and a high marriage rate, and the other, by low general fertility and a low marriage rate. What makes our evidence interesting is that it also shows that Taiwanese cities did not conform to the low pressure/high pressure paradigm. Their general fertility and

7. Wrigley, "Elegance and experience: Malthus at the bar of history", 55.

8. Barclay, *Colonial Development and Population in Taiwan*, Table 24, 116.

Figure 4: Proportion of Taiwanese women unmarried at age thirty by number of brothers at age fifteen



marriage rates were low compared to the Dutch figures. They began marrying early but twenty-five percent never married.

Our evidence also confirms the claim that their marriage rate is the critical distinguishing feature of historical demographic regimes. All of the differences in general fertility between our four sites are largely explained by differences in their marriage rates. This is even true of the difference between rural and urban Taiwan. But again our comparisons argue that while the low pressure/high pressure is sound, it is not alone sufficient to account for all the observed differences. There are at least two that cannot be explained by age at marriage and proportions marrying.

The first is the fact that Dutch marital fertility was so very much higher than Taiwanese marital fertility. Because Dutch women married late and often not at all, their general fertility was low, producing a demographic regime that is correctly characterized as low pressure. But in the Netherlands the fertility-depressing effect of a low marriage rate was partly offset by high marital fertility. Dutch women married late but when they married they bore children at a pace that is extraordinary compared to the Taiwanese pace. Had this not been the case, what is a low pressure regime would have been a nearly pressure-less regime.

The second fact that the low pressure/high pressure contrast fails to account for is the very low marital fertility of the urban Taiwanese. Urban Taiwanese women were far less likely to marry than rural Taiwanese women and when they married bore far fewer children. The result was that demographic pressure was weaker in urban Taiwan than in any of our other study sites. This is striking because the pressure was strongest in rural Taiwan.

We are faced, then, with four questions: 1) Why was it that urban Taiwanese were less likely to marry than rural Taiwanese? 2) Why was it that Dutch marital fertility was so much higher than Taiwanese marital fertility? 3) Why was it that marital fertility was lower in urban Taiwan than in rural Taiwan? And, most importantly, 4) Why was it that rural Taiwanese women (and Chinese women generally) married so much earlier and in so much greater numbers than Dutch women (and European women generally)?

Our tentative answer to the first question is that it was because urban settings offered more opportunities for female employment than rural settings. This was critical because when their daughters could be gainfully employed, Taiwanese parents kept their daughters at home rather than marrying them out at an early age. Daughters were only allowed to marry when their parents had sons old enough to provide for their support. Strong support for this argument is presented in Figure 4 (based on Table 4). It shows that the likelihood of a woman's marrying by age thirty depended on how many older brothers she had at age fifteen.

James Lee and Wang Feng have argued that Chinese women deliberately controlled their fertility by what they call "late starting, long spacing, and early stopping."⁹ This suggests that the answer to our second question is that marital fertility was higher in the Netherlands than in Taiwan because the Taiwanese practiced birth control and the Dutch did not. We reject that argument in favor of the view that marital fertility was lower in Taiwan than in Netherlands because Taiwanese women breastfed their children far longer than Dutch women and were poorer, less well nourished, and carried a heavier burden of disease.¹⁰ There is now good evidence that the length of postpartum amenorrhea depends on the metabolic load the mother is carrying rather than on how frequently she nurses her child.¹¹ Thus it is likely that being less well-nourished, Taiwanese women were slower to resume ovarian function than Dutch women. The result was that Taiwanese birth intervals were half again as long as Dutch birth intervals.

Our third question raises again – in even more acute form – the possibili-

9. Lee and Wang, *One Quarter of Humanity*.

10. Our reasons for rejecting the argument are detailed in Wolf, "Is there evidence of birth control in Late Imperial China?"

11. Ellison, *On Fertile Ground*.

ty of deliberate birth control. The total fertility rate of rural Taiwanese women was nearly a fourth again that of urban Taiwanese women. A difference of this magnitude when the women with lower fertility are urban argues for deliberate control, but this is not the only possibility. Despite the presence in the cities of wealthy officials, landlords, and merchants, the great majority of the urban population was impoverished and miserably so. Twenty-eight percent of the male household heads in our Taipei sample were registered as cart-pullers, day laborers, and coolies. Thus one possibility is that, on average, urban Taiwanese were even poorer than rural Taiwanese. Another is that because of the prostitution that is part of urban life in most societies, venereal diseases were more widespread in the cities than in the country. Table 5 (see Appendix) shows that the proportion of all children who were illegitimate was 29.9 percent among mothers aged 15-19 and 17.4 percent among those aged 20-24. This was four times the rate found in the countryside.

Our fourth question takes us back to Thomas Malthus, John Hajnal and the first volume in this series. The question is so large and so contentious that the best we can do here is to refer the reader to the papers in that volume. Suffice it to note that they largely reject the answers offered by Malthus and Hajnal and offer in their place answers ranging from the importance of female labor in the European dairy industry to a difference in the bases of European and Chinese patriarchy.¹²

The low pressure/high pressure contrast posits a causal chain that runs from marriage to mortality by way of fertility and poverty. The model accounts for the fact that general fertility was higher in rural Taiwan than in urban Taiwan and the Netherlands, but it does not account for the fact that marital fertility was higher in the Netherlands than rural Taiwan and higher in rural Taiwan than urban Taiwan. What is missing is a feedback loop running from poverty to marital fertility. Thus amended the model would say that low marital fertility is the result of high general fertility occasioned by a high marriage rate. All that would then be needed for a complete account of our data is an explanation of why marriage rates varied.

12. See Engelen and Wolf, *Marriage and the Family in Eurasia*.

Appendix

Table 1: Age-specific general fertility in Taiwan and the Netherlands

Locality	Age of wife					
	15-19	20-24	25-29	30-34	35-39	40-44
<i>Number of woman-years lived</i>						
Rural Taiwan	29,838	25,627	22,790	20,290	17,398	14,507
Urban Taiwan	15,467	14,128	12,706	11,774	9,617	8,135
Rural Netherlands	184	135	150	160	136	136
Urban Netherlands	1,286	1,090	976	837	860	677
<i>Births per 1,000 woman-years lived</i>						
Rural Taiwan	111	301	286	249	189	84
Urban Taiwan	99	210	187	158	114	48
Rural Netherlands	1	82	188	280	261	115
Urban Netherlands	3	71	201	306	278	114

Table 2: Probability of marriage by age in Taiwan and the Netherlands

Age	Rural Taiwan		Urban Taiwan		Rural Netherlands		Urban Netherlands	
	Women years	Mar. prob.	Women years	Mar. prob.	Women years	Mar. prob.	Women years	Mar. prob.
10	10,557	.000	3,520	.000	376	.000	132	.000
11	10,247	.000	3,440	.000	376	.000	132	.000
12	9,909	.001	3,405	.000	373	.000	130	.000
13	9,560	.007	3,325	.000	369	.000	129	.000
14	9,062	.039	3,233	.018	368	.000	129	.000
15	8,176	.119	3,033	.055	360	.000	128	.000
16	6,973	.248	2,767	.125	354	.000	127	.000
17	5,453	.421	2,433	.205	348	.006	126	.008
18	4,122	.572	2,083	.304	342	.009	121	.016
19	2,813	.743	1,601	.395	337	.018	115	.059
20	1,840	.846	1,350	.467	330	.045	109	.129
21	1,239	.905	1,157	.522	319	.075	100	.164
22	849	.938	1,024	.570	304	.117	93	.263
23	611	.953	966	.597	289	.179	82	.317
24	485	.963	883	.624	264	.251	76	.461
25	388	.969	806	.645	240	.301	60	.533
26	325	.973	727	.662	220	.355	52	.605
27	281	.975	658	.678	200	.427	44	.632
28	252	.977	604	.690	174	.497	41	.704
29	215	.979	563	.698	150	.551	32	.741
30	190	.980	518	.702	131	.627	28	.760
31	180	.981	487	.706	107	.655	25	.770
32	171	.981	447	.716	97	.670	23	.770
33	164	.982	412	.722	89	.703	23	.780
34	153	.983	374	.728	78	.738	22	.810
35	138	.983	336	.735	67	.770	19	.820
36	128	.984	310	.740	58	.786	18	.830
37	118	.984	284	.742	53	.806	16	.830
38	104	.985	273	.747	46	.806	15	.830
39	96	.985	251	.752	46	.811	14	.842
40	93	.986	224	.755	43	.811	13	.842
41	87	.986	203	.755	42	.815	13	.842
42	83	.986	187	.758	40	.825	13	.854
43	79	.986	168	.759	36	.825	12	.854
44	76	.986	147	.759	33	.835	11	.854

Table 3: Age-specific marital fertility in Taiwan and the Netherlands

Locality	Age of wife					
	15-19	20-24	25-29	30-34	35-39	40-44
<i>Number of woman-years lived</i>						
Rural Taiwan	10,412	21,558	20,566	18,091	15,010	11,617
Urban Taiwan	3,335	7,968	8,557	7,950	6,660	5,284
Rural Netherlands	5	132	346	503	591	575
Urban Netherlands	8	130	420	658	780	736
<i>Births per 1,000 woman-years lived</i>						
Rural Taiwan	295	342	304	267	208	99
Urban Taiwan	323	306	244	198	141	64
Rural Netherlands	211	462	449	354	330	150
Urban Netherlands	300	429	421	374	300	130

Table 4: Proportion of Taiwanese women unmarried at age thirty by location and number of younger and older brothers

Location	Number of brothers				
	No brothers	Younger brothers	1 older brother	2 older brothers	3 older brothers
<i>Number of women</i>					
Urban Taiwan	501	549	465	198	111
Rural Taiwan	629	1,503	1,107	740	647
<i>Proportion unmarried at age thirty</i>					
Urban Taiwan	26.8	22.0	14.0	10.1	8.1
Rural Taiwan	12.9	5.1	4.3	3.8	1.9

Table 5: Proportion of Taiwanese children born to never married and currently unmarried women by locality and age of mother

Locality	Age of mother					
	15-19	20-24	25-29	30-34	35-39	40-44
<i>Number of children born</i>						
Rural Taiwan	3,276	7,632	6,641	4,985	3,241	1,195
Urban Taiwan	1,536	2,957	2,343	1,755	1,052	379
<i>Proportion of children born to unmarried women</i>						
Rural Taiwan	6.9	3.5	3.1	3.0	4.0	3.8
Urban Taiwan	29.9	17.4	10.9	10.4	10.7	11.1

**Group identity and
fertility: An evaluation
of the role of religion
and ethnicity in the
Netherlands and Taiwan**

John Shepherd,

Pan Inghai, Jan Kok,

Claudia Engel,

Theo Engelen &

Melissa Brown

Modern scholarly discussion of differences in fertility among and within human populations was originally guided by the conviction that economic characteristics were the leading factor determining fertility levels and patterns. Demographic transition theory, which provided the theoretical framework for both historical and contemporary demographic research in the post-war West emphasized the impact of economic modernization in explaining fertility decline.¹ This scholarly consensus was challenged when members of the Princeton-based *European Fertility Project* concluded that cultural influences were often more important than economic characteristics in determining regional and temporal variations in fertility within European countries.² Studies of Belgium and Spain in particular revealed that structural differences in fertility coincided with linguistic barriers and thus with cultural boundaries, rather than levels of economic development. The significance of these conclusions was not restricted to countries undergoing industrialization. Societies, historical and contemporary, that had not yet undergone fertility decline were found to exhibit fertility differences that pointed to cultural as well as economic influences.³

The notion of non-economic determinants of fertility stems from the observation that the populations of nation states are rarely homogeneous. The compromises and conquests by which nations were created left within their boundaries populations exhibiting differences in behaviour and belief that social scientists categorize with such loose-fitting labels as “culture” and “ethnicity”. The most frequently remarked are language, religion, and the assorted oddities that serve to announce political loyalty.

There is no iron-clad rule that differences of this kind must affect demographic behaviour. Our purpose in this paper is to compare two very different societies – the Netherlands in the years 1830 to 1920, and Taiwan in the years 1905-1945 – to determine whether or not the internal differences found affected fertility. Our goal is to discover when cultural heterogeneity of the kind found in modern nation states has demographic consequences. In other words, under what circumstances do differences make a difference?

The authors acknowledge that “culture” is one of the most used and least understood concepts in historical studies. Our experience in studying these two populations leads us to choose a pragmatic approach, rather than to engage in a methodological and semantic discussion on the definition of “culture”.

This pragmatic approach finds parallels in approaches to the study of ethnic identity, for the kinds of economic, linguistic and cultural boundaries that

1. Notestein, “Population. The Long View”, 36-57.

2. Coale and Watkins, *The decline of fertility in Europe*.

3. Dupaquier, “L'autorégulation de la population Française”, 413-436; Wrigley et al., *English population history 1997*; Knodel, *Demographic Behavior in the Past*.

demarcate fertility differences may also define identity groups. Fredrik Barth's seminal work emphasizes that ethnic identity serves as a primary means of social differentiation.⁴ Subsequent debate between "circumstantialists" and "primordialists" arose over whether, and to what degree, culture was the basis for such social differentiation.⁵ More recently, even authors who recognize the importance of political economic circumstances to the development of ethnic identity have suggested that cultural meanings and practices are also relevant.⁶ Here, then, is another debate over the relative influences of social (including political economic) factors compared to cultural factors.

Rather than assume a priori that culture is the determining factor, we compare marital fertility across three pairs of socially differentiating identities: Catholics and Protestants in the 18th-19th century Netherlands, Hoklo and Hakka (two Han Chinese groups) in early 20th century Taiwan, and Hoklo and plains Aborigines (a Han and a non-Han group) in early 20th century Taiwan. Catholic and Protestant are religious identities, not ethnic identities. However, historians agree that they constitute clearly bounded social identities in the Netherlands during the 19th and 20th centuries. Marriage, for example, was rare across this social boundary. Hoklo and Hakka are sometimes called "sub-ethnic", regional, or speech group differences because both groups have long been considered Han (or ethnic) Chinese. Within the category of Han, however, they also constituted clearly bounded social identities in Taiwan in the 19th and 20th centuries. Again, marriage was rare across the boundary. The difference between Hakka and Hoklo, on the one hand, and the descendants of Taiwan's indigenous people, on the other, were ethnic, not religious, differences. Indeed, before 1930, the indigenous people constituted clearly bounded social identities. Intermarriage did occur, but primarily of a stigmatized sort. After 1930 or so, however, the social boundary between these identities disappears, and marriages occur freely across the previous boundary.⁷ For scholars writing on Taiwanese society, ethnicity has the same central position in social differentiation as religion in the Netherlands.

In this paper we try to establish what differences in fertility existed between religious and ethnic subpopulations in Taiwan and the Netherlands. Whenever we find situations where competition between groups is strong, we expect group identity to effect behavior significantly. McQuillan applied this idea to the relationship between religion and demography.⁸ In his view three preconditions have to be met before this relationship becomes visible. First of

4. Barth, *Ethnic groups and boundaries*.

5. E.g. Keyes, "The Dialectics of Ethnic Change".

6. E.g. Ortner, "Identities: The Hidden Life of Class".

7. E.g. Brown; Brown, *Is Taiwan Chinese?*

8. McQuillan, "When does religion influence fertility?"

all, religious doctrines have to explicitly address (the morality of) demographic behaviors. Furthermore, the religious organizations need to have methods at their disposal to influence their members directly or indirectly, via, for instance, education, print media, etc. And, lastly, the adherents must feel a strong identification with their denomination. The last two preconditions enable religiously defined differences to influence demographic behaviors. Whenever denominations conflict with political authorities (as in N. Ireland) or when denominations try to strengthen their own position versus other denominations, group identity and the influence of religion on demographic behavior may be reinforced. The Netherlands is an ideal country to test these propositions, given the number of mutually demarcated religious groups. In the Taiwanese case we asked ourselves whether McQuillan's hypotheses regarding "confessionalization" are applicable to fertility differences among ethnic groups.⁹ Whenever possible we controlled for social and regional influences, and historical developments in our examination of differences between the Taiwanese subpopulations. No process affecting fertility behavior analogous to confessionalization occurred in the competition among ethnic groups in Taiwan. Our findings that differences in marital fertility *do* correspond to religious differences in the Netherlands but *do not* correspond to ethnic differences in Taiwan raise interesting questions for future research on the relation of fertility and identity to culture and whether there are more fundamental differences in social process between Asia and Europe than have previously been recognized.

The origins of group identity

Religion in Dutch society

The dominant axis of social differentiation in the Netherlands until well into the 20th century was religious denomination.¹⁰ Even regional and social differences were influenced heavily by religious affiliation. The division of the country into distinct religious groups started in the 16th and 17th centuries, when the Dutch fought a war of independence against the Spanish emperor, Philip II. Although there is an ongoing discussion on whether the revolt was caused by political (*haec libertatis ergo*) or religious (*haec religionis ergo*) motivations, it is safe to say that Dutch Protestants rebelled against a Catholic monarch. From the end of the revolution, with the treaty of Münster in 1648, the new Dutch Republic of the United Provinces emphasized its Protestant character.

Even in the 19th and 20th centuries, regional variations in religious affiliation can be traced to this history. A line drawn from the south-west to the north-

9. McQuillan, *Culture, religion and Demographic Behaviour*, 170ff.

10. Knippenberg, "Een veelkleurig palet".

Table 1: Proportion of denominations in Dutch society (in percentages)

Period	Roman Catholics	Total	Protestants		Other denominations	No denomination
			Dutch Reformed	Calvinists		
1849	38	56	55	1	6	0
1899	35	56	48	8	6	2
1947	38	40	31	9	5	17
1960	40	37	28	9	4	18
2000	32	21	14	7	8	40

Source: Dutch Central Bureau of Statistics

east, places the majority of Catholics in the eastern and southern parts of the country, and the majority of the Protestants in the northern and western provinces. This line came into being during the so-called Twelve Year Truce (1609-1621) when it separated the Protestant and Catholic forces. From 1648 the Dutch Republic established the Reformed Church as its official denomination, reducing the Roman-Catholics to a second-class subpopulation. The Protestant rulers practiced a tolerance that later became an important feature of the Netherlands. Officially, only Dutch Reformed were allowed to worship publicly, but in daily life the state turned a blind eye to the activities of other denominations. Nevertheless for centuries important political and social functions were reserved for Protestants.

The official rehabilitation of Catholic citizens started with the Dutch version of the French Revolution in 1795, after which the preferential treatment of Protestants was abandoned. This process gained momentum in 1853 when Dutch Catholics restored their dioceses. During the second half of the 19th century, a new development in Dutch society became visible. More and more, the competition between Protestants and Catholics, and to a lesser degree Liberals and Socialists, created a new situation that dominated all societal relations. This process is called *Verzuiling* and can be translated as pillarization. Basically, this development amounted to a strict segregation of society according to the religious or social vision of the inhabitants. Pillarization reached its peak in the first decades of the 20th century. The result of this process was that within one country one could find several subpopulations living separate lives. When born a Catholic, for instance, one attended a Catholic school, married a Catholic partner, joined a Catholic labor union, and voted for the Catholic party. Even leisure activities were organized along denominational lines.

The distribution of the denominations remained almost unchanged until

1850. The majority of the Dutch population adhered to Protestantism, but Catholics formed a substantial minority. Other denominations were quantitatively negligible until the 20th century. From Table 1 we learn that around 1950 the number of Roman Catholics overtook the number of Protestants. This quantitative development is significant for the changing social position of the Catholics. Pillarization resulted in a so-called emancipation process, involving investments in better education, including the foundation of a Catholic University in 1923. By 1950, the social differences between Protestants and Catholics had vanished. The second half of the 20th century witnessed also the secularization of society. In 2000, 40% of the Dutch population was officially registered as not belonging to a denomination. In actual practice, however, 60% of the Dutch declared themselves to have no denominational affiliation.

Up to this point we have treated Protestantism as a single denomination. Protestantism in the Netherlands, however, cannot simply be brought together under one label. The Dutch Reformed Church harbors various streams, ranging from the very liberal to the very fundamentalist. In 1843, and again in 1886, two major divisions took place. In both cases large numbers of Orthodox Calvinists left the Dutch Reformed Church, which had become – in their eyes – too “modern”. In 1849, this group consisted of only 1% of the Protestant population, but by 1899 8% of all Protestants were members of one of the secessionist churches. However, a large group of Orthodox Protestants remained within the broad Reformed Church. Because of the democratic character of this church, the separate communities are relatively independent. The process of secularization in the 20th century affected Orthodox Calvinists both within and outside the Reformed Church to a lesser degree than Catholics and the liberal segments of the Dutch Reformed.

As already mentioned these three major denominations in the Netherlands constituted clearly segregated subpopulations with their own way of life. This social segregation becomes evident, among other things, when we study their demographic behavior. Time and again, research into the demography of the Dutch has concluded that Roman Catholics adhered to a traditional interpretation of marriage and reproduction. Restrictions on marriage to non-Catholics remained strong until 1960. Also, the prohibition of all forms of contraception kept Catholic marital fertility at a very high level, even when compared to Catholics in neighboring countries. Dutch Reformed couples, on the other hand, adopted “modern” reproductive behavior to a much greater degree and at an earlier date. Calvinists took an intermediate position, although closer to the Catholics.¹¹ Most of the studies referred to, however, were conducted on the basis of aggregated data. This paper will use individual level data to demonstrate the influence of denomination on reproductive behavior.

11. Engelen and Hillebrand, “Fertility and Nuptiality”.

In the Taiwanese case, ethnic groups were not distinguished by differences of religion; popular Confucianism uniformly emphasized the value of children, especially sons. We, therefore, turn to another possibly “cultural” influence. The late imperial Chinese empire encompassed great ethnic diversity. The Han majority – called “ethnic Chinese” by most Westerners – with seven mutually unintelligible Chinese “dialects”¹² as well as documented regional variation in marriage practices¹³ and political economy¹⁴ displayed at least as much ethnic and linguistic diversity as western Europe. Non-Han ethnic groups, speaking languages distantly (if at all) related to Chinese and practicing their own customs, constituted the local majority in many parts of the Chinese empire, especially in border regions. In early 20th-century Taiwan, membership in two Han and two non-Han ethnic groups was still a salient determiner of social status and group membership.

Southern-Min-speaking Han migrants and their descendants dominated Taiwanese society, demographically and politically. Most came from Changchou and Ch’uanchou, two southeastern prefectures of Fukien province. In Taiwan, Min-speaking Han called themselves “Hoklo”, the term we use here, and most were entered into the household registers as “Fukienese”. (Min-speaking Han in other parts of southeast Asia called themselves “Hokkien,” a term also used to refer to Taiwanese Hoklo.) K’e-chia-speaking Han migrants and their descendants, known as “Hakka”, constituted a significant Han minority in Taiwan. Most came from Chiayingchou, and Huichou, prefectures in northern Kwangtung province, and were entered into the registers as “Kwangtungese”.

The Han classifications that appear in the Taiwan household registers as “race” or provenance (*tsung-tsu*) – *fu* (for Fukien province) and *kuang* (for Kwangtung province) – can serve as approximate ethnic indicators. However, because they actually indicate the province of ancestral origin of an individual’s presumed biological father (or birth mother, if the father was unknown), there are two important qualifications to bear in mind. First, two small groups of Han cross-cut the correspondence between provincial origin and ethno-linguistic group (see table 2). Most significant was a small group of Min-speakers who came from the lowland, coastal areas of Kwangtung provinces’ Chaochou prefecture; they appear in the registers as “Kwangtungese”. A much smaller group of K’e-chia speakers, who came from Tingchou prefecture in Fukien, appear in the registers as “Fukienese”. It is not possible from the registers to distinguish individual members of these crosscutting groups, though local histories preserve the

12. Ramsey, *The Languages of China*.

13. Chuang and Wolf, “Marriage in Taiwan”; Stockard, *Daughters of the Canton Delta*.

14. Gates, *China’s Motor*.

Table 2: The population of Taiwan by language in daily use and provenance, 1915

Language in daily use*	Provenance					
	Fukien		Kwangtung		Plains Aborigine	
Hoklo (S. Min)	2,744,566	99.7%	70,543	14.7%	41,281	86.6%
Hakka (Ke-chia)	6,806	0.2%	407,542	85.2%	766	1.6%
Bango (aborigine)	657	0%	272	0.1%	5,612	11.8%

Census of 1915, *shukei gempyo, zento no bu*; Table 10, p.1158-59. A few speakers of Japanese and other Chinese languages are not shown in this table.

* The language classification is clarified in SPCF, p. 95; see also Hashimoto, *The Itakka Dialect*, 24 on the use of "Kwangtungese" for Hakka dialect in Japanese publications in Taiwan.

Table reprinted from Shepherd, "Demographic Studies of Plains Aborigines".

presence or absence of such populations. None of the household register sites is included among those townships where significant numbers of Tingchou and Chaochou residents are located. A second qualification about these approximate ethnic categories is that they do not indicate the ethno-linguistic classification individuals experienced in social interaction. Rather registered provenance was assigned at birth on the basis of father's provenance. Adoptions across these categories, especially of girls, were common and readily identifiable in the registers.

The many Austronesian-speaking indigenous peoples or Aborigines of Taiwan have long been categorized into two broad groups which reflect their relationship with Han peoples. ("Aborigine" is the preferred English appellation of the Alliance of Taiwan Aborigines.) The Japanese-period household registers, following late imperial Chinese practice, use the pejorative labels of "civilized barbarians" (*shu-fan*) and "wild barbarians" (*sheng-fan*); the same groups are now politely referred to as "plains Aborigines" (*ping-p'u tsu*, or "Pepo", lit. "plains tribes") and "mountain Aborigines" (*kao-shan tsu*, lit. "mountain tribes"). The mountain peoples include at least nine ethno-linguistic groups with several thousand years' occupation of Taiwan's high central mountains, narrow eastern plains, and islands off the southeastern coast. Many of these peoples defended their political independence into the Japanese-period and consequently are not well represented in the registers. The many plains peoples, divided among more than ten distinct ethno-linguistic groups, came early under Chinese political authority and cultural influence.¹⁵ The 17th-century Dutch ranked their primary allies of the southwestern plains, called the Siraya, as the most important of the Aborigines. Han colonization from the 17th through late 19th centuries made

15. Shepherd, *Statecraft and Political Economy on the Taiwan Frontier*.

the Aborigines a minority demographically and politically. By 1905, though many if not most had adopted Han language (Southern Min) and many customs, plains Aborigines were still referred to as “savages” (*fan-tsu*, T. *hoan-a*) by their Han neighbors and distinguished in the registers as “civilized” (*shu*).¹⁶

During the frontier era, the various Han and non-Han ethnic distinctions had political-economic significance. Han colonists’ reliance on hometown ties as important elements of networks for mutual aid and defense resulted in communities largely residentially segregated by speech group and provenance. Such ties were often cemented in worship groups and networks of temples devoted to patron deities identified with particular hometowns on the mainland.¹⁷ These worship groups, however, did not develop sectarian ideologies, clerical hierarchies, or a role as exclusive “denominations” in the way Protestant and Catholic groups did in Europe. Rivalry and mutual suspicion among these settler groups frequently led to violent conflicts between communities.¹⁸ Weak imperial government control on the frontier meant these conflicts often escalated out of control (anti-dynastic rebel groups occasionally fanned the flames), and had to be suppressed by military campaigns and reinforcements of government troops from the mainland.¹⁹ Hakka and plains Aborigine militia often joined government troops to put down rebellious Hoklo, though occasionally some plains Aborigines joined the rebels. (When the rebels were Changchou Hoklo, then Ch’uanchou Hoklo communities often joined the government side as well.) Repeated conflicts reinforced the internal solidarity and residential segregation of the settler groups, so that ethnic enclaves came to dominate large swaths of territory.

By the late 19th century, such communal strife had largely ended, though the geographic distribution of ethnic groups through the mid-20th century still reflected the earlier hostilities. The Hakka population was concentrated in two main areas of Taiwan: the northwestern plains and foothills in Hsin-chu and in southwestern Taiwan along the eastern edge of the Pingtung plain. At the beginning of the 20th century, pockets of plains Aborigine concentration occurred in several locations (south, central and north) on the western plains, in the Puli basin of the central mountains, and on the northeastern plain near Yilan.

These ethno-linguistic distinctions are widely assumed to correspond to crucial cultural differences, continuing from the imperial period into the present. In the early 20th century, Hoklo and Hakka spoke mutually unintelligible languages.²⁰ However, they shared fundamental Han practices and beliefs,

16. Brown, *Is Taiwan Chinese?*

17. Wang, “Religious Organization”; Sangren, *History and Magical Power in a Chinese Community*.

18. Lamley, “Subethnic Rivalry” .

19. Meskill, *A Chinese Pioneer Family*; Shepherd, *Statecraft and Political Economy on the Taiwan Frontier*.

20. E.g., Branner, *Problems in Comparative Chinese Dialectology*.

including patrilineal ancestor worship, Confucian-justified parental authority, equal property inheritance among brothers, and folk religion.²¹ Beyond language, Hakka were reputed to be different from Hoklo – and from most Han groups – in granting women a higher position in family life, with women purportedly contributing as much or possibly more labor than Hakka men to the family.²² Such conclusions primarily derive from the easily observable difference that – before the Japanese colonial government suppressed footbinding throughout Taiwan in 1915 – Hakka, unlike Hoklo, did not bind their daughters' feet.

Shepherd demonstrates from census reports that by the time they were adults, more than 90 percent of all women registered as Fukienese (mostly Hoklo women) had bound feet and that the 1.64 percent of Kwangtungese women with bound feet were most likely Min-speakers from Chaochou.²³ Although the lack of footbinding surely led to higher expectations of field and heavy manual labor contributions from girls and women among Hakka than among Hoklo, it does not necessarily follow that the Hakka gender system was any less patriarchal. Hakka, like Hoklo, did not raise a surplus of daughters, giving girls out in adoptions for minor marriages and reportedly practicing female infanticide.²⁴ Evidence from the household registers shows that Hakka and Hoklo marriage and adoption patterns were very similar, suggesting that Hakka women had no more control over their fertility than Hoklo women, an implication we explore further here.²⁵

Did ethnic distinctions between Hoklo and plains Aborigines correspond to crucial cultural differences in the early 20th century? In the 17th century, plains Aborigine ethno-linguistic groups showed dramatic cultural differences from Han – including matrilineal inheritance and gender systems with related “casual” attitudes about sexual relations, and other differences in courtship, marriage, divorce, and remarriage as well as language, religion, and subsistence; some of these differences, diminished in degree, were still noted by late nineteenth century missionaries.²⁶ By 1900, most remaining cultural differences were not readily observable.²⁷ Plains Aborigines were native speakers of South-

21. E.g., Cohen, *House United, House Divided*; Pasternak, *Guests in the Dragon*; Chuang, *Chia-tsu yu hun-yin*.

22. Davidson, *The Island of Formosa*, 590-591; Lechler, “The Hakka Chinese”, 358, 359; Oehler, “Christian Work Among the Hakka”, 352; Mackay, *From Far Formosa*, 102; Campbell, *Sketches from Formosa*, 249; Pickering, *Pioneering in Formosa*, 67-68; Wolf and Huang, *Marriage and Adoption in China*, 427-428.

23. Shepherd, “Marriage Mode and Marriage Market”.

24. Lechler, “The Hakka Chinese”, 359; Lutz and Lutz, *Hakka Chinese Confront Protestant Christianity*, 181-82, 224; Oehler, “Christian Work Among the Hakka”, 352; Wolf and Huang, *Marriage and Adoption in China*, 7-8, 336-337, 350.

25. Shepherd, “Siraya Marriage Practices”; Wolf and Chuang, “Fertility and Women’s Labour”, 430-431.

26. E.g., Shepherd, *Marriage and Mandatory Abortion*; Shepherd, “Siraya Marriage Practices”.

27. Brown, *Is Taiwan Chinese*, 74-94.

ern Min and practiced commercial Hoklo-style agriculture, including sugarcane and wet paddy rice (where conditions allowed). They used Han forms of marriage – Shepherd argues in largely the same frequencies (excepting minor marriage) as neighboring Hoklo; Brown argues in ethnically differentiated frequencies prior to the 1920s.²⁸ Funerary practices, linkage of inheritance of property to surnames, and patterns of adoption followed Hoklo patterns. Though differences in burial practices and women’s use of betel and alcohol existed, the most visible difference between Hoklo and plains Aborigines was that Hoklo bound their daughters’ feet and plains Aborigines did not. In 1905, only 0.5 percent of females registered as plains Aborigines had bound feet. As with the Hakka, lack of footbinding among plains Aborigines – especially when combined with evidence for 17th-century matrilineal inheritance – might lead to the assumption that plains Aborigine women in the 20th century had more status and power in the family than Hoklo women did. Such assumptions are problematic.²⁹

Elderly people interviewed in the study sites of T’ou-she (in Ta-nei) and Chi-pei reported that, in the early 20th century, footbinding served as the marker distinguishing Hoklo from plains Aborigines.³⁰ (There were no Hakka in this area.) Brown argues that the colonial government’s suppression of footbinding created a context which allowed plains Aborigines in T’ou-she and Chi-pei to acquire Hoklo identity around 1930, an identity she argues they maintained until the mid-1990s.³¹ Except for religious worship of one or more Aborigine deities³², which have been maintained through the present, remaining differences in customs between these and neighboring Hoklo communities disappeared over the course of the 20th century.³³ In sum, ethnic distinctions between Hoklo, Hakka, and plains Aborigines were politically important in the 17th through 19th centuries, and these distinctions are often assumed to correspond to important cultural differences throughout the 20th century.

Data

For the Dutch case, we combine six datasets in this paper. The first one is drawn from the Historical Sample of the Netherlands, a large database still under construction that will eventually contain more than 70,000 life courses. The database is built from a random sample (0.5%) in the Dutch birth certificates of 1812-

28. Shepherd, “Siraya Marriage Practices”; Brown, *Is Taiwan Chinese*, chapter 3.

29. Brown, *Is Taiwan Chinese*.

30. Brown, *Is Taiwan Chinese*, 69, 95-97.

31. Brown, *Is Taiwan Chinese*.

32. E.g., Shepherd, “Sinicized Siraya Worship”; Pan, “T’ou-she ts’un te juluo fazhan zuqun kuan-hsi”; Pan, “Wen-hua hechang yu hecheng wen-hua”; Brown, *Is Taiwan Chinese*.

33. Brown, *Is Taiwan Chinese*, 88-94.

1922, linking and entering all information in both the civil registers (birth, marriage and death certificates) and the continuous population registers which started in 1850. Their complete life courses were reconstructed by following them in all their successive places of residence.³⁴ We use the first, more or less completed, part of this database that covers the province of Utrecht. We limit the analysis to married persons in their first marriage (N=785). Their birthplaces were evenly spread over the urban and rural parts of the province.

The second dataset is built from a marriage cohort in one North-Holland village (1830-1879). All first-marrying couples (N=280) in Akersloot, an agricultural community about thirty kilometres to the northwest of Amsterdam, were traced in their migration trajectories. Akersloot was an ordinary North-Holland village, except for the fact that its continuous population registers started in 1830. The third dataset is drawn from a small – but extremely labor-intensive – family reconstruction in the city of Amsterdam (1820-1850). This database, originally intended as a three-generation study of poor relief recipients, consists of 84 families. The fourth dataset consists of married women born in the city of Rotterdam between 1872 and 1902 (N=599). Their life courses have been traced in the context of an epidemiological study. The women were originally selected by taking a sample from Rotterdam birth certificates. A number of them are part of the Historical Sample of the Netherlands.³⁵ Their fertility histories were reconstructed even after they had left the city. Finally, we make use of two datasets collected in the provincial town of Nijmegen and the proto-industrial village of Borne. Both datasets contain marriages contracted in the 19th century, 332 for Nijmegen and 285 for Borne.

Previous research on Dutch fertility has demonstrated convincingly that Roman Catholics and – to a slightly lesser extent – Orthodox Protestants rejected modern forms of birth control. Thus, at least from the late nineteenth-century onwards, Roman Catholics and those Orthodox Protestants that could be easily identified as such (*Gereformeerden*) displayed higher levels of marital fertility than people without a religion or people belonging to the Dutch Reformed Church. The “modern” behavior of the aggregated Dutch Reformed has been ascribed to the dominance of liberal groups within the Reformed Church. The province of Utrecht, especially its southeastern part, is one of the heartlands of fundamentalism *within* the Reformed Church. Surprisingly, this fact has been ignored in an earlier analysis of the relationship between religion and fertility in this province.³⁶

How can we distinguish between liberal and Orthodox Protestant *individuals*? The censuses and populations registers simply count individual Reformed

34. Mandemakers, “Historical Sample of The Netherlands”.

35. Smits, *Preconceptional Determinants*.

36. Hillebrand, *Van motivatie tot acceptatie*.

fundamentalists as Dutch Reformed. However, the religious orientation of the church *ministers* is known. In 1920, all ministers in 33 Utrecht municipalities belonged to the Orthodox “*confessionelen*” or to the “*Gereformeerde Bonders*”.³⁷ Since communities chose their own ministers, it can be assumed that these communities were Orthodox in the nineteenth century. We hypothesize that Dutch Reformed individuals who were born in such a predominantly Orthodox community were likely to be Orthodox themselves. In the category “Orthodox Protestants” we have combined them with members of the various Calvinist secessionist churches. In addition, individuals belonging to evangelical movements (e.g. Salvation Army, Baptists etcetera) were assigned to this category. Finally, couples were put in this category when at least one of the partners was Orthodox.

We have combined various liberal denominations into one category. This “liberal Protestant” group consists of the Dutch Reformed, except for those likely to be Orthodox. In addition, we include the Mennonites, the Lutherans and the Remonstrants. In our view, a mixed marriage, in particular one between a Protestant and a Catholic can be interpreted as a sign of moderate religiousness. Thus, our fourth category consists of mixed couples. Persons belonging to other groups (such as Jews, and Catholic secessionists), persons without a denomination and persons whose religion was unknown were not included in our analysis.

Household registers from four Taiwanese localities have been selected for use in this paper. Two sites come from southwestern Taiwan, Ta-nei, which has a majority Hoklo population but also a significant plains Aborigine minority, and Chi-pei which has a plains Aborigine majority population. Many people classify the plains Aborigines of Ta-nei and Chi-pei as related to the Siraya ethno-linguistic group identified by the Dutch in the 17th century.³⁸ Our third site, Chu-pei, located in the northwestern county of Hsiu-chu, had a population evenly divided between a Hoklo area (Ch’iu-k’ang) and a Hakka area (Liu-chia). The fourth site, Lu-kang, a small town on the central western coast of Taiwan, is predominantly Hoklo. These four sites thus contain representatives of three of the four main ethnic groups of Taiwanese society, and provide a total of six locality/ethnic groups for comparison (Ta-nei Hoklo, Ta-nei plains Aborigines, Chi-pei plains Aborigines, Chu-pei Hoklo, Chu-pei Hakka, and Lu-kang Hoklo). We will also draw on previous studies of household registers from the communities of Lung-tu, a Hakka area in southern Taiwan, Chung-she, a Hoklo village located not far

37. Knippenberg, “Een veelkleurig palet”; Knippenberg, *De Religieuze Kaart van Nederland*.

38. Shepherd, “Sinicized Siraya Worship”; Liu, “Taiwan nan-pu ti-chu ping-p’u-tzu te Ali Chu xin-yang”; Shih Wan-shou, *Taiwan te pai-hu min-tsu*, but see Pan, “A Study on the Pragmatics of Human Understanding”; Pan, “T’ou-she cun de juluo fazhan zuqun guanxi”; Pan, “Wen-hua hechang yu hecheng wen-hua”; Tsuchida et al., *Linguistic Material*.

from Ta-pei and Chi-pei in southwestern Taiwan, and Haishan, a Hoklo area in the T'ai-pei basin, in northern Taiwan.³⁹

Hypotheses

In the Netherlands the study of the influence of religion on fertility has been concentrated heavily on the period during and after the onset of the fertility decline. According to these studies the differences between a “traditional” mentality ascribed to the Roman Catholics and Orthodox Protestants and a “modern” or “liberal” mentality ascribed to the Dutch Reformed led to a difference in the pace in which modern forms of birth control were accepted.⁴⁰ For a long time, “traditional” groups rejected modern forms of birth control and continued to rely on the Malthusian methods of late marriage and celibacy. On the other hand, liberal Protestants and persons without a religion were more prone to accept the innovation of parity specific birth control. Why should we also expect differential fertility behavior *before* the transition?

Three reasons lead us to expect that differences between religious groups affected fertility. First, the prudential restraint demanded from pretransitional couples (no premarital sex and waiting with marriage until economic independence had been achieved) may have varied among religious communities. Both Catholics and Calvinists secured high levels of conformity to the required level of “morality” with mechanisms of social control, such as public shaming of pregnant brides. On the other hand, in the Dutch Reformed Church these mechanisms had become obsolete by the first half of the 19th century. Indeed, there were conspicuous differences in the levels of bridal pregnancy and illegitimacy between Catholics and Calvinists (*Gereformeerden*) on the one hand, and Dutch Reformed on the other.⁴¹ Couples that had their first child earlier than other couples, either because of a premarital conception or not, were likely to have a larger family size.

Secondly, religious groups differed in breastfeeding practices. For instance, an individual-level enquiry in The Hague in 1908 showed that Catholics practiced less breastfeeding than Protestants (and both groups less than Jews).⁴² The reluctance of Catholic mothers to breastfeed their infants has been associated with the relatively high infant mortality among Catholic children in the second half of the 19th century.⁴³ Shorter birth intervals in Catholic families were

39. Pasternak, *Guests in the Dragon*; Wolf and Huang, *Marriage and Adoption in China*.

40. Boonstra and Van der Woude, “Demographic transition in the Netherlands”; Engelen and Hillebrand, “Fertility and Nuptiality”.

41. Kok, “The moral nation”.

42. Saltet, *Sterfte*.

43. Wolleswinkel-Van den Bosch, *The Epidemiological Transition*; Van Poppel et al., “Religious Differentials in Infant and Child Mortality”.

another effect, even apart from the death of the previous infant.⁴⁴ The rejection of breastfeeding among the Catholics has been ascribed to the extraordinary prudishness the priests insisted upon. In fact, after 1850 the clergy started a campaign against breastfeeding on the ground that exposing the breasts was something shameful.

Thirdly, differences in (religious) mentality may result in differential behavior of couples with respect to discussing and applying conscious means of regulating fertility. Before 1900, the most important means of limiting the pace of childbearing were withdrawal and abstinence.⁴⁵ For some couples, the application of these means may have resulted in earlier stopping with childbearing. The Reformation has often been associated with rationalist and pragmatic attitudes. According to McQuillan, "(...) Protestantism encouraged individuals to accept responsibility for handling the problems of everyday life".⁴⁶ This Weberian view has found occasional support in historical demography.⁴⁷ However, Dutch Calvinists tended to submit themselves to God's will to the same extent as the Roman Catholics. For instance, in the early 19th century, both Catholic and Orthodox Protestant villages were very reluctant to adopt vaccination against smallpox. On the other hand, liberal Protestant denominations like the Mennonites took the lead in this respect.⁴⁸ The official doctrines of the Reformed Church were much less uniform in their rejection of individual control of fertility than Calvinist and Catholic ones.⁴⁹ This may have given liberal Protestants even more leeway to experiment with forms of fertility control.

There is no established literature documenting a consistent pattern of ethnic difference in fertility among the Taiwanese ethnic groups. Rather, there are isolated speculations in the literature that assert or by their logic imply fertility differences for these ethnic groups. We grouped these speculations into three hypotheses.

The first is what we term the *footbinding hypothesis*. It is premised on the well-known fact that unlike other Han women, Hakka women did not bind their feet and worked in the fields and sometimes on construction jobs. The hypothesis envisions two possibilities, both of which predict lower fertility among the Hakka than among the Hoklo. The first is that heavy labor depleted Hakka women's child-bearing capacity. The second is that the contribution they made to

44. Meurkens, *Sociale veranderingen in het oude Kempenland*.

45. Szreter et al, "Fertility and contraception".

46. McQuillan, *Culture, Religion and Demographic Behaviour*.

47. Perrenoud, "Malthusianisme et protestantisme" .

48. Rutten, *De vreselijkste aller harpijen*.

49. Van Poppel, "Late Fertility Decline".

the family economy enhanced Hakka' women's status vis à vis their husbands and parents-in-law. Compared then with Hoklo women who bound their feet and were limited to domestic tasks, Hakka women were in a better position to limit their fertility when they desired doing so. The same hypothesis applies to plains Aborigine women who also did not bind their feet, in contrast to Hoklo women.

Our second hypothesis is the *natural fertility hypothesis*. It stems from the assumption that because of cultural preferences and concern for old age security, none of the groups we are comparing wanted to limit their fertility. Fertility was "natural" in the sense that there was no deliberate fertility control. The hypothesis predicts that the fertility of the three groups followed Louis Henry's natural fertility pattern at roughly the same level. Differences in level will be attributable to differences in premarital sexual relations, age at marriage, breast-feeding, and infant mortality. They will not be attributable to cultural preferences, the position of women, or differences in the economic value of children.

Our third hypothesis we term the *standard of living hypothesis*. It stems from the fact that the Siraya plains Aborigines in Ta-nei were demonstrably poorer than both their Hoklo neighbors in Ta-nei and their fellow plains Aborigines in Chi-pei. What the hypothesis predicts depends on what one assumes about the relative effects of infant mortality and poor nutrition on fertility. While poverty may raise fertility by raising infant mortality and thus shortening birth intervals, it can also lower fertility by reducing fecundability and lowering the proportion of all conceptions that result in a live birth.

Findings for the Netherlands

For reasons mentioned above we divided the analysis of the Dutch data into two parts: one dealing with the period before the fertility decline, (women born before 1860), and the period of the decline itself as found in the fertility of women born after 1860. In Table 3 we first look at the onset of procreation of women born before 1860. To what extent did religious groups differ in "starting"? Village reconstitutions have shown that the age at marriage of both men and women of religious minorities was higher than those of the majority groups. In these villages the Orthodox Protestants, the practicing members of the Reformed Church and the Roman Catholics married at higher ages than the non-practicing members of the Dutch Reformed Church. This was explained by the difficulty members of minority groups encountered in finding a spouse resulting in a longer period of waiting.⁵⁰ However, we can also assume that mechanisms of social control were more effective in Orthodox and Catholic communities, both with respect to delaying marriage and preventing premarital sexuality that could bring forward the wedding. Table 3, however, does not yield

50. Noordam, *Leven in Maasland*.

Table 3: Age at first child and percentage born within seven months after the marriage, by religion of the couple. Mothers born before 1860, the Netherlands

	Age at first birth: Mother born before 1860	Percentage of first children born within seven months	N
Husband and wife both liberal Protestant	26.8	23.0	305
Husband and wife both Roman Catholic	28.9	10.8	379
Husband and wife both Orthodox Protestant	26.9	29.9	67
Mixed Catholic-Protestant marriages	29.1	30.3	33

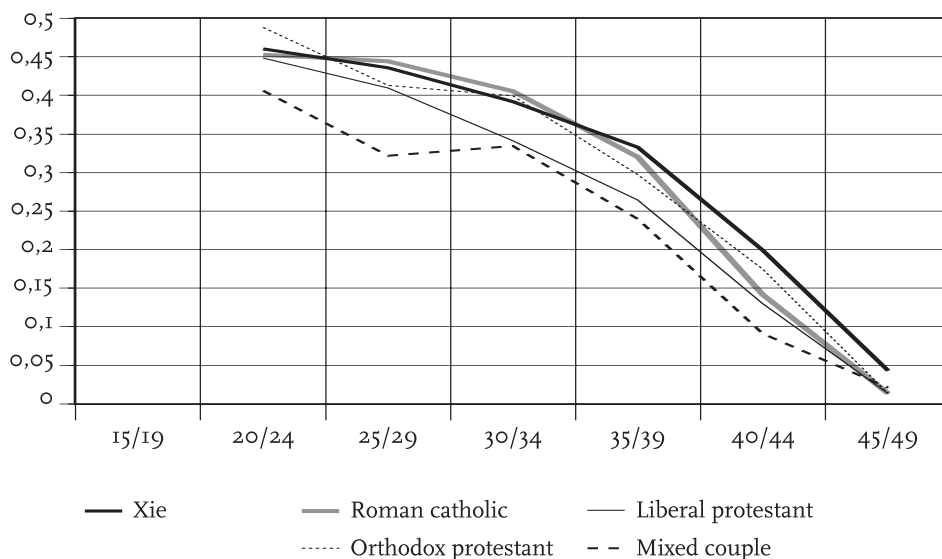
unambiguous conclusions. Women from both Protestant groups (Liberals and Orthodox) married earlier than the Catholics – a difference of roughly two years, which can probably be ascribed to their much higher levels of premarital pregnancies. Overall, pregnant brides married 2.7 years younger than non-pregnant brides. The compliance of Orthodox Protestant couples to their churches' insistence on sexual purity seems oddly at variance with premarital "licence". Indeed, a high incidence of premarital pregnancies was conspicuous among certain pietist sections within Dutch Orthodoxy.⁵¹ Interestingly, the religiously mixed couples displayed a combination of both late marriage and high levels of premarital pregnancies.

Obviously, premarital pregnancies effect marital fertility. The concentration of such "forced marriages" in particular age groups biases the calculation of the Age Specific Marital Fertility Rates (ASMFR) because the period "at risk" of conception after the wedding is shorter than in age groups with a lower incidence of pregnant brides. Thus, the denominator is smaller and the ASMFR higher. We solve this problem following a procedure developed by Wilson.⁵² We calculate the mean intervals between marriage and first births in the case of pregnant and non-pregnant brides. Then we add the difference between these intervals (generally about a year) to the period at risk of the pregnant brides. Figure 1 presents the ASMFR by religious group. It shows that the fertility rates of the Roman Catholics and Orthodox Protestants were very close to the natural fertility standard as depicted in Xie's index (see also Kok, Yang and Hsieh in this volume). Liberal Protestant and mixed couples had markedly lower levels although the convex shape of their curves suggest that they did not practice parity-specific fertility limitation on a large scale.

51. Kooy and Keuls, *Enforced marriage in the Netherlands*.

52. Wilson, "Natural fertility in pre-industrial England"; Van Bavel, "Detecting Stopping".

Figure 1: Age specific marital fertility rates, women born before 1860, by religion of couple



In the contribution of Kok, Yang and Hsieh to this volume it is demonstrated that the birth intervals of Roman Catholics and Orthodox Protestant couples were shorter than those of liberal Protestant couples even after controlling for the death of the previous infant. Similar results have been reached in other recent studies.⁵³ Longer intervals, leading to lower ASMR, may result from either prolonged breastfeeding or from deliberate efforts among – at least a number of – couples to limit the pace of their childbearing. Deliberate spacing has been associated with the desire of working-class couples to prevent the mother from being burdened with too many young children and thus reducing her income-earning capacities.⁵⁴

Figure 1 has already disclosed that massive parity-specific stopping behavior did not take place in this early cohort. However, table 4 shows that among “completed” marriage those with strict creeds stopped child bearing later than more lenient ones. Although moderate, this kind of stopping behavior seems to have preceded the more conspicuous differences between the religions during and after the fertility transition.

53. Van Bavel and Kok, “Birth spacing in The Netherlands”; Schellekens and Van Poppel, “Religious Differentials in Marital Fertility”.

54. Van Bavel, *Van natuurlijke naar gecontroleerde vruchtbaarheid* and Van Bavel, “Does an effect of marriage duration”.

Table 4: Age at last child, by religion of the couple, mothers born before 1860, The Netherlands

	Age at last child	N
Both liberal Protestant	39.1	220
Both Roman Catholic	40.4	273
Orthodox Protestant	40.2	45
Mixed Catholic-Protestant	39.2	25

Completed marriages, mother at least 45 years.

Table 5: Total age specific marital fertility rates, percentages of infant and child mortality and number of children surviving to at least age five, by religion of the couple. Mothers born before 1860, the Netherlands

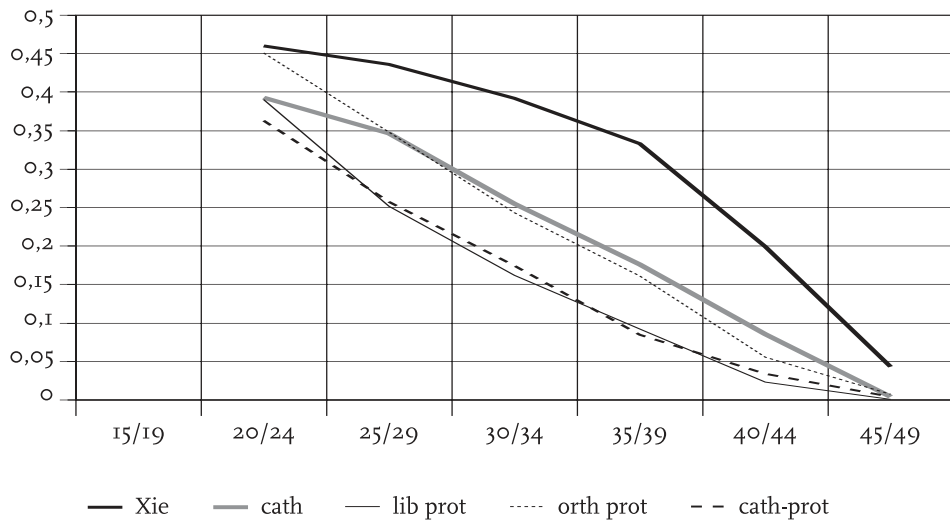
	Total age specific mar- ital fertility (20-49)	% infant mortality	% child mortality	Surviving children	N com- pleted marriages
Both liberal Protestant	8.04	17.7	10.1	4.54	217
Both Roman Catholic	8.89	18.4	12.1	4.36	268
Orthodox Protestant	8.93	15.0	13.7	5.23	44
Mixed Catholic- Protestant	7.07	14.4	13.0	3.79	24

Surviving children counted in completed marriages, mother at least 45 years.

As we have seen, the ASMR of Catholic and Orthodox Protestant women were similar. In both groups women who married at age 20 and remained married until age fifty, would have experienced an average of 8.9 childbirths (see table 4). However, the actual family sizes of couples were much smaller, due to late starting and infant mortality. The Roman Catholics exhibit the largest difference between their “hypothetical family size” and their actual family size. Not only did they marry later (see table 3), they also experienced relatively high levels of infant and child mortality. Thus, they ended up with smaller families than the Protestants. Obviously, this situation would change the moment sanitary improvements reduced infant mortality as they did from the 1880s onwards.

We now move to the last quarter of the 19th century, when Dutch reproduction changed dramatically. Although the fertility of the country remained very high until 1960, when compared to Belgium and Germany, fertility decline

Figure 2: Age specific marital fertility rates, women born after 1860, by religion of couple



clearly started much earlier. Figure 2 offers an impression of the magnitude of the change. Married women born before 1860 had an ASMFR just below Xie's index for natural fertility. Roman Catholic women between age 25 and 34 even reached a fertility level that surpassed the index. Clearly, all categories of women born after 1860 took part in the fertility decline.

The fertility of all denominations in this later period is much lower than Xie's index, and the Dutch population seems to be divided in two subgroups. Roman Catholics and orthodox Protestants are characterized by relatively high fertility – the conservative doctrine prohibiting contraceptive practices seems to have worked – while Liberal Protestants and mixed marriages have limited their fertility significantly. They already display the concave shaped ASMFR that is indicative of parity specific birth control.

The ASMFR does not inform us of the starting and stopping behavior of the couples included in our analysis. Still, the total fertility realized is the result of the ASMFR combined with the ages at which women start and end their reproductive career. From Table 6 we learn that among Catholics and orthodox Protestants marriage restriction was maintained relatively late. Their age at first childbirth was two years higher than among the mixed couples, considered to be relatively independent from church doctrines. Examining age at last birth, again we find striking differences. Although all women studied seem to stop having children some ten years before biological fecundity ends, this is clearly more the case for liberal Protestants and mixed marriages than for Roman Catholics. In the end, then, the period in their life span that was dedicated to reproduction dif-

Table 6: Age at first and last child, reproductive period and surviving children by religion of the couple. Mothers born after 1860, the Netherlands

	Age at first child	Age at last child	Reproductive period	Number of children surviving to age 5
Both liberal Protestant	25.7	33.1	7.4	3.24
Both Roman Catholic	26.4	35.6	9.2	4.28
Orthodox Protestant	26.5	35.2	8.7	4.18
Mixed Catholic-Protestant	24.5	32.9	8.4	3.41

ferred markedly. Roman Catholic women used their reproductive possibilities almost two years longer than their liberal Protestant colleagues.

When we look at the number of children surviving until age 5, we find completed family size closely related to reproductive period. The order from high to low number of children is exactly as described already in many studies: Roman Catholic, Orthodox Protestant, Mixed Catholic-Protestant and Liberal Protestant. The social and economic development of Dutch society in the period studied now is evident. In the cohort of women born before 1860, completed family size was heavily influenced by infant and childhood mortality. When sanitary improvements reduced mortality at young ages markedly, completed family size much more closely reflected the ASMR and reproductive period.

Findings for Taiwan

Total marital fertility

To create samples as ethnically homogeneous as possible, we restrict group membership to married women who had both a birth mother and spouse whose registered provenance/ethnicity was not known to differ from their own (which almost always followed the registered provenance of the father). Women adopted by a foster parent were included in the group of the foster parent if they married a spouse whose registered provenance did not differ from that of the foster parent. Thus individuals who were the product of mixed marriages, or who married across ethnic lines have been excluded from the samples used to test for ethnic differences in this paper. To be sure, mixed marriages deserve study in their own right, but for the present paper it was thought that comparison of homogeneous groups would be most likely to bring out cultural differences.

Analysis of ethnic differences in marriage patterns in Taiwan is complicated by the important effect the form of marriage has on the standard demographic measures. We distinguish three main categories of marriage: major,

minor and uxorilocal. Major marriages are those that bring an adult bride into the home of an adult groom. Major marriages are the culturally ideal and most prestigious form of marriage in the Chinese kinship system as it was practiced in Taiwan. Minor marriages were those that result from the adoption of a young girl at an early age for the purpose of matching her to her foster parents' son. Such marriages are also known as little daughter-in-law marriages. Both the major and the minor marriage forms are viri-patrilocal, in that they result in residence of the married couple in the groom's parents' household. The third type is uxorilocal marriage, which brings a groom into the household of his bride's parents. Uxorilocal marriages are attractive alternatives for parents who have failed to raise an adult male heir; by bringing in a son-in-law for a daughter, parents can extend their family through the daughter's sons.

In a large corpus of work combining ethnographic studies and data from the household registers, Wolf has documented important demographic differences among the forms of marriage in the late 19th and early 20th centuries.⁵⁵ Minor marriages when the age at adoption is very young had lower fertility, higher rates of adultery and divorce, and earlier ages at marriage than major and uxorilocal marriages. Uxorilocal marriages had higher rates of divorce and higher male age at marriage than major marriages. Because of the influence such differences may have on fertility, form of marriage must be controlled for in our comparisons of ethnic and locality groups.

We begin our exploration of differences in fertility by comparing the summary measure of total marital fertility (TMFR) for our six locality and ethnic groups. See Figure 3 and 4. They say that consistent differences between the six groups do not exist. In both cohorts the Chi-pei Plains Aborigines and Ta-nei Plains Aborigines have both the highest and lowest fertility.

Does the conclusion that there are no significant differences between ethnic groups hold when we differentiate form of marriage? (See Table 7) In all the groups major marriage is the most frequent form, and among the Han minor marriages are, excepting Ta-nei, more frequent than uxorilocal marriages. Minor marriages were rare among the two Plains Aborigine groups and are omitted for that reason.

We divide the sample into two cohorts, one born before 1/1/1896 and one born after 1/1/1896. Both the early and later born cohorts are sizeable, come close to constituting halves of the total sample, and contain some women whose births were fully observed for their entire reproductive period. Fertility rates are known to have risen and mortality to have fallen over the period the registers were compiled, from 1906 to 1946.⁵⁶ We control for the composi-

55. Wolf and Huang, *Marriage and Adoption in China*; Wolf, *Sexual Attraction and Childhood Association*.

56. Pasternak, *Guests in the Dragon*, 90.

Table 7: Total marital fertility of women born before and after 1/1/1896 by locality, ethnicity and marriage type

Locality and ethnicity	Women born before 1/1/1896			Women born after 1/1/1896		
	Births	Person Years	TMFR 15-49	Births	Person Years	TMFR 15-49
Ta-nei Hoklo	3540	19353	6.67	5983	19942	7.95
Ta-nei Hoklo Major	3012	16554	6.70	4797	15948	7.88
Ta-nei Hoklo Uxor	372	1975	6.90	863	2794	8.60
Ta-nei Hoklo Minor	156	824	6.17	323	1201	7.02
Ta-nei PA	467	2878	6.37	807	2578	8.37
Ta-nei PA Major	384	2451	6.29	619	1954	8.20
Ta-nei PA Uxor	75	389	7.03	175	578	8.79
Chi-pei PA	621	2848	8.14	635	1829	9.21
Chi-pei PA Major	519	2456	7.83	477	1353	9.20
Chi-pei PA Uxor	92	356	8.44	139	375	10.48
Chu-pei Hoklo	1324	8335	6.59	2532	8594	8.11
Chu-pei Hoklo Major	777	4571	7.10	1678	5440	8.53
Chu-pei Hoklo Uxor	168	857	7.59	266	852	8.01
Chu-pei Hoklo Minor	379	2907	5.32	588	2302	7.10
Chu-pei Hakka	1641	9946	6.26	2619	9276	7.82
Chu-pei Hakka Major	935	5701	6.45	1678	5714	8.18
Chu-pei Hakka Uxor	162	915	6.98	277	811	9.07
Chu-pei Hakka Minor	544	3330	5.87	664	2751	6.89
Lu-kang Hoklo	1775	10462	6.49	3002	10214	8.19
Lu-kang Hoklo Major	1272	7548	6.63	2267	7501	8.33
Lu-kang Hoklo Uxor	169	971	6.55	242	810	8.65
Lu-kang Hoklo Minor	334	1943	6.10	493	1902	7.29

tional and period effects by dividing our sample into birth cohorts who experienced similar rates of fertility and mortality as they aged. Distinguishing the two cohorts also enables us to detect changes in the behavior of our comparison groups over time. If ethnic-cultural factors effected fertility levels among our groups, these effects should endure temporal changes that are not themselves cultural.

Table 7 presents the number of births, persons years, and the total marital fertility rates for our locality and ethnicity groups by form of marriage for the two cohorts. For all groups and forms of marriage total marital fertility increased sig-

nificantly from the earlier to the later born cohort, which suggests a significant impact from improvements in health and nutrition by the latter part of the Japanese period, a topic beyond the scope of this paper.

We direct our attention first to the *major* marriages among the plains Aborigines. The Chi-pei plains Aborigines had the highest total marital fertility in both cohorts, while the Ta-nei plains Aborigines had the lowest in the earlier born cohort and one of the lowest in the later born cohort. The age specific rates show that the rates for the Chi-pei plains Aborigines are significantly higher than those for Ta-nei especially from age 30. Interestingly the fertility of the Ta-nei plains Aborigines fell below that of the Ta-nei Hoklo in the early cohort and surpassed them in the later cohort, when the Ta-nei Hoklo ranked lowest. The sharp contrast between the Chi-pei and the Ta-nei plains Aborigines suggests that the level of fertility in these groups owes little to shared cultural factors (female status, gender division of labor, courtship practices, etc.), and much more to factors affecting health, nutrition, standard of living, and disease, etc.

The “footbinding” hypothesis that predicts plains aborigine women to have lower fertility than Hoklo, is controverted by the Chi-pei fertility rate in both cohorts and the Ta-nei plains aborigine fertility rate in the later born cohort. The Siraya cultural premises that we speculated might have lowered natural fertility also appear not to have had much impact on the Chi-pei plains Aborigines.

The “standard of living” hypothesis is initially confirmed by the higher fertility of the Chi-pei plains Aborigines compared to the Ta-nei plains Aborigines in both cohorts. But what are the implications for the standard of living hypothesis of the comparison between the Ta-nei plains Aborigines and the Ta-nei Hoklo? Presumably the relative poverty and its depressing effect on the fertility of the Ta-nei plains Aborigines compared to their Hoklo neighbors was a consistent feature of the entire period, but by the later cohort plains Aborigine fertility is higher than that of Hoklo in Ta-nei. Infant mortality complicates the implications we draw from simple findings of higher fertility; is the higher fertility the product of higher standards of living or higher rates of infant loss? Our expectation from island wide trends is that the rate of infant loss experienced by mothers would decline slightly from the early born cohort to the later born cohort; thus we would not expect rising rates of infant mortality to have caused the rise in fertility between the cohorts. But we need an independent measure of infant mortality to begin to sort out the degree to which differences in infant mortality are affecting fertility. In sum, we will need much more detailed data to adequately test our initial hypothesis.

Among the Han the Chu-pei Hoklo rank highest in both cohorts in major marriage fertility, while the Chu-pei Hakka moved up from lowest to next lowest by the later cohort. But the hypothesis that absence of footbinding would lower Hakka fertility is dealt a blow by the Lung-tu Hakka, who had higher fertility

than both the Chu-pei Hakka and the Chu-pei Hoklo.⁵⁷ Thus low major marriage fertility is very unlikely to be a cultural feature of Hakka fertility.

We turn next to *minor* marriages. Certainly there is no ethnic patterning in the case of minor marriage, as the Chu-pei Hoklo and Hakka both rank lowest and next lowest in one or the other of the two cohorts. This suggests that common locality rather than different ethnicity is a more important factor affecting fertility levels.

With respect to *uxorilocal* marriages, we find that Chi-pei plains Aborigine marital fertility is the highest among our groups in both cohorts, and higher than major marriage fertility in Chi-pei. While Ta-nei plains Aborigine fertility in uxorilocal marriages is only middling among our groups, it is always higher than Ta-nei plains Aborigine major marriage and higher than Ta-nei Hoklo major and uxorilocal marriages. We would expect that female power would be greatest in uxorilocal marriages where the bride does not come under the authority of her mother-in-law. Thus if female status and power within the family is playing a role in determining plains Aborigine fertility levels, it appears that role is to *increase* rather than reduce fertility, contrary to the footbinding and related hypotheses we discussed above.

In sum, our initial overview of marital fertility by locality, ethnicity, and marriage form, has revealed a considerable amount of variation within localities and ethnic groups and over time. The initial speculative hypotheses that we culled from the literature, such as the footbinding hypothesis, and the standard of living hypothesis, have all been controverted by at least a few cases and no strong ethnic pattern has emerged in level of total marital fertility.

However, to assess the relation between ethnic identity and the local structural position or social status of a group (e.g., as the locally dominant numerical majority), we further considered marital fertility by ethnicity and locality (see Table 8). The category of Ta-nei pools plains Aborigine data from across different structural situations across an entire township – that is, it pools data from the village of T'ou-she, where plains Aborigines were the numerical majority locally, with villages where plains Aborigines were numerical minorities, ranging from very small to significant local populations. (In contrast, Chi-pei is a village.) Consequently, we considered lower locality levels within Ta-nei. Here, in three out of four comparisons (for women born before 1896 in T'ou-she and for women born on or after 1896 in both T'ou-she and Chi-pei), when Hoklo were the local numerical minority, they had lower fertility. The small numbers and the further pooling of the rest of Ta-nei (including the village of Wu-tou, where plains Aborigines were a sizeable and influential minority) preclude definitive conclusions,

57. Pasternak, *Guests in the Dragon*, 92.

Table 8: Total marital fertility of women by ethnicity and locality

Ethnicity and locality	Women born before 1/1/1896			Women born on or after 1/1/1896		
	Births	Person Years	TMFR 15-49	Births	Person Years	TMFR 15-49
<i>plains Aborigines</i>						
Chi-pei PA	649	2818	8.46	674	1903	9.76
<i>Ta-nei PA</i>						
T'ou-she PA	345	2068	6.54	569	1883	8.1
Other Ta-nei PA	129	755	6.55	243	709	9.42*
<i>Hoklo</i>						
Chi-pei Hoklo	28	108	8.49	43	134	8.31*
<i>Ta-nei Hoklo</i>						
T'ou-she Hoklo	60	412	5.05	141	526	6.68
Other Ta-nei Hoklo	3516	18420	6.89	5835	19308	7.93

Women registered as Hoklo but adopted by plains Aborigines are recorded as plains Aborigines.

Only marriages where the spouses have the same ethnicity are counted.

* TMFR is for ages 15-44 only, as there were 0 person-years observed in the 45-49 age cohort.

but these data suggest that, whereas ethnicity alone is clearly not a good predictor of fertility, ethnicity combined with consideration of local-level structural relations may be interesting avenue for further investigation.

In general, our task is to determine whether cultural differences associated with ethnicity in Taiwan have a significant impact on demographic indicators of fertility in ways analogous to the differences found between Catholics and Protestants in Europe. In the European case, groups with religious ideologies specifically addressing questions of childbearing and marital sexuality demonstrate contrasting levels and patterns of fertility. Thus the assumption that these ideologies shaped reproductive behavior and attitudes sufficiently to have produced the fertility differences may well be warranted. There was no similar ideological or behavioral cleavage in Taiwanese society, however. The Taiwan ethnic groups demonstrate some variation by locality and by whether they were the local dominant ethnic group (which may be class related) but there is no clear ethnic pattern to fertility. These results suggest that either there are not such cultural differences between these ethnic groups, which is supported by ethnographic evidence⁵⁸, or cultural differences here are not suf-

58. Chuang, *Chia-tsu yu hun-yin*; Brown, *Is Taiwan Chinese*.

ficient to have shaped reproductive behavior and produced the fertility differences seen.

While we have not uncovered stark contrasts among the Taiwanese ethnic groups in total marital fertility, we cannot rule out the possibility of differences operating at finer levels of distinction though with only minor effect on total fertility. In the following sections we will pursue more detailed measures in an attempt to discern ethnic patterns.

Marriage form and first births: Age at first birth and the first birth interval

The distribution of marriage types by locality and ethnic group varied widely across Taiwan, as can be seen in Table 9. Most striking is the extremely low proportion of first marriages of the minor type among the plains aborigines of Ta-nei and Chi-pei. Minor marriage may have been nearly absent among plains Aborigines, but it also varied widely in frequency among the localities of Taiwan. That differences between Hoklo and Hakka ethnicity do not explain these variations among Han is evident from our data: the highest frequencies of minor marriage occur among the Hoklo (19.9 %) and Hakka (27.3 %) of Chu-pei. The high frequency of minor marriage among Chu-pei Hakka contrasts greatly with the Hakka of Lung-tu, where the low frequency of minor marriage (from 1.9% to 4.2% of marriages) more nearly resembles our plains Aborigine frequencies.⁵⁹ The Hoklo of Ta-nei (4.2 % minor), on the other hand, rank at the low end of the variation in minor marriage frequencies in Taiwan in our sample, but do not appear to be unique in that respect among Taiwanese of south Taiwan. The wide variation in the frequency of minor marriage and female adoption among Han Taiwanese remains one of the more puzzling aspects of the Taiwanese marriage pattern. Some have suggested that this north-south differentiation among the Han may be related to historically high rates of intermarriage between Han and plains Aborigines in the south, while Shepherd suspects higher infant and child mortality in the south lowers the possibility of minor marriage there.⁶⁰

The Ta-nei (19.8 %) and Chi-pei (13.6 %) plains Aborigines are also distinctive in having the highest frequencies of uxori-local marriage among the communities in our sample. But these frequencies are not as high as some reported for Taiwanese Han communities (e.g. Chung-she Hoklo at 39.4%).⁶¹ Thus this evidence alone is not sufficient to identify a high frequency of uxori-local marriage as distinctive of plains Aborigine marital culture. While the frequencies of minor and uxori-local marriage vary widely, their combined numbers in all sites

59. Pasternak, *Guests in the Dragon*, 50

60. E.g., Wolf, *Sexual Attraction and Childhood Association*, 54-55; Brown, *Is Taiwan Chinese*, 155-157.

61. Pasternak, *Guests in the Dragon*, 53.

Table 9: Marriages by form of marriage among women continuously observed from first marriage to first birth. Ethnic groups are defined as those born and/or raised, and married within the same ethnicity

Locality, ethnicity and form of marriage	Number observed	Form of marriage percentages
Ta-nei Hoklo	1377	100.0
Ta-nei Hoklo Major	1141	82.9
Ta-nei Hoklo Uxor	138	12.1
Ta-nei Hoklo Minor	58	4.2
Ta-nei PA	182	100.0
Ta-nei PA Major	142	78.0
Ta-nei PA Uxor	36	19.8
Ta-nei PA Minor	4	2.2
Chi-pei PA	132	100.0
Chi-pei PA Major	110	83.3
Chi-pei PA Uxor	18	13.6
Chi-pei PA Minor	4	3.0
Chu-pei Hoklo	457	100.0
Chu-pei Hoklo Major	316	69.1
Chu-pei Hoklo Uxor	50	10.9
Chu-pei Hoklo Minor	91	19.9
Chu-pei Hakka	587	100.0
Chu-pei Hakka Major	372	63.4
Chu-pei Hakka Uxor	55	9.4
Chu-pei Hakka Minor	160	27.3
Lu-kang Hoklo	617	100.0
Lu-kang Hoklo Major	488	79.1
Lu-kang Hoklo Uxor	35	5.7
Lu-kang Hoklo Minor	94	15.2

significantly reduce the proportion of major marriages (least among the Ta-nei Hoklo and Chi-pei plains Aborigines, most among Hoklo and Hakka in Chu-pei). Let us turn to some of the consequences of this variation for the demography of fertility among the various ethnic groups.

Age at marriage is a key determinant of fertility among women in societies that attempt to restrict childbearing to married women. Large differences in average ages at marriage and proportions married are a staple of contrasts between European and Asian societies. A woman's age at first birth is a function of her age at marriage and the length of the first birth interval (from marriage to first birth).

Table 10: Age at marriage and first birth, first birth interval and proportions adopting before first birth of women continuously observed from first marriage to first birth, excluding brides pregnant at marriage

Locality, ethnicity and form of marriage	Age at marriage	Age at first birth	First birth interval	Proportions adopting before first birth
Ta-nei Hoklo	18.9	20.9	2.04	2.2
Ta-nei Hoklo Major	19.1	21.1	2.01	1.9
Ta-nei Hoklo Uxor	17.6	19.8	2.23	2.9
Ta-nei Hoklo Minor	17.9	20.2	2.25	5.2
Ta-nei PA	18.1	20.0	1.87	7.1
Ta-nei PA Major	18.0	19.9	1.90	6.3
Ta-nei PA Uxor	18.4	20.0	1.62	8.3
Chi-pei PA	19.0	20.8	1.82	4.5
Chi-pei PA Major	19.1	20.9	1.81	5.5
Chi-pei PA Uxor	18.5	20.1	1.62	0.0
Chu-pei Hoklo	18.0	20.0	1.96	8.8
Chu-pei Hoklo Major	18.1	19.9	1.82	7.9
Chu-pei Hoklo Uxor	18.8	20.7	1.91	10.0
Chu-pei Hoklo Minor	17.4	19.8	2.45	11.0
Chu-pei Hakka	18.1	20.3	2.19	8.7
Chu-pei Hakka Major	18.8	20.8	2.02	5.6
Chu-pei Hakka Uxor	17.6	19.2	1.59	5.5
Chu-pei Hakka Minor	16.8	19.5	2.78	16.9
Lu-kang Hoklo	18.5	20.5	1.99	6.5
Lu-kang Hoklo Major	18.8	20.7	1.90	5.1
Lu-kang Hoklo Uxor	17.8	19.6	1.79	8.6
Lu-kang Hoklo Minor	17.3	19.8	2.51	12.8

Table 10 presents these indicators for women in their first marriages who were not pregnant at marriage. No data are reported for minor marriages among the plains Aborigines of Ta-nei and Chi-pei where samples are extremely small.

The average ages at marriage shown for the various ethnic and locality groups in the table, fall within a narrow range from 18.0 to 19.0 years. Once again, variation among the communities is determined less by ethnicity than by form of marriage and locality. The overall average age at first marriage is lowest among the Ta-nei plains Aborigines (18.1), and the Hakka (18.1) and Hoklo (18.0) of Chu-pei, bringing together representatives of the three ethnic groups at the

low end of the spectrum. The highest overall averages are among the Chi-pei plains Aborigines (19.0) and the Ta-nei Hoklo (18.9). Thus there is little evidence of an ethnic standard for Hoklo or for plains Aborigines at the level of group averages. The similarity between the two Chu-pei groups in average age at marriage disguises differences by form of marriage. The average age at uxori-local marriage is the same for the two plains Aborigine groups of Ta-nei and Chi-pei, but any sense of ethnic uniformity is undermined by their average ages at major marriage that are a full year apart. Age at minor marriage is consistently low, but age at uxori-local marriage is in two cases higher (Chu-pei Hoklo, Ta-nei plains Aborigine) rather than lower than age at major marriage.

The length of the first birth interval determines the wait from the marriage to the arrival of the first child (brides pregnant at marriage have been removed from the sample). The two plains Aborigine groups have the shortest overall average first birth interval, and are also alike in having shorter intervals for uxori-local marriages than major marriages, a characteristic they share with Chu-pei Hakka and Lkang Hoklo. The short birth intervals among the plains Aborigines in Ta-nei and Chi-pei also cast doubt on any hypothesis that nutritional deficiencies in one of the plains Aborigine groups delayed menarche sufficiently to have impacted the first birth interval.

The longest first birth intervals for all the Han groups are in the minor marriages. This may be attributed both to the younger age of many of the women married in the minor fashion (very near menarche), and the sexual aversion felt for their spouses by those adopted at an early age.⁶² In general the first birth intervals reported here are for all marriages lengthy, averaging around two full years (and longer than the *median* lengths reported by Pasternak for Lung-tu of around 15 months).⁶³

Taiwanese women who failed to produce a birth early in their marriages had an alternative open to them that was not available to their European counterparts. Childless Taiwanese women could adopt a child in anticipation of birth; this possibility held for Hoklo, Hakka and plains Aborigines alike.⁶⁴ A look at the community averages in the table reveals that the Ta-nei Hoklo were least likely to adopt before birth, while the Chu-pei Hoklo were the most likely (closely followed by the Chu-pei Hakka). The plains Aborigine averages fall midway along the spectrum, with adoption more frequent in Ta-nei than for Lu-kang Hoklo, and less frequent in Chi-pei (though adoption in major marriages in Chi-pei was more frequent than in major marriages in Lu-kang). Again we find a stronger pattern of variation by locality than by ethnicity, pointing to wide differences in

62. Wolf, *Sexual Attraction and Childhood Association*.

63. Pasternak, *Guests in the Dragon*, 110.

64. Wolf and Huang, *Marriage and Adoption in China*, 242ff.; Brown, *Is Taiwan Chinese*, 87-88.

adoption markets by locality (cf. Pasternak, who documents low rates of adoption among Lung-tu Hakka).⁶⁵ Frequencies of adoption also varied greatly by form of marriage. The proportions of women with an adoption before her first birth were in every Han group highest for those in minor marriages, where the average first birth interval was also the longest.

When we examine the data by age at first birth and by length of first birth interval (not shown here), we discover that for all marriage types the higher the age at first birth, and the longer the first birth interval, the more likely women were to have adopted a child prior to their first birth. This relationship holds true for the plains Aborigines of Ta-nei and Chi-pei as well as for the Han communities; 46.2% and 50% of plains Aborigine women in Ta-nei and Chi-pei who had first birth intervals greater than four years first had an adopted child (the comparable rates are 17% of Ta-nei Hoklo, 60% of Chu-pei Hoklo, 43.1% for Chu-pei Hakka, and 47.6% for Lu-kang Hoklo). This can be interpreted as an expression of growing anxiety about the bearing of children by couples whose old age security depended on the production of surviving offspring. The increasing propensity to adopt as the first birth interval lengthens belies claims that long first birth intervals were intentional means of birth control.⁶⁶

Ages at first birth in our sample groups ranged from 19.2 (Chu-pei Hakka uxorilocal marriages) to 21.1 (Ta-nei Hoklo major marriages), which is a narrower range than ages at marriage, which ran from 16.8 (Chu-pei Hakka minor marriages) to 19.1 (major marriages for Chi-pei plains Aborigines and Ta-nei Hoklo). Much of that narrowing is due to the long birth intervals in minor marriages that despite the early age at marriage delayed the age at first birth in minor marriages; this was sufficient to prevent minor marriages having the earliest age at first birth except among the Chu-pei Hoklo.

Our analysis of age at marriage and first birth for the sample of brides pregnant at marriage by locality, ethnic group and form of marriage yield comparable results. The patterns of bridal pregnancy reveal no ethnic uniformity, beyond the absence of minor marriage among the plains Aborigines.

Completed marriages: Age at last birth, completed fertility, and infant and child mortality

To study the beginning of marriage and childbearing we were able to use a sample of women who were under observation for the relatively brief portion of their marriages from age at marriage to age at first birth. To study the fertility of marriages over their full length, especially when the cessation of childbearing is of interest, requires a set of "completed marriages".⁶⁷ Comparisons of completed

65. Pasternak, *Guests in the Dragon*, 117-118.

66. Campbell et al., "Pretransitional Fertility in China".

Table 11: Women remaining in first marriages and continuously under observation from age at marriage (before age 30) to age 46 by locality, ethnicity and form of marriage

Locality, ethnicity, form of marriage	Number of completed marriages observed	Number zero parity	Pct. of non-zero parity completed marriages
Ta-nei Hoklo	239	6	97.5
Ta-nei Hoklo Major	202	6	97.0
Ta-nei PA	24	1	95.8
Ta-nei PA Major	18	1	94.4
Chi-pei PA	31	0	100.0
Chi-pei PA Major	27	0	100.0
Chu-pei Hoklo	92	7	92.4
Chu-pei Hoklo Major	65	6	90.8
Chu-pei Hakka	101	7	93.1
Chu-pei Hakka Major	71	7	90.1
Lu-kang Hoklo	119	8	93.3
Lu-kang Hoklo Major	86	6	93.0

marriages require excluding marriages that are only partially observed through their history, and marriages disrupted by death or divorce before the end of a woman's reproductive period. For this paper we define the set of completed marriages as those in which women remained in first marriages and were continuously under observation from age at marriage (no later than the 30th birthday) to age 46. (The condition of marrying before age 30 ensures that a minimum of 15 years of married life is observed for each marriage.) These are stringent conditions. They have the effect of severely reducing the number of marriages in our sample (see Table 11). In many ways the few marriages that survive to fulfill these conditions are clearly not "typical" marriages. Many more marriages in Taiwan were broken by death or divorce. Marriages are also eliminated from the sample because observation was interrupted by migration, either to areas outside the study area before the marriage reached completion or into the study area after the marriage was initiated.

In the case of the Taiwan household registers that were open only from 1906 to 1945, these stringent requirements also mean that the sample of completed marriages is restricted to a narrow birth cohort. This sample is thus restricted to women born before 1/1/1901 who reach age 46 by 12/31/45, the end

of the register period. In addition, all marriages in the sample must occur after 1/1/1906 if they are to be fully observed. As average age at first marriage is 19, most of the women marrying after 1906 will have been born after 1886. Of women born before 1886, only those marrying above the average age at marriage and after 1/1/1906 will enter the sample. The bulk of the women in this sample thus come from a much narrower cohort than that used in the tables for first marriages and first births above where later marrying women enter the sample. Because fertility rates are known to have risen and mortality to have fallen from 1906 to 1946, limiting the sample to a narrow birth cohort has the advantage of minimizing compositional and period effects, but this benefit comes at the heavy price of a reduced sample size .

The smallness of the sample of completed marriages also constricts our ability to fully compare the less frequent forms of marriage. The number of minor and uxori-local marriages surviving in our sample is small not just because they were less frequent than major marriages among first marriages, but also because divorce rates in minor and uxori-local marriages were higher than in major marriages.⁶⁸ Thus for the analysis of completed marriages we will not separately compare minor and uxori-local marriages. In the case of our plains Aborigine populations we are still left with very small samples of major and total marriages, which makes the results for these groups less reliable. Our criteria maximizing the homogeneity of the ethnicity samples remain the same as above.

Presented in Table 12 are the ages at first and last birth, the length of the reproductive period (years from first to last birth), the average closed birth interval, and the average number of births per woman for our ethnic groups. We have already discussed age at first birth using our larger sample above, and will focus here on the cessation of childbearing and the overall fertility of our completed marriages.

The youngest age at last birth and the shortest average reproductive period is found among the Ta-nei plains Aborigines in major marriages. This contrasts sharply with the Chi-pei plains Aborigines in major marriages that have the oldest age at last birth and the longest reproductive period in our sample. The same contrast is found between these two groups in average closed birth interval (longest for Ta-nei plains Aborigines and second shortest for Chi-pei plains Aborigines) and in average births per woman (lowest for Ta-nei and highest for Chi-pei). Clearly there is no single cultural pattern dictating fertility and length of the reproductive period among the plains Aborigines in our sample. Similarly, in the

68. Wolf, *Sexual attraction and childhood association*. Ethnographic materials suggest that adoptive mothers did not necessarily have any say in the decision to adopt.

Table 12: Women remaining in first marriages and continuously under observation from age at marriage (before age 30) to age 46 by locality, ethnicity and form of marriage: age at last birth, birth intervals, and births per woman

Locality, ethnicity, form of marriage	Age first birth*	Age last birth*	Reproductive period~	Avg. closed birth interval	Births per woman*
Ta-nei Hoklo	21.47	37.62	16.15	2.81	6.74
Ta-nei Hoklo Major	21.65	37.43	15.79	2.81	6.63
Ta-nei PA	20.57	36.09	15.52	2.97	6.22
Ta-nei PA Major	20.94	34.20	13.25	3.00	5.41
Chi-pei PA	21.41	38.15	16.74	2.51	7.68
Chi-pei PA Major	21.69	38.38	16.69	2.52	7.63
Chu-pei Hoklo	21.18	36.76	15.57	2.71	6.74
Chu-pei Hoklo Major	21.36	36.26	14.89	2.65	6.61
Chu-pei Hakka	21.44	37.96	16.52	2.77	6.96
Chu-pei Hakka Major	22.25	37.77	15.52	2.68	6.80
Lu-kang Hoklo	20.63	37.23	16.60	2.55	7.52
Lu-kang Hoklo Major	21.22	37.01	15.79	2.43	7.49

* Excludes zero parity women. ~the period from first to last birth in years.

case of the Chu-pei Hakka, except for age at last birth (which is high but not as high as Chi-pei) the indicators for reproductive period, birth interval and births per woman all fall in the middle of those from the Hoklo groups, and most often are closest to those of the Chu-pei Hoklo. Thus, these measures of fertility also fail to identify a distinctive Hakka – Hoklo difference.

In western Europe, as the Dutch data documents, less breastfeeding and higher infant mortality among Catholics shortened birth intervals and contributed to higher fertility compared to Protestants. No differences concerning length of breastfeeding period are known to distinguish either ethnic groups or localities in Taiwan. Average birth intervals in our sample groups are long and variation among groups is most likely related to different levels of infant mortality, as we will discuss shortly. The lack of uniform patterns distinguishing our ethnic groups undermines claims that ethnic differences, for example gender roles and the presence of footbinding, can explain differences in reproductive behavior among Taiwanese groups. So once again, on indicators that regularly discriminate between Protestants and Catholics in European cases, the Taiwanese ethnic groups are more likely to vary by locality than by ethnicity.

The average births per woman for completed marriages confirms our finding using the total marital fertility rates that Chi-pei plains Aborigines have

the highest fertility but the ranking of the other groups changes, with Ta-nei plains Aborigines now at the bottom and Lu-kang Hoklo next to Chi-pei at the top. In all our groups, the average births per woman is higher for all forms of marriage combined than for major marriages. This is somewhat surprising, given our expectation that the low fertility of minor marriages would depress the overall average compared to major marriage, at least for Han groups where minor marriages are numerous. Measures of total marital fertility which make fuller use of the register sample compared to measures based on completed marriages which discard so many cases, show higher fertility in major and uxori-local marriages. The divergence may also be a product of a selection effect operating on our sample of completed marriages: higher rates of divorce in uxori-local and minor marriages have eliminated more low parity marriages from those samples than divorce has eliminated from the major marriage sample.

In Table 12 we see that Chi-pei (7.68) and Lu-kang (7.52) have significantly higher births per woman than the other groups (the lowest number of births are found in major marriages of Ta-nei plains Aborigines, 5.41). Table 13 shows the number of children and the number of sons surviving to a fifth birthday per woman, along with measures of infant and child mortality. The high fertility in Chi-pei and Lu-kang is greatly reduced by correspondingly high rates of infant and child mortality. The reduction is so great in the case of Chi-pei (where child mortality is as high as infant mortality) that its number of surviving children put it near the bottom of the groups, along with Ta-nei plains Aborigines. As a result of mortality, the range of numbers of surviving children is much narrower, from 4.06 (Ta-nei plains Aborigines) to 5.72 (Chu-pei Hakka) compared to the numbers of births. High rates of infant and child mortality, by speeding the end of breastfeeding and its contraceptive effect, play a role in increasing fertility in Chi-pei and Lu-kang. Plains Aborigine women in Chi-pei and Hoklo women in Lu-kang combine the shortest closed birth intervals with slightly longer reproductive periods to make possible a higher number of births. The common experience of high infant and child mortality, despite ethnic difference, is what drives up fertility in these two populations. At the other extreme, the Chu-pei Hakka stand out for having particularly low rates of child mortality, which other evidence suggests may indeed indicate some sanitary or other health practices that are distinctively Hakka.

Table 14 presents for completed marriages the proportions of women who have three or fewer births and who had nine or more births. These are women whose fertility significantly diverged from the average. An overreliance on measures of central tendency in fertility measures obscures the important role of women at the extremes in many discussions of fertility, which tends to give the impression that an overwhelming majority of women were at or near the average number of births. This table seeks to rectify that shortcoming by documenting

Table 13: Women remaining in first marriages and continuously under observation from age at marriage (before age 30) to age 46 by locality, ethnicity and form of marriage: surviving children and sons, infant and child mortality

Locality, ethnicity, form of marriage	Births per woman*	Surviving children per woman*~	Surviving sons per woman*~	Infant deaths per 100 births	Child deaths (ages 1-4) per 100 surviving infants
Ta-nei Hoklo	6.74	5.18	2.61	11.45	13.17
Ta-nei Hoklo Major	6.63	5.13	2.55	11.70	12.38
Ta-nei PA	6.22	4.74	2.30	15.38	9.92
Ta-nei PA Major	5.41	4.06	1.88	17.39	9.21
Chi-pei PA	7.68	4.65	2.45	23.11	21.31
Chi-pei PA Major	7.63	4.63	2.33	21.36	22.84
Chu-pei Hoklo	6.74	5.15	2.64	15.36	9.69
Chu-pei Hoklo Major	6.61	5.15	2.56	13.59	9.79
Chu-pei Hakka	6.96	5.72	2.87	14.37	3.93
Chu-pei Hakka Major	6.80	5.55	2.72	15.17	3.79
Lu-kang Hoklo	7.52	5.20	2.65	20.96	12.58
Lu-kang Hoklo Major	7.49	5.35	2.73	19.53	11.20

* Excludes zero parity women. ~ children and boys surviving to a fifth birthday.

the large proportion of women whose fertility substantially exceeded or fell well short of the average. In eight of our twelve groups, from 46% to 64% of women were at the extremes of the parity distribution. Particularly striking are the large proportions of women who bore nine or more children in Chi-pei and Lu-kang, where we have seen high infant mortality pushed up completed fertility. Also striking is the very low proportion of Chi-pei women in completed marriages that had three or fewer births, which may be an indication of the great pressure high rates of infant mortality put on such women. Nearly as striking are the low proportions of Ta-nei plains Aborigine women who had nine or more births, which relates to the low fertility of this group of completed marriages. As a result, the four groups where smaller overall proportions fell into the extremes were all from Ta-nei and Chi-pei plains Aborigines (these are also our smallest samples of only 24 and 31 completed marriages).

As noted above in our discussion of adoption at the beginning of child-bearing, adoption was an option open to Chinese women with unsatisfactory fertility that was not available to European women. We interpret adopting a child after the *last* birth not only as evidence that families were not satisfied with the

Table 14: Women remaining in first marriages and continuously under observation from age at marriage (before age 30) to age 46 by locality, ethnicity and form of marriage: parity distribution, proportions adopting after last birth

Locality, ethnicity, form of marriage	Pct. low parity women <=3births*	Pct. high parity women >=9births	Pct. of all women adopting after last birth*	Pct. low parity women adopting after last birth*	Pct. adopt- ing after last birth who are low parity*	Adoptees per low parity woman
Ta-nei Hoklo	17.57	28.87	7.53	30.95	72.22	0.69
Ta-nei Hoklo Major	18.82	27.72	8.42	34.21	76.47	0.71
Ta-nei PA	16.67	12.50	20.83	100.0	80.0	1.50
Ta-nei PA Major	22.22	5.56	27.78	100.0	80.0	1.50
Chi-pei PA	6.45	35.48	19.35	50.0	16.67	0.50
Chi-pei PA Major	7.41	37.04	18.52	50.0	20.0	0.50
Chu-pei Hoklo	29.35	31.52	35.87	66.67	54.55	1.70
Chu-pei Hoklo Major	30.77	29.23	43.08	75.0	53.57	1.95
Chu-pei Hakka	18.81	30.69	29.70	68.42	43.33	1.89
Chu-pei Hakka Major	23.94	28.17	33.80	70.59	50.0	1.76
Lu-kang Hoklo	21.85	39.50	19.33	69.23	78.26	1.58
Lu-kang Hoklo Major	23.26	40.70	18.60	60.0	75.0	1.40

* Includes zero parity women.

size or sex composition of their offspring sets but also that stopping may not have been voluntary. Certainly adding another mouth to feed to the family contradicts the notion that early stopping is a deliberate means of limiting family size. The strong son preference of the Taiwanese family might lead us to expect that more boys would be adopted than girls, but it also meant that few families gave up boys for adoption. Thus adoptions were in fact overwhelmingly female. Adopted daughters could serve as son substitutes if no sons survived and an uxori-local marriage could be arranged to continue the family. Foster daughters could also serve as little daughters-in-law, and be married at maturity in a minor marriage to a son of the family at little expense and much potential gain to the domestic control exercised by the mother-in-law cum foster mother. In larger families, a surplus daughter might be sent out at the same time a foster daughter was brought in; this was a means of removing unwanted daughters and replacing them with little daughters-in-law in preparation for an anticipated minor marriage to a son. In these circumstances adoptions resulted in no net

gains in numbers of children. Our tables report any adoption occurring after the last birth regardless of sex.

In all the groups, substantial proportions of low parity women (having three or fewer births) adopted after their last birth. And in all the groups except Chi-pei, substantial proportions of the families adopting after a woman's last birth were for low parity women. Chi-pei is the exception because there were so few low parity women in the sample of completed marriages in Chi-pei (two women in a sample of 31). Adoption was a well-established custom in both the Chi-pei and Ta-nei plains Aborigine groups, as we saw above with respect to adoptions preceding first birth, and the high rates of adoption among the low parity plains Aborigine women of Ta-nei confirm that pattern.⁶⁹

These patterns strongly suggest that families with low parity women, far from being satisfied with the size and sex composition of their offspring set when stopping childbearing so early and with so few children, were in fact strongly dissatisfied. Reinforcing this conclusion is the number of children ever adopted (without regard to timing of adoption) per low parity woman. The highest numbers of adoptions occur for women stopping at the youngest ages, having the lowest number of births, and the lowest number of surviving sons. Thus the number and timing of adoptions cast serious doubt on notions that early stopping can be interpreted as intentional fertility control. The perspective provided by adoption offered by these tables shows there is little difference between the groups defined either by locality or by ethnicity with respect to desire of low parity women to increase their holding of children.

Conclusions and discussion

The goal of this paper was to establish what fertility differences existed, if any, between subpopulations in the Netherlands and Taiwan. The subpopulations chosen represent religious and ethnic categories that, according to most authors, form basic identification for the actors involved as well as for the keepers of the population and household registers. Whenever possible we took into account the confounding effects of socio-economic and regional influences. The results are both surprising and interesting, because they show that cultural identifications can influence reproductive behavior strongly or not at all. We will first present them for the two countries separately and then discuss the importance of the comparison.

The reproduction of Dutch couples between 1880 and 1960 had two characteristics that distinguished them from their counterparts in the neighboring countries. First of all, the national average of fertility was markedly higher. According to E.W. Hofstee we can find the reason for this in the pervasive reli-

69. Brown, *Is Taiwan Chinese*, 84-88.

gious character of the country. The power of “organized confessionalism” was such that even non-religious inhabitants were heavily influenced by the strict doctrine of the Roman Catholic and Orthodox Protestant churches.⁷⁰ This already hints at the importance of religion when trying to understand Dutch fertility.

To be sure, this idea is supported convincingly by the differences between the major denominations within the Netherlands. The onset of fertility decline is visible when comparing the ASMFR for the pre-decline and post-decline eras, but the rank order of the denominations does not change. The two orthodox religious groups (Roman Catholics and Orthodox Protestants) consistently exhibit a higher fertility when compared to their less strict colleagues. The fertility decline appears to have deepened the denominational differences between orthodox and liberal groups to the extent that Liberal Protestant women and women from mixed marriages of the second cohort already had a concave shaped ASMFR (indicating deliberate fertility limitation).

Denominational differences also affect the beginning and the end of the reproductive career. In the cohorts born before and after 1860, Roman Catholic and Orthodox Protestant brides start bearing children at a later age than Liberal Protestants. The only remarkable difference between the cohorts is to be found for couples of mixed religion. In the first cohort they were the last to start having children, while in the second cohort they were the first. The end of the reproductive period comes later for the strict religions too. Where contraception is not allowed, this is to be expected. Still, even orthodox couples stop having children five years earlier in the later cohort than they did in the earlier cohort. Not surprisingly, the influence of religion is to be found also in the completed family size of our couples. In the first cohort this effect is biased by differences in infant and childhood mortality. Nonetheless, this finding is another indication of the all-pervasive influence of religion on society: fertility, breastfeeding and sanitation habits all differentiate according to denomination.

Our main conclusion is in line with the finding of other authors in the Netherlands. If one wants to predict the fertility of a Dutch couple in the 19th and early 20th century, it is to religious denomination that one must turn. A relatively new conclusion is that the differentiation between denominations was already visible long before the *pillarization* started.

In Taiwan, we have searched for systematic ethnic patterning in childbearing using measures as diverse as total marital fertility, age at marriage and first and last birth, proportions of pregnant brides, proportions adopting before first birth and after last birth, length of birth intervals, and rates of infant and child mortality. Our overall conclusion with respect to our main question is a negative one.

70. Hofstee, *Korte demografische geschiedenis*, 58-62.

Ethnicity in Taiwan does not appear to have a significant impact on demographic indicators of fertility in ways analogous to the differences found between Catholics and Protestants in the Netherlands. We do not claim that there were no significant cultural differences characterizing marriage and reproductive behavior among these groups; we merely assert that such differences as existed did not result in distinctive levels and patterns of marital fertility among the ethnic groups. Differences were as likely to be explained by appeal to factors relating to locality and period as to ethnicity.

Marriage and reproduction are phenomena of major importance in human life, in every society and historical period. They constitute a very sensitive instrument to measure the impact of events and processes experienced by the population studied. Historical demographic research has repeatedly shown close links between demographic behavior and environmental and economic factors, as well as purportedly cultural factors such as ethnicity and religion. We expected, therefore, that the fertility differences between “cultural” subgroups of the population of Taiwan and the Netherlands would demonstrate the importance of the respective group identities. The results are remarkable. Being Dutch in the late nineteenth and early twentieth century implied being a member of one of the strictly organized denominations (in the case of Roman Catholics and Orthodox Protestants) or of less demarcated denominations (Liberal Protestants and others). Being Taiwanese in the first half of the twentieth century implied being aware of the provenance of ancestors, and thus being Hoklo, Hakka or plains Aborigine. Surprisingly, we find that group identity effected nuptiality and fertility in the Netherlands, but failed to do so in Taiwan.

The question to be answered, then, is why, in this important regard, the countries differed. Our data do not allow us to make final statements. The following possible answers, however, may guide future research. Religion in the Netherlands appears to be a much more powerful predictor for fertility than ethnicity is in Taiwan. Issues relating to age at marriage, sexuality, breastfeeding, and contraception were important in distinguishing religious denominations in the Netherlands, and denominational membership thus came to have an important influence on the demographic behavior of members. The same issues never operated as criteria distinguishing the Hakka, Hoklo, and plains Aborigines of Taiwan. Instead, the Taiwanese groups distinguished themselves on the basis of criteria such as provenance, footbinding, language, and patron gods, criteria that did not dictate distinctive fertility outcomes. As it is, we can only conclude that the often invoked differences between ethnic groups in Taiwan are of little significance when studying their demographic behavior. The Dutch couples in our data not only considered themselves Protestant or Catholic, but acted accordingly. The Taiwanese couples in our data considered themselves Hoklo, Hakka or

plains Aborigines, but acted either according to circumstances, or simply as Taiwanese. This, then, takes us back to the hypothesis formulated by McQuillan. The preconditions necessary for group identity (be it religious or ethnic) to influence demographic behavior were met by Roman Catholics and Orthodox Protestants in the Netherlands, but evidently not by the Taiwanese ethnic groups. Orthodox Protestants and Catholics in the Netherlands were worlds apart in the same small country. With regard to their demographic behavior, Hakka, Hoklo and plain Aborigines were not.

**Fertility and infant and
early childhood
mortality: Some lessons
on stopping behavior
from Taiwanese and
Dutch cases**

John R. Shepherd,

Jan Kok &

Hsieh Ying-hui

This chapter presents a preliminary exploration of issues surrounding the impact of infant and early child mortality on fertility behavior in Taiwan and the Netherlands. A particular concern is to assess claims made about the distinctive features of Chinese vs. European fertility behavior by the revisionist school of “anti-Malthusians” led by James Lee and Wang Feng and Zhao Zhongwei, in particular claims asserting the presence of “deliberate fertility control” by Chinese in the late imperial period.¹ The bulk of this chapter focuses on the impacts child mortality and survival have on women’s completed fertility and age at last birth (“stopping behavior”). Lee and Wang’s finding of a low average age at last birth (“early stopping”) in the Ch’ing imperial lineage and the banner population of Daoyi is a key element in their revisionist “anti-Malthusian” view of marital fertility in historical Chinese populations. Do we find indications that couples “started to stop” once they were satisfied with their present family size? Under what circumstances did early stopping occur? We feel that measures such as the average age at last birth are inadequate to distinguish subfecund couples from “deliberate stoppers”. Therefore, in this paper, we will work with the complete fertility history of individual couples. Basically, we ask simple questions: were couples that stopped at a low age of the wife blessed with surviving sons early in their “procreative career”? Conversely, did couples that supposedly stopped early voluntarily also have a low propensity to adopt children after their last child was born? A detailed comparison of fertility histories by final parity of completed marriages allows us to answer this kind of question. In addition, we compare multivariate models on parity progression that look at the effects on stopping of present family composition. The focus in this paper is on Taiwan, but where possible comparisons will be made with the Netherlands. In the case of the Netherlands deliberate parity-specific stopping is supposed not to have occurred among “pretransitional” cohorts.

In the next section, we will survey the literature dealing with the relation between infant mortality, or infant survival, and early stopping. We will also describe our choice of data for this contribution. Then, we will present a first inspection of the fertility histories of both Taiwanese and Dutch women with an eye to determining the extent to which final parity is related to the experience of infant mortality. Next, we look at the relationship between child (or son) survival and age at last birth. In a subsequent section, we put adoption into the equation and look at the effect of the sex of the last child as well. Were couples more eager to stop when last child was male? Then, we compare our findings based on descriptive statistics with a multivariate model that predicts parity progression while controlling for factors such as age of the mother, marriage duration and family composition. In a final section we test Zhao’s assertion that mothers who had experienced reproductive success at a young age were particularly likely to stop childbearing early.

1. Lee and Wang, *One Quarter of Humanity*; Zhao, “Deliberate birth control”.

Women's fertility and their experience of infant mortality: Preliminary considerations

The relationship between the number of children a woman bears and the number of children a woman loses to an early death has many dimensions. One dimension relates fertility to infant mortality through the impact of breastfeeding on birth spacing. In a society like that of early twentieth century Taiwan where the average period a child was breastfed extended well beyond the first year of life, the death of a child in infancy will cut short the amount of time the mother breastfeeds. This is important because of the role played by intense breastfeeding in the hormonal suppression of ovulation and menstruation. When ovulation is no longer suppressed by intense breastfeeding, the mother returns to a fecund state, and can be expected to conceive her next child earlier than might have been the case had her nursling survived the full period of breastfeeding. Thus we can expect that a woman who loses many children in infancy (by death, or, as we should not forget in the Taiwanese case, by adoption out) will have shorter intervals between births, on average, and thus in a given amount of time will bear a larger number of children. The same effect is found in Dutch society among the portion of the population breastfeeding for extended periods. This result requires no intent or special volition on the part of the woman or her spouse. So long as other factors affecting fecundability remain the same, this effect occurs automatically as the joint result of biological processes and breastfeeding customs. Our shorthand for the relationship connecting shortened breastfeeding and infant mortality to fertility will be the "lactation interruption effect".²

However, it would not be correct to assume the lactation interruption effect excludes all deliberate attempts to affect fertility. Because of the high value of sons, Taiwanese women are known to breastfeed sons for longer periods than daughters. This means birth intervals should be longer after a *surviving* son than a surviving daughter (the average interval after all births may show little difference between boys and girls, because higher male infant mortality reduces the average interval following male births). Women can speed their return to fecundability following the birth of a daughter not just by shortening the breastfeeding period but also by giving a daughter away in infancy and through female infanticide. The earlier return to fecundability speeds the possible conception of a boy. The deliberate shortening of the breastfeeding period following birth of a daughter may be seen as a woman's attempt to raise her fertility, and her prolonging the breastfeeding of a daughter could be interpreted as an attempt to limit fertility. However, prolonging the breastfeeding of a son was surely intended to ensure his survival, not to limit fertility. When might we expect the breastfeeding

2. Montgomery and Cohen, *From birth to death*, 2.

of a daughter to be prolonged as an attempt to limit fertility? Perhaps the daughters of women with many surviving sons were breastfed for longer periods and given away in infancy at lower proportions than the daughters of women anxious to bear additional sons? The extent to which such practices were important can be demonstrated by analysis of birth interval spacing, a subject being dealt with in other contributions to this volume.³

A different pathway connecting infant mortality and fertility involves the role of planning and intent of parents in response to the experience of infant loss. Couples may take steps to increase their fertility to replace a lost child (“replacement”) or in anticipation of child loss (“hoarding”). Wives in Chinese families were judged by their ability to produce male heirs for the family, and a woman who failed to produce sons lived an uneasy existence in her husband’s family. But more was at stake in the survival of sons than status in the family. Women’s long term welfare and security depended on raising sons to adulthood who would loyally support their mothers in old age. Maternal self-interest demanded that priority be given to raising sons. If no sons survived, a daughter (or adopted daughter) who married uxorilocally could serve as a son substitute. Daughters too had value, at least as insurance against the possibility of no sons surviving. Because of the cultural priorities of the Chinese family, married women understood that much was at stake in the raising of sons. This nexus of relationships and cultural premises stressing the importance of sons suggests that women who lost children, especially sons, in infancy or early childhood, can be expected to make a special and deliberate effort to conceive additional children, and perhaps to extend the usual period of childbearing to a later age. This pathway also suggests that women who lost few children, and were successful in producing surviving sons, might prefer to take more time between births, and perhaps to terminate their childbearing years earlier than their less fortunate sisters.

John Knodel identifies the replacement effect as one “whereby couples have replacement births in response to their own actual (as opposed to anticipated) experience with child loss”⁴, but Knodel quickly *inverts* the notion to one that *links early stopping to experience with high rates of child survival*. He points out that the replacement effect assumes that limitation is practiced to some degree in the population at large. If limitation is absent we expect all couples to continue childbearing to the end of the reproductive span, regardless of their experience with child mortality. With no limitation, there would be no difference in the age at last birth between those who lost children in infancy and early childhood (and are assumed to want “replacement”) and those who did not. Under such conditions Knodel suggests we may find instead of replacement by couples that have lost children in infancy earlier stopping by couples that have not.⁵ Our shorthand for these relationships con-

3. Cf. Zhao, “Deliberate birth control”, 743; Wolf, “Is There Evidence of Birth Control”, 146.

4. Knodel, *Demographic Behavior*, 393.

5. Knodel, *Demographic Behavior*, 406.

necting infant mortality and fertility in the absence of limitation will be the “early stopping hypothesis”. In theory, only if fertility limitation were broadly practiced would we expect to detect a replacement effect by which couples experiencing infant loss prolonged their childbearing in order to have additional births. In practical terms, given the relative nature of “early” and “late”, it may be difficult to determine if a difference in age at stopping between two groups should be attributed to early stopping in one group rather than later stopping in the other.

Finally, an alternative hypothesis, which we shall call the “natural fertility hypothesis”, states that couples continue childbearing to the end of the reproductive span and take no actions “to stop childbearing at any particular parity in order to limit family size to a given number”.⁶ If there is no deliberate attempt to increase or decrease childbearing in response to infant and child mortality and survival, as the natural fertility hypothesis predicts, then we should find no relationship between women’s ages at last birth and their experience of infant and child mortality. The natural fertility hypothesis predicts that women who lost children will have their last birth at ages similar to women who did not. All women are presumed to continue bearing children until the end of their reproductive spans regardless of their experience of child loss and survival; the only difference between them will be that women who lose children in infancy will have on average shorter birth intervals (due to the lactation interruption effect) that make possible a greater number of births within that span.

Note that in the Chinese case we need to distinguish stopping behavior as a response to son survival, not just child survival. The notion of natural fertility originates in attempts to identify limitation of family size without regard to the sex composition of offspring. In the context of Chinese son preference, our analysis must be sensitive to the presence of stopping behaviors as a response to survival of sons not just children overall. Both the replacement effect and the early stopping hypothesis predict that women with few surviving sons will have a higher age at last birth than women with many, and conversely that the more surviving sons a woman has, the earlier her age at last birth will be. An additional corollary holds that the earlier a woman has surviving sons, the earlier will be her age at last birth.⁷

Who are the early and late stoppers?

Lee and Wang construct a model of Chinese fertility in which a pattern of early stopping is one of three demographic mechanisms (the other two are late starting and long birth intervals) that they interpret as evidence of marital fertility restraint.⁸ They cite the finding of a mean age at last birth for the women of

6. Knodel, *Demographic Behavior*, 252.

7. Cf. Zhao, “Deliberate birth control”, 747.

Daoyi at age 33.5 (35 sui) (in completed marriages defined as those under observation until the woman is 46 sui), in contrast to much higher averages in European populations, as evidence of marital fertility control in Daoyi.⁹ But Lee and Campbell make little further inquiry into the conditions under which a low age at last birth occurred that might test its relationship to marital restraint. They interpret a low age at last birth as evidence of intentional and voluntary “early stopping,” without consideration of alternative possibilities.¹⁰

The average age at last birth in a population is the product of many variables, and reflects the parity distribution, birth spacing, and age at first birth. When comparing populations, historical demographers commonly consider a lower average age at last birth an indicator of fertility control, but only when age at marriage is controlled. As Flinn notes for European populations, “the earlier women married, the earlier they tended to give birth to their last child.”¹¹ *Early marriage especially reduces the age at last birth of the lowest parity women.* For two populations with identical parity distributions (and thus identical stopping patterns), a large difference in female age at first marriage will be enough to lower the average age at last birth of the population marrying earlier. A very large gap existed between the Taiwanese average age at marriage of 19.2 and the Dutch average of 26. We show in the table below that the early age at last birth of low parity women (1-6) is chiefly responsible for lowering the overall average age at last birth of the early marrying Taiwanese when compared to the late marrying Dutch. Indeed our comparison shows that having a lower average age at last birth does not prevent the early marrying Taiwanese from having a higher mean parity, which is hardly suggestive of fertility limitation. It is the early age at marriage that lowers the Taiwanese average age at last birth in the Taiwan-Dutch comparison, not intentional early stopping. Lee, Wang and Campbell fail to control for the much earlier age at marriage of the Chinese population when they claim that a lower age at last birth demonstrates Chinese marital fertility restraint compared to the Europeans. Instead it simply reflects the earlier Chinese age at marriage.

We can investigate the circumstances surrounding women’s age at last birth using individual level data from household register databases. Conventional under-

8. Lee and Wang, *One Quarter of Humanity*, 88.

9. Lee and Wang, *One Quarter of Humanity*, 89-90; Lee and Campbell, *Fate and Fortune*, 92-93, Table 5.5.

10. In the Daoyi population, Lee and Campbell acknowledge that an estimated half of all births were unregistered (one-third of male and two-thirds of female births), Lee and Campbell, *Fate and Fortune*, 66-67) (presumably these are unregistered non-survivors who never make the “first appearance” from which births are imputed. Accordingly, they adjust their fertility rates upward to compensate for missing births. However, no equivalent adjustment is made in the calculation of the ages at first and last birth. Adjusting for the missing first and last births would shorten the first birth intervals and raise the average age at last birth).

11. Flinn, *The European Demographic System*, 44.

Table 1: Mean age at last birth by final parity

	Taiwanese	N	Dutch	N
All parities	37.4	621	39.5	603
Parities 1-6	32.6	265	38.1	366
Parities 7 +	41.0	356	41.6	237

standings of the pronatalism of the Chinese family would predict early stopping only in those cases where a couple has achieved a sufficient holding of surviving sons. These assumptions imply a relationship of stopping behavior to couples' experience of child mortality and survival in accord with the early stopping hypothesis (limitation otherwise absent) and the replacement effect (limitation widely practiced). If a relationship can be established that links child survival to early stopping, then it may be reasonable to conclude that birth limitation is the likely motivation, on the assumption that couples have become satisfied with the size and sex composition of their offspring sets. If however the relationship of child survival to early stopping is weak or nonexistent, then we may doubt that couples are consciously limiting their fertility in attempts to shape their offspring sets.

However, an early age at last birth in completed marriages may be a response not to child survival but to difficult births, poor maternal health, the emotional stress surrounding child mortality, or low coital frequency due to long marital duration, spousal separation or marital estrangement.¹² "Early stopping" thus may be a sign of secondary sterility or experience with difficult pregnancies or births that renders a woman unwilling to undergo the risks of additional childbearing. It is not plausible to claim that a woman whose last birth is at age 33, all of whose children died before age 5, is intentionally limiting her fertility, without additional evidence. Fertility limitation is a plausible motive for stopping only for women who have surviving children, and in the Chinese case, sons.

If an early age at last birth may be a response to two quite divergent experiences with child mortality and childbearing, we must look for evidence of both kinds of early stoppers and ask which kind is more numerous when the last birth is at a given age: is it those that have many surviving children or those that have lost infants in relation to difficult pregnancies and birth traumas? As early stopping may be the product of either situation, evidence of the presence of early stoppers in the population is not itself evidence of intentional birth limitation. Indeed where we find an early age at last birth followed by death of spouse, divorce and a husband's remarriage, and for women who remain married, adop-

12. Knodel, *Demographic Behavior*, 378.

Figure 1: Hypotheses relating age at last birth and experience of child survival

Age at Last Birth	Experience of Child Survival	
	Few children survive	Many children survive
Later	Replacement Strategy	
'Natural'	'Natural' Fertility (lactation interruption effect)	
Earlier	Involuntary Stopping	Early Stopping

tion of children, husbands acquiring concubines (behaviors inconsistent with an intention to limit fertility), and uxori-local marriages arranged for daughters signaling failure to raise a son to adulthood, we justifiably see such events as indicative of involuntary cessation of childbearing. Thus, we need to probe our data for relationships between age at last birth, child mortality, and child survival that consider the fuller context of women's fertility decision making.

The Taiwan and Dutch samples of completed marriages

Study of the fertility of marriages over their full length, especially when the cessation of childbearing is of interest, requires a set of "completed marriages".¹³ The samples employed in this paper are of Taiwan and Dutch completed marriages in which women remained in first marriages and were continuously under observation from age at marriage to age 46.¹⁴ These are stringent conditions. They have the effect of severely reducing the number of marriages that qualify for our samples. In many ways the marriages that survive to fulfill these conditions are clearly not "typical" marriages. Many women's marriages were interrupted by death or divorce and followed by remarriage, but excluding these from the sample is necessary to eliminate marital disruption as a reason for stopping childbearing at lower parities. Marriages are also eliminated from the sample if observation is interrupted by migration, either to areas outside the study area before the marriage reached completion or into the study area after the marriage was initiated. Restricting our sample to completed marriages lasting to at least age 46 is also necessary to ensure that even the later born children of these women remain under observation for at least some years (so we know with great certainty whether the children survived their first years of life) and that what appears to be the woman's last birth is indeed her last birth. The counts of births and infant and child deaths include only legitimate births.

13. Knodel, *Demographic Behavior*, 407.

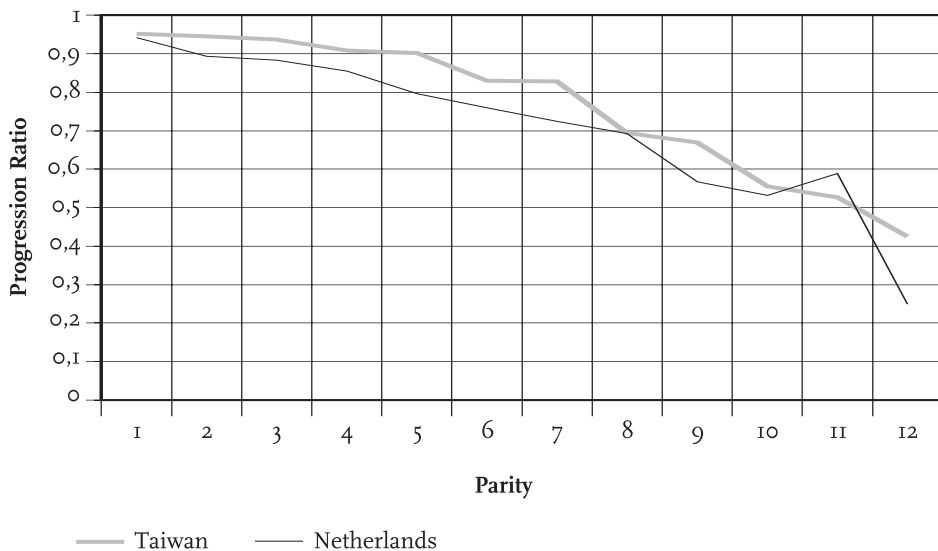
14. The Taiwan sample also eliminates women married after the thirtieth birthdate to ensure that a minimum of 15 years of married life is observed for each marriage.

Because the Taiwan household registers were open only from 1906 to 1945, the sample of completed marriages is restricted to a narrow birth cohort. The sample includes only women born before 1/1/1901 who reach age 46 by 12/31/1945, the end of the register period. In addition, all women in the sample must marry after 1/1/1906 if their marital fertility is to be fully observed. As average age at first marriage is 19, most of the women marrying after 1906 will have been born after 1886. Of women born before 1886, only those marrying above the average age at marriage and after 1/1/1906 will enter the sample. The bulk of the women in this sample thus come from a narrow birth cohort born between the 1880's and 1901. Because fertility rates are known to have risen and mortality to have fallen from 1906 to 1946, limiting the sample to a narrow birth cohort has the advantage of minimizing compositional and period effects.

This paper draws data from the household registers of four Taiwan localities. Two sites come from southwestern Taiwan, Ta-nei (N=277), which has a majority Hoklo population but also a significant plains Aborigine minority, and Chi-pei (N=49) which has a plains Aborigine majority population. Our third site, Chu-pei (N=206), located in the northwestern county of Hsin-chu, had a population evenly divided between a Hoklo area (Chiu-kang) and a Hakka area (Liu-chia). The fourth site, Lu-kang (N=119), a medium sized town on the central western coast of Taiwan, is predominantly Hoklo. These four sites thus contain representatives of three of the four main ethnic groups of Taiwanese society, and are located in the three main regions of Taiwan (north, center and south). (In separate analyses we have found minimal systematic variation in fertility due to ethnic differences but larger differences related to locality.) We make no claims that the sample is "representative" of some all-Taiwan average, but note only that it draws women from a diversity of local populations.

The Dutch sample is drawn from women born between 1800 and 1860 in five localities. These localities include urban Amsterdam (N=36), urban and rural parts of Utrecht (N=198), the medium sized provincial town of Nijmegen (N=105), the proto-industrial agricultural community of Borne in the eastern province of Overijssel (N=98), and the agricultural community of Akersloot in North Holland (N=166). Throughout this chapter parity distributions are used in preference to single figure summary measures to explore and represent women's actual fertility experience. Parity distributions of women's completed fertility document the range and heterogeneity of fertility that characterize human populations. Thus parity distributions are in many ways a superior measure compared to age specific fertility rates that focus solely on pacing and reduce real variation to averages of women's experience, and total fertility rates that sum those averages (without regard to differences in marital duration). Mean parity also better reflects the average of women's actual fertility (determined by both duration and pacing of childbearing), compared to total fertility rates. Total fertility rates are

Figure 2: Parity Ratios, Completed marriages, Taiwan and the Netherlands, zero parity excluded



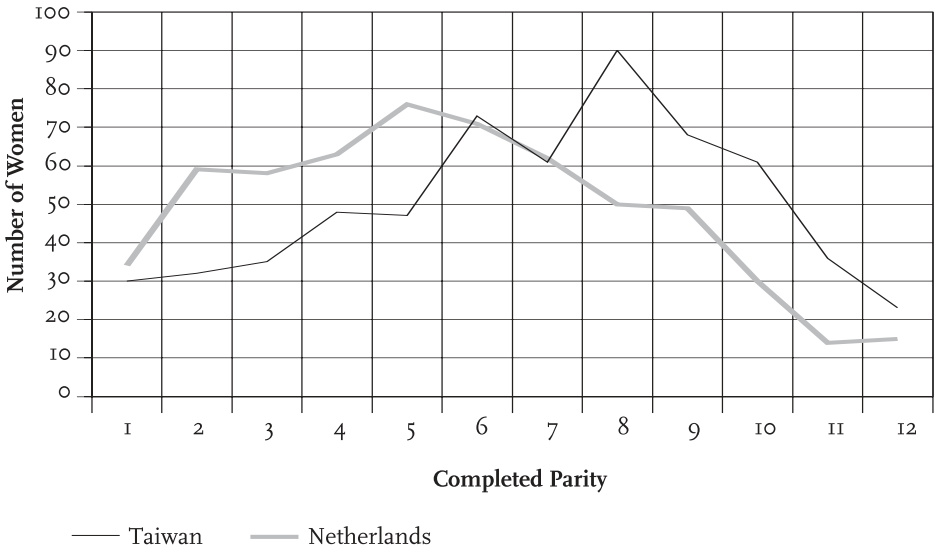
Mean parity: Taiwan 6.98, Netherlands 5.73

based on the statistical fiction of a synthetic cohort experiencing a succession of age specific fertility rates, and thus assume in the case of total marital fertility, contrary to fact, that women are married the entire fertile period, age 15-49. Total marital fertility rates derived from synthetic cohorts can be seriously misleading when comparing populations, such as the Chinese and the Europeans, which have different ages at marriage and marital durations and real differences in mean parity. Our parity distributions present the actual experience of women in completed marriages. We use tables organized by parity, number of surviving sons, and age at last birth to display a variety of indicators that characterize the experience of women at different parities, and ages at last birth.

Figures 2 and 3, presenting the parity progression ratios and the parity distributions (also Tables 2 and 3 below) provide an overview of childbearing in our sample marriages. The parity progression ratios confirm that both populations are characterized by natural fertility where parity specific limitation is absent. The parity progression ratios show the proportion of women progressing to the next birth remaining at .80 or above from parity one until parity five in the Netherlands and until parity seven in Taiwan; after that the ratios decline slowly and are still above .50 at parity eleven in both samples. Such patterns are typical of natural fertility populations where women do not control their fertility.¹⁵

15. Lutz, *Distributional Aspects of Human Fertility*, 50.

Figure 3: Parity distributions, Completed marriages, Taiwan and the Netherlands, zero parity excluded



Mean parity: Taiwan 6.98, Netherlands 5.73

The mean final parity of women (excluding zero parity) was 6.98 births in Taiwan and 5.73 births in the Netherlands. Differences in mean age at marriage, about 19 in Taiwan and 26 in the Netherlands, cause marital durations and the number of years from first to last birth to diverge widely (discussed below), with the Dutch only partly making up for late marriage and short durations by a more rapid pace of childbearing. Figure 3 shows that the distribution of individual women by parity was highly dispersed around the average parities. Excluding zero parity women, women having one to three births were 15.6% of the Taiwan population and 25.6 % of the Dutch population. Women having nine or more births were 33% of the Taiwan population and 19.3 % of the Dutch population. Thus in both populations at least 45% of childbearing women were substantially below or above the mean parity. In the Taiwan sample 57% of women had seven or more births while in the Dutch sample 51% had six or more births.

Infant mortality at 15.8 per 100 births in Taiwan was just slightly lower than the rate of 16.7 per hundred in the Netherlands (see Tables 2 and 3). The proportion of children who survived to age one but died by their fifth birth date was 12.0 per hundred in Taiwan and 10.3 per hundred in the Netherlands. Thus both our populations combine high natural fertility with high levels of infant and child mortality.

No conclusions should be drawn from the large difference in the pro-

portions at zero parity between the two populations. This is most likely an artifact of differences in sample construction (the Taiwan sample excludes women married after age 30, many of whom bore no children, while the Dutch sample does not) as well as real differences in average age at marriage between the samples (circa 19 in the case of Taiwan and circa 26 in the case of the Dutch). Completed marriages do not provide an appropriate sample for estimating the proportion of women sterile in a population, especially given the higher likelihood in Taiwan that infertile women will be divorced compared to fertile women.¹⁶

Fertility and infant mortality: Cause or consequence?

We begin our exploration of hypotheses linking infant and early child mortality and women's fertility behavior with Tables 2 and 3 below which present distributions of women by their completed fertility and the number of infant losses experienced by these women.

What relationship, if any, does the broad distribution by parity have to the experience of infant mortality? The lactation interruption effect and replacement both assume that infant mortality is independent of parity, and that women increase their parity in response to infant loss. In Tables 2 and 3 if we look at the columns headed "infant deaths per woman", we notice that women who had more births were also more likely to have lost one or more of those births in infancy than women who had fewer births. At first glance this suggests that the lactation interruption effect and/or replacement must be playing a strong role because women at the highest parities have lost the most births. But it also suggests other possibilities we must consider. We know that the risks of infant mortality are higher for high parity births. Some deaths of this nature are likely contributing to the total numbers of infants lost to women at high parities. Another possibility is that high parity women have more crowded birth spacing that leads to higher rates of infant mortality, which then in recursive fashion results in foreshortened birth intervals and more births (the "crowding hypothesis"). Is infant mortality a cause of high fertility (as the lactation interruption effect and replacement assume) or its *consequence*?

If infant mortality were a consequence of high fertility, we would expect to find that infant deaths per births increases regularly with parity. When we look at the columns headed "infant deaths per 100 births" we learn that there is a much weaker and inconsistent relationship between the probability of an infant dying and parity. In the Taiwan case, infants born to women at the highest (11-14) and also the lowest (1-3) parities were more likely to die than those born to women at middling parities. A similar pattern is found in the Dutch case, where infants born to women at parities 9-13 were more likely to die than

¹⁶ Wolf, *Sexual Attraction and Childhood Association*, 155-164.

those born to women at middling parities. The increases in the rate of loss per infant born (to a maximum of 63% and 66% over the averages for the Taiwanese and Dutch respectively) is much less than the increase in the numbers lost per woman (to a maximum of 3.3 and 3.75 times the averages). If women at higher parities suffer more infant losses per woman it is primarily because the more children born, the greater the likelihood that one child will die, and only secondarily because the probability of infant mortality (per birth) increases with parity. Though women are more likely to have suffered an infant loss at higher parities this does not demonstrate that such losses were a cause of their progressing to higher parities. Average closed birth intervals in both samples also decline with increasing parity and the number of infant deaths per woman; but is this because short intervals raise infant mortality, or is infant mortality via the lactation interruption effect reducing the average birth interval? That infant mortality is not independent of parity complicates our analysis of the responses to it, and we must beware in our interpretations of the data of assuming the causal arrow flows in only one direction.

At the lowest parities in the Taiwan sample the rates of infant loss per birth are also elevated (though to a lesser extent than at high parities) but infant deaths per woman are among the lowest. We know that the risks of infant mortality are higher for first births. Deaths of this nature are surely a significant proportion of the infants lost to women who remain at these low parities, which suggests that for some of them early experience with infant loss may signal difficulties in childbearing that terminate further childbearing, rather than spurring it to higher levels.

Both tables show that women experiencing broadly similar rates of loss *per birth* have widely divergent total numbers of births. In general these patterns give at best weak support to the crowding and replacement hypotheses. Women who had fewer than average births did not lose fewer infants per birth, and cannot be said to have stopped childbearing early because more of their children survived. And women having higher than average births did not all lose more infants per birth, nor can these women be said to have continued childbearing to higher parities because they lost a higher proportion of births in infancy.

Nevertheless, the increase with parity in the average number of infant deaths *per woman* shown in these tables suggests a strong relationship between women's experience of infant mortality and their fertility. But is that relationship explained by the early stopping hypothesis and/or replacement (women whose children survive stop earlier than women with fewer surviving children) or by the lactation interruption effect in conjunction with natural fertility (women continue bearing children to the end of their reproductive lives at a pace determined by the time spent breastfeeding surviving infants)? The lactation interruption effect predicts that women whose children survive bear fewer children because breastfeed-

Table 2: Final parity and infant losses of Taiwanese women remaining in first marriages and continuously under observation from age at marriage (by age 30) to age 46 by births, surviving sons, infant deaths, etc., 1906-1946

# Births	Number of women	Total births	Infant deaths	Infant deaths per woman	Infant deaths per 100 births:	Avg. closed birth interval
0	30	0	0	0	---	---
1	30	30	6	0.20	20.0	---
2	32	64	13	0.41	20.3	5.40
3	35	105	23	0.66	21.9	3.65
4	48	192	33	0.69	17.2	3.57
5	47	235	24	0.51	10.2	3.50
6	73	438	59	0.81	13.5	3.04
7	61	427	56	0.92	13.1	2.93
8	90	720	117	1.30	16.3	2.74
9	68	612	75	1.10	12.3	2.56
10	61	610	85	1.39	13.9	2.53
11	36	396	79	2.19	19.9	2.33
12	23	276	59	2.57	21.4	2.13
13	10	130	33	3.30	25.4	1.93
14	5	70	18	3.60	25.7	1.97
15	1	15	2	2.00	13.3	1.86
16	1	16	1	1.00	6.3	1.49
Total	651	4336	683	1.10*	15.8	2.71

* Average excludes zero parity women.

ing slows their pace of childbearing compared to women who lose children in infancy. The early stopping hypothesis predicts stopping when women reach a satisfactory number of surviving children or sons in contrast to the natural fertility hypothesis that predicts stopping only when fecundity declines (either due to secondary sterility (early) or old age (late)) without regard to the number of surviving sons. To test these alternative explanations we need to explore our data further for evidence that would discriminate between these two hypotheses.

Age at last birth and surviving children and sons

If some women were stopping childbearing "early", did they do so in terms of parity, age, or number of surviving children and sons? Our tables relating completed parity and infant mortality showed large numbers of women stopping at

Table 3: Final parity and infant losses of Dutch women born before 1860 remaining in first marriages and continuously under observation from age at marriage to age 46

# Births	Number of women	Total births	Infant deaths	Infant deaths per woman	Infant deaths per 100 births:	Avg. closed birth interval
0	118	0	0	0	---	---
1	34	34	5	0.15	14.7	---
2	59	118	13	0.22	11.0	3.00
3	58	174	21	0.36	12.1	3.20
4	63	252	35	0.56	13.9	2.80
5	76	380	60	0.79	15.8	2.78
6	71	426	66	0.93	15.5	2.44
7	62	434	81	1.31	18.7	2.23
8	50	400	49	0.98	12.3	2.34
9	49	441	79	1.61	17.9	2.10
10	30	300	64	2.13	21.3	1.80
11	14	154	31	2.21	20.1	1.87
12	15	180	40	2.67	22.2	1.76
13	5	65	18	3.60	27.7	1.82
Total	704	3358	562	0.96*	16.7	2.33

* Average excludes zero parity women.

every parity up to 12 and even higher but told us little about the circumstances characterizing these women. Did women stopping at lower parities have more surviving sons in the case of the Taiwanese, and surviving children in the case of the Dutch, than women stopping at higher parities? And did they do so at younger ages or after shorter childbearing periods, defined here as the years from first to last birth? The importance of producing surviving sons to the long term welfare of women in the Chinese family, meant that Taiwanese women were strongly motivated to continue childbearing until they could be sure that at least one son would survive. The early stopping hypothesis predicts that Taiwanese women with many surviving sons will stop childbearing earlier than women who have few or no surviving sons and who must continue childbearing until they reach a satisfactory number or come to the end of their reproductive period. Will we find analogous patterns for Dutch women anxious to produce surviving children and sons?

“Surviving children” and “surviving sons” are defined as those who survived early childhood and lived to at least age five. The definition used here selects survival to age five in order to balance two countervailing pressures, iden-

Table 4: Age at last birth of Taiwanese women remaining in first marriages and continuously under observation from age at marriage (by age 30) to age 46 by births, surviving sons, infant deaths, etc., 1906-1946

Age at last birth	# Women	Total births	Births/ woman	Surviving children/ woman	Surviving sons/ woman	Surviving children/ 100 births	Surviving sons/ 100 births	Infant deaths/ woman	Infant deaths/ 100 births
15-17	2	2	1.00	0.50	0.50	50.0	50.0	0.50	50.0
18-20	11	15	1.36	0.73	0.45	53.3	33.3	0.45	33.3
21-23	17	33	1.94	1.47	0.76	75.8	39.4	0.29	15.2
24-26	33	99	3.00	1.94	0.97	64.6	32.3	0.70	23.2
27-29	38	124	3.26	2.37	1.00	72.6	30.6	0.68	21.0
30-32	30	134	4.47	3.40	1.90	76.1	42.5	0.57	12.7
33-35	56	310	5.54	4.20	2.02	75.8	36.5	0.88	15.8
36-38	98	659	6.72	4.94	2.67	73.4	39.8	1.03	15.3
39-41	178	1477	8.30	6.10	3.11	73.5	37.4	1.35	16.2
42-44	138	1282	9.29	6.99	3.62	75.3	39.0	1.34	14.4
45-47	19	193	10.16	7.89	3.89	77.7	38.3	1.58	15.5
48-50	1	8	8.00	7.00	4.00	87.5	50.0	1.00	12.5
Total	621*	4336	6.98	5.18	2.66	74.2	38.1	1.10	15.8

* Excludes 30 zero parity women.

tified by Knodel: "This age.... encompasses the age range of most pre-adult mortality, while minimizing the chance that the parents will have become sterile by the time of the child's death".¹⁷ If we are to observe mothers employing limitation and replacement strategies in response to the survival and loss of previously born children, the child's death must occur before the end of the mother's reproductive period. Mothers are likely to have remaining childbearing capacity to adjust their birth planning to the death of a child as late as age five even in the case of later born children. It is also important from the point of view of sample construction that children of mothers continuously under observation to at least age 46 are also highly likely to remain under observation to age five.

The tables below present data on numbers of births, surviving children and sons, infant losses, and age at last birth for women in completed marriages. Tables 4, 5 and 6 display these data organized by age at last birth, number of sur-

17. Knodel, *Demographic Behavior*, 407.

Table 5: Surviving sons of Taiwanese women remaining in first marriages and continuously under observation from age at marriage (by age 30) to age 46 by number of surviving sons, births, age at last birth, infant loss, etc., 1906-1946

# Surviving sons	# Women	Total births	Age at last birth	births woman	Surviving children/woman	Surviving children/100 births	Surviving sons/100 births	Infant deaths/woman	Infant deaths/100 births
0	51*	147	28.18	2.88	1.29	44.9	0.0	1.08	37.4
1	116	549	33.10	4.73	2.98	63.0	21.1	1.13	23.9
2	150	997	37.59	6.65	4.80	72.2	30.1	1.14	17.2
3	127	1015	39.73	7.99	5.98	74.8	37.5	1.25	15.7
4	92	795	40.71	8.64	6.85	79.2	46.3	0.93	10.8
5	44	415	41.62	9.43	7.77	82.4	53.0	1.09	11.6
6	25	245	41.22	9.80	8.00	81.6	61.2	1.04	10.6
7	13	135	43.17	10.38	9.23	88.9	67.4	0.38	3.7
8	2	22	41.59	11.00	9.00	81.8	72.7	0.50	4.5
9	---	---	---	---	---	---	---	---	---
10	1	16	42.09	16.00	15.00	93.8	62.5	1.00	6.3
Total	621*	4336	37.45	6.97	5.18	74.2	38.1	1.10	15.8

* Excludes 30 zero parity women.

living sons, and completed parity for the Taiwanese, and Table 7 displays the data for the Dutch by completed parity. All tables show a *consistent positive relationship between age at last birth, number of births per woman, and number of surviving children and sons per woman*. Women could produce more surviving children and sons only by having more births and extending childbearing to a later age. The average age at last birth was 37.45 years in Taiwan, which is similar to Zhao's finding of an average age at last birth of 38.2 in the 1982 one-per-thousand population fertility survey¹⁸, and much higher than the reported age of 33.5 for Daoyi village in the nineteenth century.¹⁹ Women in the Netherlands who married and had first births much later than the Taiwanese stopped childbearing at an average age of 39.5 years. Women who stopped childbearing earlier than the average age at last birth had below average numbers of surviving children and sons while women who continued bearing children to later than average ages were reward-

18. Zhao, "Deliberate birth control", 735.

19. Lee and Campbell, *Fate and Fortune*, 92-93.

Table 6: Parity distribution of Taiwanese women remaining in first marriages and continuously under observation from age at marriage (by age 30) to age 46 and age at last birth etc., 1906-1946

# Births	# Women	Total births	Age at last birth	Surviving children/woman	Surviving sons/woman	Surviving children/100 births	Surviving sons/100 births	Infant deaths/woman	Infant deaths/100 births
0	30	0	---	0	0	---	---	0	---
1	30	30	24.07	0.73	0.40	73.3	40.0	0.20	20.0
2	32	64	28.34	1.53	0.84	76.6	42.2	0.41	20.3
3	35	105	28.97	2.06	1.14	68.6	38.1	0.66	21.9
4	48	192	33.09	2.79	1.31	69.8	32.8	0.69	17.2
5	47	235	35.92	4.06	2.02	81.3	40.4	0.51	10.2
6	73	438	37.32	4.71	2.47	78.5	41.1	0.81	13.5
7	61	427	39.23	5.52	2.89	78.9	41.2	0.92	13.1
8	90	720	40.28	5.83	3.14	72.9	39.3	1.30	16.3
9	68	612	41.16	6.90	3.54	76.6	39.4	1.10	12.3
10	61	610	42.11	7.56	3.89	75.6	38.9	1.39	13.9
11	36	396	42.20	7.61	3.72	69.2	33.8	2.19	19.9
12	23	276	42.36	8.04	4.09	67.0	34.1	2.57	21.4
13	10	130	42.14	7.80	3.90	60.0	30.0	3.30	25.4
14	5	70	44.40	9.60	3.60	68.6	25.7	3.60	25.7
15	1	15	44.55	12.00	3.00	80.0	20.0	2.00	13.3
16	1	16	42.09	15.00	10.00	93.8	62.5	1.00	6.3
Total	651	4336	37.45*	5.18*	2.66*	74.2	38.1	1.10*	15.8

* Average excludes zero parity women.

ed with above average numbers of surviving children and sons. Thus there is no indication that women continued bearing children to late ages because of a failure to produce surviving children as the replacement hypothesis predicts; if anything they enjoyed, and presumably wanted, a surplus. Contrary to the predictions of the early stopping hypothesis, early stoppers had fewer than average surviving children and sons.

Zhao found a similar positive relationship between age at last birth and the number of children born in his analysis of women's ages at last birth by the sex composition of their children, and he recognizes that "this is to be expected because a large family size naturally requires a longer time to achieve".²⁰ But

Table 7: Parity distribution of Dutch women born before 1860 remaining in first marriages and continuously under observation from age at marriage to age 46 and age at last birth etc.

# Births	# Women	Total births	Age at last birth	Surviving children/woman	Surviving sons/woman	Surviving children/100 births	Surviving sons/100 births	Infant deaths/woman	Infant deaths/100 births
0	118	0	---	0	0	---	---	---	---
1	34	34	34.9	0.85	0.53	85.3	52.9	0.15	14.7
2	59	118	35.1	1.66	0.86	83.1	43.2	0.22	11.0
3	58	174	37.6	2.33	1.29	77.6	43.1	0.36	12.1
4	63	252	38.8	3.11	1.76	77.8	44.0	0.56	13.9
5	76	380	39.8	3.83	2.07	76.6	41.3	0.79	15.8
6	71	426	40.1	4.52	1.90	75.4	31.7	0.93	15.5
7	62	434	40.3	5.16	2.52	73.7	35.9	1.31	18.7
8	50	400	41.8	6.32	3.98	79.0	49.8	0.98	12.3
9	49	441	42.3	6.67	3.10	74.1	34.5	1.61	17.9
10	30	300	41.3	6.93	4.07	69.3	40.7	2.13	21.3
11	14	154	42.5	7.71	4.50	70.1	40.9	2.21	20.1
12	15	180	43.3	7.87	3.87	65.6	32.2	2.67	22.2
13	5	65	44.2	8.00	3.00	61.5	23.1	3.60	27.7
Total	704	3358	39.5*	4.28*	2.24*	74.7	39.1	0.96*	16.7

* Average excludes zero parity women.

Zhao interprets the pattern differently, emphasizing the low fertility of those who stopped at younger ages as evidence of deliberate limitation, while ignoring the high fertility of those who continued even though they had numerous sons. Is there any indication in the tables of a relationship between experience of infant and child mortality and age at last birth? Did women continue to have births to later ages because they experienced higher-than-average losses among their children? Is there a “positive relationship between the age of mother at last birth and the number of previous child deaths”?²¹ The number of infant deaths experienced by a woman bears a direct relationship to the number of births; the more births the greater the probability that any one newborn will suffer an early death. This direct relationship between number of births and number of infant

20. Zhao, “Deliberate birth control”, 739.

21. Knodel, *Demographic Behavior*, 418.

deaths per woman shows up clearly in the tables organized by parity. But did women having higher numbers of births also suffer a higher rate of infant loss per birth? Or a lower proportion of surviving sons and children per birth? And did this high rate of loss affect their age at last birth?

There appears to be a weak and somewhat inconsistent relationship between infant deaths per birth and parity, as discussed above. In Tables 6 and 7 organized by parity we find that at high parities, 11 to 14 for Taiwanese and 10 to 13 for the Dutch, a lower than average proportion of births have survived to age five and a higher than average proportion of births have died in infancy. These high parity women also have higher ages at last birth. This suggests that these women may have continued childbearing to such high parities and late ages because of infant and child losses, in accordance with replacement. But when we look at the numbers of surviving children and surviving sons per woman produced by these high parity women it is clear that overall they were *more* successful than even their above average but lower parity sisters.

In Tables 4 and 5, organized by age at last birth and by number of surviving sons of Taiwanese women, we find that women stopping childbearing early (especially those stopping by age 29) and women with fewer than average surviving sons experienced higher rates of infant death per birth and lower rates of child and son survival than women stopping at later ages and women having higher-than-average numbers of surviving sons. Thus the tables organized by age at last birth and number of surviving sons show that Taiwanese women stopping early and with fewer surviving sons had more infant deaths per birth rather than fewer. This pattern is contrary to what the replacement hypothesis would lead us to expect. The women who continue childbearing to later ages are more successful in avoiding infant and child loss per birth, and better able to achieve the benefits of a larger number of surviving children and sons.

We are thus left with strong hints that infant and child mortality played a role in preventing some low parity women from continuing childbearing, and somewhat weaker hints that infant and child mortality played a role in delaying stopping by some high parity women who had already produced above average numbers of children. But these are minor notes in an overall picture showing a consistent positive relationship between age at last birth, number of births per woman, and number of surviving children and sons per woman that accords well with the natural fertility hypothesis that women continued childbearing to the end of their reproductive spans with little regard to their experience of infant and child loss.

Early stopping further explored

What explains early stopping if it is not an early satisfaction with the number of surviving sons and a desire to limit subsequent childbearing? Is such early stop-

ping voluntary, part of a deliberate birth limitation strategy, or is it involuntary, and perhaps the result of secondary sterility, infertile husbands, marital estrangement or other difficulty that makes further childbearing either impossible or dangerous to the health of the woman? First of all, we look at the effect of an early *start*.

If women were limiting their births after achievement of a satisfactory holding of surviving sons, we might expect that on average those who started their childbearing period early would stop early and those who began late would stop late, as claimed for the imperial lineage.²² According to Zhao Zhongwei “women’s age at birth of their last child (or son) was positively related to their age at having a first child (or son)”.²³ The result of such a pattern would be a convergence of childbearing spans around a narrow range of years. Table 8 below, organized by age at last birth, shows that the Taiwanese women who stopped childbearing at the youngest ages (up through age 26) started on average at the earliest ages, while the remaining women had starting ages that cluster within a narrow range around the average of 21.2. This gives the impression that there may be a weak positive relation between early starting and early stopping as predicted by the revisionists. However, for the entire range of stopping ages a strong positive relationship emerges between women’s age at last birth and their number of childbearing years. The result shown in Table 8 is a greater number of years of childbearing the later the age at which women have their last birth, rather than a convergence of the spans, regardless of starting or stopping ages. Tables 9 and 10, organized by number of surviving sons and completed parity, show an *inverse* relationship between starting and stopping ages, rather than a positive one, and a strong positive relationship between the length of the childbearing span and the number of surviving sons in Table 9, and births in Table 10. These tables show that the most fertile women in Taiwan had the longest childbearing periods, achieved by starting early and stopping late, while the least fertile started late and stopped early, and had short childbearing spans. From the perspective of surviving sons and parity, it appears the *early stoppers* were *not early starters* who have achieved their childbearing targets early, and are not deliberately limiting their fertility but are more plausibly women who had their fertile years cut short involuntarily, before they could achieve a higher number of surviving children and sons. We find that the same inverse relation between starting and stopping ages, and positive relation between length of childbearing span and the number of births, also characterize the Dutch parity distribution in Table 11.

More direct evidence of intent surrounding age at last birth comes from

22. Wang, Lee and Campbell, “Marital fertility control”, 393.

23. Zhao, “Deliberate birth control”, 750.

Table 8: Age at last birth of Taiwanese women remaining in first marriages and continuously under observation from age at marriage (by age 30) to age 46 by births, surviving sons, infant deaths, etc., 1906-1946

Age at last birth	# Women	Age at first birth	Avg. child-bearing years (t)	# Women adopting after last birth	% Adopting after last birth	# Adopted children	Adopted children/woman	% Male of last births
15-17	2	17.6	0.0	2	100.0	3	1.50	50.0
18-20	11	19.2	0.6	9	81.8	18	1.64	63.6
21-23	17	20.2	2.2	10	58.8	19	1.12	52.9
24-26	33	20.2	5.5	12	36.4	28	0.85	60.6
27-29	38	22.3	6.3	15	39.5	33	0.87	60.5
30-32	30	21.3	10.5	9	30.0	31	1.03	50.0
33-35	56	21.2	13.3	10	17.9	44	0.79	44.6
36-38	98	21.5	16.2	10	10.2	59	0.60	64.3
39-41	178	21.1	19.4	13	7.3	137	0.77	52.8
42-44	138	21.3	22.0	5	3.6	108	0.78	62.3
45-47	19	21.7	24.3	0	0.0	19	1.00	57.9
48-50	1	25.3	23.3	0	0.0	3	3.00	0.0
Total*	621*	21.2	16.2	95	15.3	502**	0.81*	57.0

* Excludes zero parity women; ** Excludes 62 children adopted by zero parity women.

t. "Childbearing years" are the years from the first to the last birth.

the patterns of adoption employed by the Taiwanese women (Dutch women did not have the option of adopting). We interpret adopting a child after the last birth not only as evidence that women were not satisfied with the size or sex composition of their offspring sets but also that stopping may not have been voluntary. Certainly adding another mouth to feed to the family contradicts the notion that early stopping is a deliberate means of limiting family size. The strong son preference of the Taiwanese family might lead us to expect that more boys would be adopted than girls, but it also meant that few families gave up boys for adoption. Thus adoptions were in fact overwhelmingly female; 84.8% of our sample's 564 total adoptions were female. Families adopting girls could use them as son substitutes; if no sons survived they could arrange a uxori-local marriage to continue the family. Foster daughters could also serve as little daughters-in-law, and be married at maturity to a son of the family at little expense and much potential gain to the domestic control exercised by the mother-in-law cum foster mother.

Table 9: Surviving sons of Taiwanese women remaining in first marriages and continuously under observation from age at marriage (by age 30) to age 46 by number of surviving sons, births, age at last birth, infant loss, etc., 1906-1946

# Surviving sons	# Women	Age at first birth	Age at last birth	Avg. child-bearing years (t)	# Women adopting after last birth	% Adopting after last birth	# Adopted children/woman	Adopted children/woman	% Male of last births
0	51*	22.6	28.2	5.6	26	51.0	63	1.24	29.4
1	116	22.0	33.1	11.1	29	25.0	102	0.88	61.2
2	150	21.3	37.6	16.3	17	11.3	111	0.74	53.3
3	127	21.2	39.7	18.6	14	11.0	102	0.80	54.3
4	92	20.5	40.7	20.2	8	8.7	67	0.73	60.9
5	44	20.2	41.6	21.4	0	0.0	32	0.73	70.5
6	25	19.3	41.2	21.9	0	0.0	17	0.68	80.0
7	13	20.8	43.2	22.3	1	7.7	7	0.54	69.2
8	2	18.5	41.6	23.1	0	0.0	1	0.50	100.0
9	---	---	---	---	---	---	---	---	---
10	1	19.6	42.1	22.4	0	0.0	0	0.00	100.0
Total	621*	21.2	37.4	16.2	95	15.3	502**	0.81	57.0

* Excludes 30 zero parity women; ** Excludes 62 children adopted by zero parity women.

t. "Childbearing years" are the years from the first to the last birth.

In larger families, a surplus daughter might be sent out at the same time a foster daughter was brought in; this was a means of unloading unwanted daughters and replacing them with little daughters-in-law in preparation for an anticipated minor marriage to a son. In these circumstances adoptions resulted in no net gains in numbers of children.

Our tables report any adoption occurring after the last birth regardless of sex. The highest proportions adopting after the last birth are found at the earliest ages at last birth (Table 8), among those with no or only one surviving son (Table 9), and at the lowest completed parities (Table 10). These patterns strongly suggest that women, far from being satisfied with the size and sex composition of their offspring set when stopping childbearing so early and with so few children, were in fact strongly dissatisfied. Reinforcing this conclusion is the number of children ever adopted (without regard to timing of adoption) per woman (as no account has been taken of daughters given out, these are gross and not net numbers adopted). Women stopping at the youngest ages (Table 8), having the lowest

Table 10: Parity distribution of Taiwanese women remaining in first marriages and continuously under observation from age at marriage (by age 30) to age 46 and age at last birth etc., 1906-1946

# Births	# Women	Age at first birth	Age at last birth	Avg. child-bearing years (t)	Avg. closed birth interval	# Women adopt- ing after last birth	% Adopt- ing after last birth	# Adopted child- ren	Adopted child- ren/ woman	% Male of last births
0	30	---	---	0	---	---	---	62	2.07	0.0
1	30	24.1	24.1	0.0	---	19	63.3	35	1.17	56.7
2	32	23.0	28.3	5.4	5.4	12	37.5	33	1.03	62.5
3	35	21.6	29.0	7.3	3.65	13	37.1	38	1.09	51.4
4	48	22.4	33.1	10.7	3.57	14	29.2	47	0.98	66.7
5	47	21.9	35.9	14.0	3.5	8	17.0	35	0.74	48.9
6	73	22.1	37.3	15.2	3.04	10	13.7	51	0.70	52.1
7	61	21.6	39.2	17.6	2.93	4	6.6	32	0.52	50.8
8	90	21.1	40.3	19.2	2.74	5	5.6	70	0.78	65.6
9	68	20.7	41.2	20.5	2.56	7	10.3	40	0.59	64.7
10	61	19.3	42.1	22.8	2.53	1	1.6	47	0.77	42.6
11	36	18.9	42.2	23.3	2.33	0	0.0	36	1.00	72.2
12	23	18.9	42.4	23.4	2.13	1	4.3	19	0.83	47.8
13	10	18.9	42.1	23.2	1.93	0	0.0	8	0.80	50.0
14	5	18.8	44.4	25.6	1.97	1	20.0	11	2.20	60.0
15	1	18.4	44.5	26.1	1.86	0	0.0	0	0.00	0.0
16	1	19.6	42.1	22.4	1.49	0	0.0	0	0.00	100.0
Total*	651	21.2*	37.4*	16.2*	2.71	95	15.3*	564	0.87**	57.0

* Average excluding zero parity women; ** Average includes zero parity women.

1. "Childbearing years" are the years from the first to the last birth.

number of surviving sons (Table 9), and having the lowest number of births (Table 10), have always adopted more than the average number of adopted children per woman. Thus the number and timing of adoptions cast serious doubt on notions that early stopping can be interpreted as intentional fertility control.

The last remaining measure presented in the Taiwanese tables is the proportion of last born children who are male. Given the son preference of the Chinese family, and a desire to have as many surviving sons as possible, women may have felt more secure stopping further childbearing if their last born was a

Table 11: Parity distribution of Dutch women born before 1860 remaining in first marriages and continuously under observation from age at marriage to age 46 and age at last birth etc.

# Births	# Women	Age at first birth	Age at last birth	Avg. child-bearing years (1)	Avg. closed birth interval
0	118	---	---	---	---
1	34	34.9	34.9	---	---
2	59	32.1	35.1	3	3
3	58	31.2	37.6	6.4	3.2
4	63	30.4	38.8	8.4	2.8
5	76	28.7	39.8	11.1	2.78
6	71	27.9	40.1	12.2	2.44
7	62	26.9	40.3	13.4	2.23
8	50	25.4	41.8	16.4	2.3
9	49	25.5	42.3	16.8	2.1
10	30	25.1	41.3	16.2	1.8
11	14	23.8	42.5	18.7	1.87
12	15	23.9	43.3	19.4	1.76
13	5	22.4	44.2	21.8	1.82
Total*	704	28.5*	39.5*	11.0*	2.33

* Average excluding zero parity women; ** Average includes zero parity women.

“Childbearing years” are the years from the first to the last birth.

male child. High proportions male of last births may indicate that couples waited to have a son before stopping further childbearing. However, there appears to be no consistent relationship between proportion male of last born and either age at last birth (Table 8) or completed parity (Table 10). There is however a strong likelihood that women with five or more surviving sons will end with a male birth (Table 9). Thus it appears that women who had achieved twice the average number of surviving sons were likely to stop further childbearing following the birth of a boy, but we note that the average age at last birth of these women is already much higher than average. If this is “early stopping” it could have little effect in preventing additional births.

The general picture of the childbearing patterns of married women that emerges from these tables reveals no clear signs of the practice of fertility limitation. Taiwanese and Dutch women who came close to the average numbers of births and the average ages at last birth were likely to produce the average numbers of surviving children (5.18 and 4.28) and sons (2.66 and 2.24). Does this

represent a “target” family size around which women converge? Rather than a large number of women reaching this target with only a few women exceeding the target, as might be expected if replacement and fertility limitation by early stopping were important determinants of women’s childbearing, women are broadly dispersed across a wide range of levels of total births and numbers of surviving children. Sizeable numbers of women had below average numbers of births and surviving children and sons and sizeable numbers exceeded those levels by more than one birth.

A better view of these childbearing patterns is that there are two groups of women, a subfertile group of early stoppers and a fertile group. Members of the first group are women whose fertility was impaired or interrupted before they reached the average number of surviving children. This group of women had below average numbers of births and surviving children, earlier ages at last birth, shorter childbearing periods, and because they were dissatisfied, more adoptions. This is a record of failure and disappointment, not one of birth targets attained followed by limitation. It appears likely that these women’s childbearing was cut short prematurely by couple infertility or other problems making childbearing dangerous for the woman’s health, and not by voluntary choice.

On the other hand we have more fertile women who enjoyed greater success in producing surviving children and sons. This group of women reached or exceeded the average number of births and surviving children, but they did this by continuing childbearing for a longer period and having their last birth at or above the average age. Those who were fortunate to reach the average number of surviving children early did not stop but continued to bear children and surviving sons, adding to their prior success. The 28.5% of fertile Taiwanese women having four or more surviving sons (Table 9) and the 27.8% of fertile Dutch women having eight or more births and more than six surviving children (Tables 7 and 11), had significantly longer childbearing periods and later ages at last birth, and apparently saw no benefit in stopping earlier.

Family composition and parity progression

Figure 2 has shown that, overall, parity progression ratios in Taiwan were higher than in the pretransitional Netherlands. A much lower age at marriage can probably account for this. However, it has often been asserted that the duration of marriage, with its inverse relation to coital frequency, is an autonomous factor in itself and should be taken into account when marital fertility is analyzed.²⁴ To some extent, these factors balanced one another. Thus, notwithstanding their later age at marriage, Dutch women might have been quite fertile because their marriages were “fresher” than those of their Taiwanese counterparts of the same

24. Van Bavel, “Does an effect of marriage duration”.

age. Controlling for age at marriage and marriage duration simultaneously will allow us to look from yet another angle at the motivation to stop or to continue child bearing.

We can surmise that, at least before the fertility transition, couples were more “satisfied” when they had at least two sons and at least one daughter.²⁵ One son was needed to inherit headship status and to take care of the rites connected with the ancestral cult. At least one other son was needed as a reserve and to provide additional labor. At least one daughter was needed to assist with household chores. Also, she could bring in a bride price. Thus, couples who had not achieved this minimum “target” would be more likely to continue with child bearing than couples otherwise similarly situated (especially with regard to age at marriage and marriage duration). At each parity, we ask what the probability is that another child will come. For instance, in Taiwan at parity eight this probability is .695 and thus the probability of “stopping” is .305 (see Figure 2). In a logistic regression model, the probability (p) of the dependent variable stopping is calculated in terms of *odds*, that is the probability of a “yes” divided by the probability of a “no” ($p/(1-p)$).²⁶ In our example the odds are .305/.695. The regression coefficients of the independent variables are the natural logarithms of the odds. By exponentiating them, we obtain *odds ratios*. These indicate the increase in the odds of the dependent variable being a yes resulting from an increase of one unit in the independent variable (Menard 1995). Again, we work with completed marriages only. In the model we include variables for the age of the mother at the time the present child was born and the duration of her marriage. We also include the length of the previous birth interval. By doing this we control for subfecundity, either caused by unfavourable health conditions of the couple or by prolonged breastfeeding. We assume that the longer the previous interval, the higher the chance that stopping will occur. To measure the effect of the family composition at the time the present child was born, we have created four dummy variables: 1) less than two sons survive (including the one just born) and no daughter; 2) less than two sons survive (including the one just born) but at least one daughter; 3) at least two sons survive (including the one just born) but no daughter and 4) at least two sons survive (including the one just born) and at least one daughter. By taking the last variable as the reference, we assume that the non-ideal family compositions (1-3) will result in lower odds of stopping. Finally, when couples had some kind of target, we expect that their odds of stopping decreased when the present child died quickly. Obviously, in populations that did not restrain their fertility in any parity-specific way, this kind of replacement behaviour is not to be expected.

25. See also Skinner, “Family Systems and Demographic Processes”.

26. Menard, *Applied logistic regression analysis*.

Table 12: Odds ratios of stopping per parity, completed marriages Taiwan (models per parity)

Birth order	Age at marriage	Duration of marriage	Interval with previous child	Less than 2 sons	Less than 2 sons surviving and no daughters	At least 2 sons surviving but no daughters	At least 2 sons surviving and at least 1 daughter	Child dies within a year	Model chi-square	R ²	N
3	0.99	1.02***	1.02	1.70	0.87	0.76	1.00	1.15	28.66	0.17	428
4	1.22****	1.02****	1.02	3.71	1.26	1.87	1.00	1.25	43.45	0.24	400
5	1.26****	1.03****	1.02**	---	1.24	0.27	1.00	0.71	64.49	0.32	367
6	1.20***	1.03****	1.03*	---	0.29	0.64**	1.00	0.78	73.12	0.35	326
7	1.31****	1.03****	1.06***	---	0.76	1.43	1.00	1.03	77.08	0.41	276
8	1.41****	1.04****	1.03*	---	0.47	1.02	1.00	0.59	84.81	0.44	231
9	1.79****	1.04****	1.02	---	1.61	1.45	1.00	0.25**	75.51	0.50	166
10	1.70****	1.06***	1.01	---	1.10	---	1.00	1.04	65.46	0.61	107

R² is Nagelkerke's R Square; * Significance level $p < .10$; ** Significance level $p < .05$; *** Significance level $p < .01$; **** Significance level $p < .001$

In Tables 12 and 13 we present the outcomes of our calculations. Since we look at the effect of children present on the odds of stopping, we have substracted daughters who had been adopted out in calculating the family composition at each parity in the Taiwan case. Both tables show the paramount importance of both age and marriage duration in predicting the odds of stopping. Also, their impact increases with parity. For instance, at parity eight in Taiwan, the effect of an additional year of the mother's age at marriage is to shift the odds by 41% in favour of stopping. At the same parity, each additional month that the couple had been married, increases the odds of stopping by 4%. Interestingly, the Dutch model (Table 13) is quite significant already at low parities, whereas the Taiwanese model gains significance per parity. Clearly, in the Netherlands age at marriage is already relevant to explaining the end of childbearing when only a few children have been born. As we expected, there is a direct relation between the length of the previous birth interval and the odds of stopping. However, this is only significant in a limited number of the models.

The influence of the actual family composition is very limited. Interestingly, we find slightly more evidence of "targeting" in the Netherlands than we do in Taiwan. For instance, having less than two surviving sons (but at least one daughter) lowered the chance of stopping in the Netherlands both at parity five and

Table 13: Odds ratios of stopping per parity, completed marriages the Netherlands, women born before 1860 (models per parity)

Birth order	Age at marriage	Duration of marriage	Interval with previous child	Less than 2 sons surviving and no daughters	Less than 2 sons surviving, at least 1 daughter	At least 2 sons surviving but no daughters	At least 2 sons surviving and at least 1 daughter	Child dies within a year	Model chi-square	R ²	N
3	1.36 ****	1.05 ****	1.00	0.21	0.58	0.45	1.00	0.47	120.03	0.41	508
4	1.40 ****	1.04 ****	1.01	1.34	0.72	1.24	1.00	0.32 **	121.44	0.43	448
5	1.46 ****	1.05 ****	1.02 *	---	0.50 *	0.95	1.00	0.62	155.91	0.53	385
6	1.52 ****	1.04 ****	1.03 **	---	1.03	0.23 **	1.00	1.23	121.58	0.49	309
7	1.47 ****	1.03 ****	1.01	---	1.21	0.72	1.00	1.43	63.42	0.34	237
8	1.68 ****	1.08 ****	1.01	---	0.16 **	2.45	1.00	1.86	95.07	0.60	174
9	1.73 ****	1.05 ****	1.02	---	1.20	0.86	1.00	2.00	65.23	0.55	124
10	1.57 ****	1.03 ***	1.02	---	2.59	1.7	1.00	1.04	22.92	0.36	75

R² is Nagelkerke's R Square; * Significance level $p < .10$; ** Significance level $p < .05$; *** Significance level $p < .01$; **** Significance level $p < .001$

eight. Similarly, there is no systematic evidence that deceased children were replaced. The death of a child within one year was only significant at parity four in the Netherlands and parity nine in Taiwan. Overall, our results confirm that the experience of infant and child mortality/survival had at best a very weak effect on the fertility decision-making of couples. Instead the models confirm that stopping was mainly determined by age at marriage and marriage duration.

Does success at an early age lead to limitation?

Did married women, as they neared the end of their childbearing years, cut short their fertility based on their previous success in producing surviving sons? Zhao Zhongwei has argued on the basis of his analysis of China's 1982 one-per-thousand population fertility survey that "Women who had their first surviving son at younger ages ceased childbearing earlier, while those who had their first surviving son at older ages stopped later".²⁷ Zhao interpreted a few months difference in mean age at last birth between groups of women having five year differences in age at birth of first surviving son as evidence of deliberate stopping behavior.

27. Zhao, "Deliberate birth control", 747.

In his own test of the hypothesis relating age at birth of first surviving son and age at last birth, Zhao limited his sample to those bearing a first child at ages 15-19.²⁸ He reasoned that women who “started childbearing at roughly the same age” could be expected to have very similar ages at last birth except for differences in sex composition and survivorship of offspring that led some women to stop childbearing earlier than others.²⁹ As age at first birth appears positively related both to age at birth of first surviving son and age at last birth, age at first birth may well be confounding the relationship between age at birth of first surviving son and age at last birth. We can control for age at first birth by dividing our sample into two subsamples, women having their first birth at ages 15-19 and ages 20-24, both of which will include a sizeable number of women, with the latter group having their first birth close to the average age at first birth of 21. Zhao imposed additional controls on his large sample by requiring that the women in the sample have a birth at age 28 or 29 and have both surviving sons and daughters before age 30. We will control for outlying ages at last birth by requiring that the age at last birth be greater than 30, and limit the sample to those having a first surviving son before age 30, but will not take into account the presence of surviving daughters before age 30.

Table 14 below presents the characteristics for the subsamples of women having their first birth at ages 15-19 and ages 20-24, their first surviving son by age 30, and their last birth above age 30, according to age at birth of first surviving son. The average ages at birth of the first surviving son are 21.3 and 23.67 for the women having their first birth at ages 15-19 and ages 20-24, respectively (the average age is 24.3 for the whole sample of 576 women having a surviving son). For women having their first birth at ages 15-19 the table shows age at last birth is unaffected by the age at which these women bore their first surviving son. For women having their first birth at ages 20-24 the table shows age at last birth is actually later by half a year for women who bore their first surviving son earlier. When we compare the overall averages for the women having their first births at ages 15-19 and ages 20-24, we find women having their first births at ages 15-19 stopping only two tenths of a year earlier than women having their first births at ages 20-24, despite bearing a first child on average three and a half years earlier, and a first surviving son on average two and a third years earlier.

In sum Table 14 shows that there is no relationship between age at last birth and age at birth of first surviving son when we control for age at first birth and require last birth be above 30. As in the case of our larger sample, in each of our subsamples the women who had their first surviving son at the earliest ages also had some of the longest childbearing periods, and often had larger than

28. Zhao, “Deliberate birth control”, 747, Table 5.

29. Zhao, “Deliberate birth control”, 745-746.

Table 14: Age at last birth by age at birth of first surviving son and age at first birth: Taiwanese women remaining in first marriages and continuously under observation from age at marriage to age 46 by age at first birth, who had their first surviving son before age 30 and their last birth after age 30, 1906-1946

Age at birth of first surviving son	# Women	Age at marriage	Age at first birth	Age at last birth	Avg. child-bearing years	Births/woman	Surviving sons/woman
<i>First birth 15-19</i>							
15-19	87	16.78	18.27	39.70	21.43	8.82	3.71
20-24	72	16.91	18.46	39.66	21.21	9.21	3.44
25-29	33	17.06	18.41	39.63	21.22	9.45	2.91
Total	192	16.88	18.36	39.67	21.31	9.07	3.47
<i>First birth 20-24</i>							
20-24	142	19.62	21.65	40.03	18.38	7.75	3.43
25-29	56	20.11	22.19	39.51	17.31	7.11	2.79
Total	198	19.76	21.80	39.88	18.08	7.57	3.25

average numbers of births and total surviving sons.

Thus the women who had the advantage of producing a first surviving son at an earlier age, appear not to have used that advantage to stop childbearing at lower levels or earlier ages than less fortunate women. Instead they appear to have built on their success to have more children and more surviving sons than average. These women may have shortened their childbearing period by stopping early by a few months as Zhao discovered in his sample, but we would be misled if we thought the women who did so had reduced either their overall childbearing period or their number of total births.

Conclusions

To interpret as deliberate fertility limitation the “early stopping” by a few months of high parity women who had lower levels of infant loss or earlier ages at birth of first surviving son and at first birth (Table 14) requires us to ignore that these same women have already exceeded the average number of births and surviving sons and the average childbearing span. To see women having the earliest ages at last birth when viewing the entire parity distribution as practicing deliberate fertility limitation (“early stopping”) (Tables 4 through 8) requires us to ignore the lower-than-average number of births and surviving sons of women whose childbearing period has been cut off.

When we look at the full range of women by parity distribution, number of surviving sons, and ages at last birth, and at a broad array of their experiences, including infant loss, age at first birth, and number of adoptions, we see women in a context that single indicators strip away. This broader context suggests both that many women failed to achieve a desired number of surviving sons, and that another sizeable group met and surpassed the average. Overall we find a broad continuum of women less and more successful in producing surviving sons, but rarely any hint that women limit their fertility once they have achieved the average or family ideal of two sons and a daughter.

Our overview of women's fertility, based on our examination of a number of characteristics of women according to their age at last birth, parity, and number of surviving sons has produced no convincing evidence of replacement and fertility limitation. Instead we have found that women who met early success in producing surviving sons were more likely, not less, to have higher fertility than women who were less fortunate. The characteristics of early stoppers, who had fewer surviving sons, fewer births overall, more adoptions, and fewer childbearing years, controvert the notion that they were practicing fertility limitation, and suggest that they likely suffered impaired couple fertility (secondary sterility, spousal infertility, morbidity, etc.), or troubled marital relationships.

The fertility pattern of married women overall is better characterized by the natural fertility hypothesis that women continued childbearing to the end of their reproductive period regardless of their previous loss of children or success in producing surviving sons.

This paper has reported information on fertility in tables showing the full range of women's completed fertility. Parity distributions are unique in reporting the experience of the many women at the extremes of low and high fertility (the low extremes would be even more heavily populated if we had not restricted the sample to women continuously married). One looks in vain in the many works of modern historical demography and family reconstitution for reports of actual parity distribution. There are thousands of pages on fertility in the works of Knodel, Wrigley, Leridon, Bongaarts and Potter, and Wood but not one (!) parity distribution that reports the actual distribution of women by completed fertility.³⁰ Lutz and Pullum et. al. are the exceptions.³¹ Instead there is an overreliance on measures of central tendency and on statistical fictions such as the total fertility rate based on averaged age-specific fertility rates for a synthetic cohort. Averages that recklessly strip away the full context of women's experience can be highly mis-

30. Knodel, *Demographic behavior*; Wrigley, Davies, Oeppen and Schofield, *English population history*; Leridon, *Human Fertility*; Bongaarts and Potter, *Fertility, Biology and Behavior*; Wood, *Dynamics of Human Reproduction*.

31. Lutz, *Distributional Aspects of Human Fertility*; Pullum, Tedrow and Herting, "Measuring Change and Continuity".

Table 15: Summary measures of Taiwanese and Dutch fertility

	Taiwanese	Dutch
Age at marriage	19.2	26
Age at first birth	21.2	28.5
Reproductive span (years)	16.2	11.0
Age at last birth	37.4	39.5
Avg. closed birth interval (years)	2.71	2.33
Mean completed parity	6.98	5.73

leading. As summary measures average rates may be indispensable, but they should not be allowed to erase the experience of the many women outside the average. The ‘average’ experience acquires meaning only when contrasted to the experience of women at the extremes who failed to meet or who surpassed the average. The experience of women whose fertility diverges from the average sheds invaluable light on the experience of all women. The full range of experience, not its central points, should be the starting point for studies of fertility.

Lee and Wang support their claim that early stopping is a general feature of Chinese “marital restraint” in contrast to pretransition European populations with three items of data: earlier mean age at last birth, short reproductive span, and high proportions subsequently infertile.³² They first cite evidence from their case studies of Daoyi and the imperial lineage of a mean age at last birth of married wives of 33 to 34 that is much earlier than that of the Europeans (circa age 40). Our finding of a mean age at last birth of 37.4 for the Taiwanese and 39.5 for the Dutch agrees with the general proposition that mean age at last birth is earlier for Chinese than Europeans, though the gap is nowhere so extreme as Lee and Wang claim on the basis of their evidence, and even rather small considering the much earlier mean ages at marriage (19.2 vs. 26) and first birth (21.2 vs. 28.5) of the Taiwanese compared to the Europeans.

A more fundamental question arises regarding Lee, Wang and Campbell’s assumption that differences in average age at last birth between European and Chinese populations reflect differences in stopping behavior.³³ As noted above (pages 4-5) historical demographers commonly consider differences in average age at last birth as indicators of fertility control but only when age at marriage is controlled. A very large gap existed between the Taiwanese average age at marriage of 19.2 and the Dutch average of 26, and it is the early age at last birth of

32. Lee and Wang, *One Quarter of Humanity*, 88-90.

33. Lee and Campbell, *Fate and fortune*, 92; Lee and Wang, *One Quarter of Humanity*, 89.

Table 16: Proportions of married women not fertile after stated age

Age	Taiwan	Europe (1)	Liaoning (2)
20	4	1	4
25	8	6	13
30	12	16	29
35	20	27	51
40	50	56	74
45	95	97	93

Europe: based on Leridon, *Human Fertility*, 101-102.

Liaoning: calculated from Table 5.5 of Lee and Campbell, *Fate and Fortune*, 93.

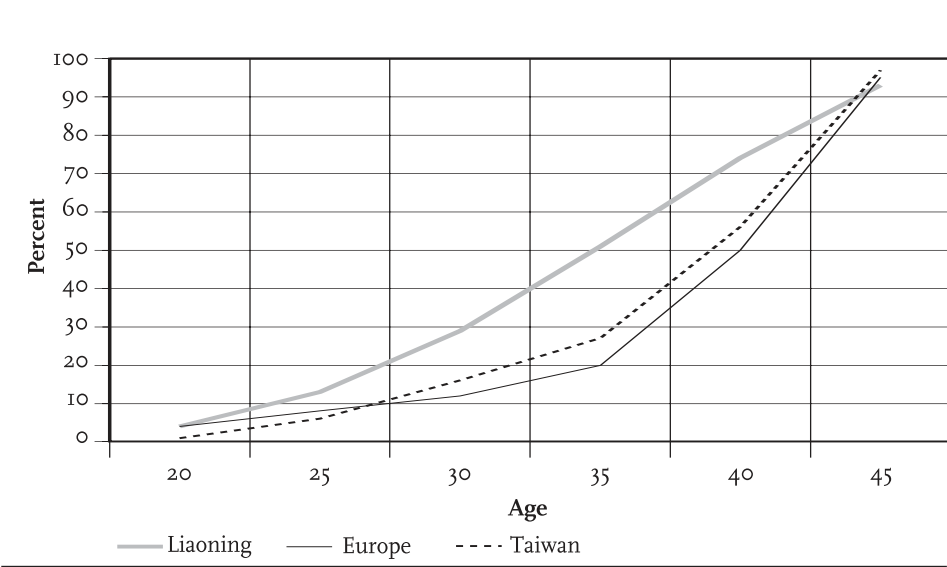
low parity women (parities 1-6) that is chiefly responsible for lowering the overall average age at last birth of the early marrying Taiwanese when compared to the late marrying Dutch (Table 1). Indeed Table 15 shows that having a lower average age at last birth does not prevent the early marrying Taiwanese from having a longer reproductive span and despite longer birth intervals, a higher mean parity, which is hardly suggestive of fertility limitation. It is the early age at marriage that lowers the Taiwanese average age at last birth in the Taiwan-Dutch comparison, not intentional early stopping. Lee, Wang and Campbell fail to control for the much earlier age at marriage of the Chinese population when they claim that a lower age at last birth demonstrates Chinese marital fertility restraint compared to the Europeans. Instead it simply reflects the earlier Chinese age at marriage.

Lee and Wang go on to argue from their data that “Whereas on average a European mother had a reproductive span between first and last birth of 14 years, the average Chinese mother had a reproductive span of only 11 years”. We find just the opposite: Taiwanese women’s mean reproductive span (childbearing years) of 16.2 years was much longer than Dutch women’s 11.0 years. Thus our findings contradict Lee and Wang’s claim that “Despite their late starting, Chinese couples also stopped childbearing far earlier than pretransition couples in the West”.³⁴

The third item of evidence cited by Lee, Wang and Campbell in support of their claim that early stopping is a general feature of Chinese fertility is the age pattern of stopping as represented by the proportions subsequently infertile by age.³⁵ The proportions of married women not fertile after a stated age for the Taiwanese, European and Liaoning (Daoyi) populations are presented in Table 16

34. Lee and Wang, *One Quarter of Humanity*, 88.

Figure 4: Proportions of couples subsequently infertile



and figure 4. The Taiwanese age pattern of stopping agrees closely with that of the Europeans³⁶ (Leridon 1977: 101-2), while that for Liaoning diverges significantly. Thus we must disagree with Lee and Wang’s larger claim that “The Chinese and European age patterns of stopping are thus fundamentally different. European populations contain few early stoppers and follow an exponential pattern of increase, with a rapidly rising rate after age 35; Chinese populations contain many early stoppers and follow a logistic pattern of increase with a slowly tapering rise. The two curves clearly reflect two distinctive fertility patterns and cannot be transformed simply by shifting or compressing”. Instead, we find on the basis of the sample of Taiwanese completed marriages that the proportion of early stoppers remains low and increases rapidly only after age 35.

In sum, our findings contradict on every score Lee and Wang’s claims that the pretransition Chinese population in comparison to those of pretransition Europe is characterized by a much earlier mean age at last birth, a shorter reproductive span, and much higher proportions subsequently infertile with age. Claims by Lee, Wang and Campbell and Zhao that the historical Chinese population is one characterized by deliberate early stopping are, in light of the Taiwanese evidence, untenable.

35. Lee and Wang, *One Quarter of Humanity*; 89-90, Lee and Campbell, *Fate and Fortune*, 89, 92; Wang, Lee and Campbell, “Marital fertility control”, 390-91.

36. Leridon, *Human Fertility*, 101-102.

**Marital fertility and
birth control in rural
Netherlands and
Taiwan, 19th and early
20th centuries***

Jan Kok,

Yang Wen-shan &

Hsieh Ying-hui

A few years ago, Arthur Wolf compared the oral and literary evidence that the pretransitional Chinese had practiced deliberate birth control to an elephant in the living room: “There would be evidence of its presence everywhere”. He stated that all suggestions of wide spread birth control were utterly misguided: “Who, then, cleaned up after the elephant? No one. There was no elephant”.¹ With these sentences he concluded an article in which he dismissed the claim of “revisionist” demographers that historical levels of Chinese marital fertility were low because Chinese couples had consciously limited their family size. The “revisionists”, however, are not convinced by Wolf’s arguments and the debate on pretransitional fertility continues unabated.² This controversy is not restricted to the arcane field of sexuality in the Chinese past. The subject is attracting interest from economic and “world” historians, who take a keen interest in the diverging developments of China and western Europe in the past three centuries. See, for instance, the latest issues of *the Journal of Asian Studies*. Indeed, these are exciting times to analyze and compare historical fertility patterns in China and western Europe.

The “new” historical demography of China seeks to undermine the “Malthusian” paradigm on Chinese population history. In the wake of Malthus, it is a widely held view that Chinese population growth was checked by recurrent crises, such as wars and epidemics. Because the Chinese married early and universally, the birth rates are supposed to have been high. However, recent research shows that marital fertility was actually very low, at least compared to Europe. In addition, (female) infanticide was a commonly used method to adjust family size to current circumstances. Some authors have described this as the “functional equivalent of family planning”.³ How did Chinese couples achieve a low marital fertility and was this deliberate or more or less accidental? The debate on this issue is based on rather disparate sources. The “revisionists” draw on John Lossing Buck’s Farm Survey (1929-1931), on Qing imperial genealogies (1700-1830) and on the registers of the bannermen of Daoyi in Liaoning province (1774-1873). According to Lee, Wang, Campbell and others, Chinese marital fertility rates were low due to late starting, early stopping and the spacing of birth intervals. In their view, reduction of fertility occurred in all social groups as a strategic adaptation to adverse economic circumstances. Also, fertility of couples with a humble position within the extended household was relatively

* The authors wish to express their gratitude to James Lee and Cameron Campbell for their comments to an earlier version of this article.

1. Wolf, “Is There Evidence of Birth Control”, 151-152.

2. Campbell, Wang and Lee, “Pretransitional Fertility in China”; Lee, Campbell and Wang, “Positive Checks or Chinese Checks”.

3. Lavelly and Bin Wong, “Revising the Malthusian Narrative”.

low. Clearly, decisions at the household level overruled the aspirations of individual couples.⁴ According to Lee and Wang, the tradition of submission to household collective needs prepared the ground for the successful state control of fertility in the People's Republic.⁵

Critics, in particular Arthur Wolf, challenge this view on several grounds. Wolf states that the Buck survey seriously underestimated Chinese marital fertility, whereas the banner registers underreported births to an alarming degree.⁶ Also, he contends that the Qing dynasty and the bannermen are in no way representative of the Chinese population at large.⁷ More important, he refutes the claim that Chinese couples deliberately reduced the number of offspring. Although Wolf admits that Chinese marital fertility levels were quite low and that the Chinese were indeed rational planners with respect to reproduction, he says that the low fertility was a consequence of low maternal health and miscarriages (due to malnutrition) as well as to spousal separations when husbands were seeking work. Also, Chinese marriages were typically secured at a very early age. In many cases, women married before the age at menarche, leading to the false impression of "late starting". Since duration of marriage is negatively associated with coital frequency, the "early stopping" can also be seen as a consequence of early marriage. Finally, when prospective brides were adopted at an early age and were raised alongside their future husband, their "natural" aversion to one another resulted in very low fertility within these "minor" marriages.⁸ In short, although Chinese couples traditionally aimed at maximizing their (male) offspring, their low actual fertility was caused by adverse conditions. Wolf backs up his claims with interviews of elderly mainland women held in the 1980s and with the Taiwanese household registers (1905-1945). His opponents, in their turn, doubt that Wolf's data have any bearing on the 18th and 19th century mainland population, they question his statistical methods and, in particular, they challenge Wolf's conviction that poverty and malnutrition directly impaired procreation.⁹

Meanwhile, in Europe, a revived interest in pretransitional fertility is visible as well. European "revisionists" challenge the conventional view that interference with childbearing within marriage was "outside the calculus of conscious choice". In this conventional view, deliberate fertility control in western Europe began with the (innovative) adoption of contraceptive methods that were

4. Lee and Campbell, *Fate and Fortune*, 92-101.

5. Lee and Wang, "Malthusian Models and Chinese Realities"; Lee and Wang, *One Quarter of Humanity*, 130.

6. Wolf, "Fertility in Prerevolutionary China".

7. Wolf, "Is There Evidence of Birth Control".

8. Wolf and Huang, *Marriage and Adoption in China*; Wolf, *Sexual Attraction and Childhood Association*.

9. Campbell, Wang and Lee, "Pretransitional Fertility in China".

used once a desired family size was reached. The application of new techniques heralded the onset of the fertility decline that generally took place in the final decades of the 19th century. Instead, authors like Anderton and Bean, David and Mroz, Szreter, Friedlander, Okun and Segal and Van Bavel challenge the equation of fertility control with parity specific birth control.¹⁰ They claim that deliberate birth spacing, regardless of parity, was an important feature of traditional fertility behavior and prepared the (mental) ground for the later introduction of birth control techniques. Thus, the European fertility decline was not the dramatic break with past practices as has often been portrayed. However, convincing empirical studies of birth spacing are still very scarce. Generally, it is considered to have been of minimal importance.¹¹ At best, spacing is seen as a temporary stage in the fertility transition.¹²

These debates within historical demography may have an important bearing on how differences between East and West are perceived. If the “revisionist” claims on both sides of the continent are rejected it appears that the “Malthusians” have stood their ground. This implies that Europeans were rather unique in controlling their family size through entry into marriage. This may have given them a crucial advantage in the form of a capacity to accumulate economic resources. The Chinese, on the other hand, were constantly suffering the consequences of their early and universal marriage pattern. These consequences, of course, were poverty and high mortality. However, when revisionist claims can be confirmed, this would mean that Chinese and Europeans shared, to some extent at least, a rational attitude towards procreation. Thus, there would be no intrinsic behavioral difference that could explain why the paths of economic development diverged so widely from the 18th century onwards. This perspective is already taken by Pomeranz who states that the west-European took the lead through Britain’s control of (cotton-producing) colonies and the location of their coalmines.¹³

The stakes of the fertility debate are high. However, it is probably much too early to draw firm conclusions. More empirical studies, in particular for China, are desperately needed and the comparisons with western European case studies have to be more finely tuned. Also, potential biases need to be removed before comparing. A lot of discussion has been devoted to total marital fertility rates (TMFR). An upward bias of the TMFR may result from the inclusion of the

10. Anderton and Bean, “Birth spacing and fertility limitation”; David and Mroz, “Evidence of Fertility Regulation”; Szreter, *Fertility, class and gender*; Friedlander, Okun and Segal, “The Demographic Transition”; Van Bavel, “Deliberate birth spacing”.

11. Knodel, *Demographic Behavior*, 329.

12. Alter, “Theories of Fertility Decline”, 15.

13. Pomeranz, *The Great Divergence*.

experience of 15-19 year old women.¹⁴ Also, pregnant brides cause an upward bias because – often marrying because they are pregnant – they are clearly not *at risk* of pregnancy. This problem is particularly acute in western Europe where often the majority of the brides in the younger age groups were pregnant. Age-specific marital fertility rates are attractive to portray the difference in levels between East and West.¹⁵ Also, the concave shape of the curves are interpreted as “natural fertility”, that is without parity-specific limitation. However, this comparison may be misleading because of strong differences in marriage duration in western Europe and China. The Chinese rates tend to be dominated by the fertility of women all marrying around age 20. In Europe, the aggregation of women marrying at various ages reinforces the concave shape of the curve.¹⁶ Thus, it would be more precise to compare only women married in the same age group. Finally, the debate is somewhat hampered by a lack of agreement of what constitutes a significant difference. For instance, Arthur Wolf noted that mothers with only sons stopped child bearing earlier than mothers with only daughters. They also had longer last birth intervals and lower parity progression ratios. However, he asserted that this did not indicate reduction of births: “They had just relaxed a little”.¹⁷

Even more important is the question how to detect *deliberate* birth control. The intervals between successive births intervals and the timing of the last child are determined by a host of biological, social and cultural factors. How to disentangle all these effects and how to determine to what extent deliberate efforts were involved? Essentially, we have to take account of four sets of factors.

1. The natural determinants of fertility. The age of mother is a very important factor, since fecundity is negatively associated with age. Thus, intervals tend to be longer and the chance of stopping increases when the mother is older. Also, birth intervals react strongly to infant mortality. The early death of the previous infant puts an abrupt end to breastfeeding. Breastfeeding causes postpartum amenorrhea during which the woman is not fecund. Therefore, the decease of an infant leads to a quick return of fecundity and thus to a short subsequent interval.¹⁸ Obviously, fecundability is directly related to coital frequency. The latter tends too declined as a function of the duration of marriage. Finally, we have to consider individual differences in fecundability; some women have shorter intervals and more births simply because they are more fecund.

14. Campbell, Wang and Lee, “Pretransitional Fertility in China”, 739.

15. Lee, and Wang, *One Quarter of Humanity*, 87.

16. Van Bavel, *Van natuurlijke naar gecontroleerde vruchtbaarheid*, 98.

17. Wolf, “Is There Evidence of Birth Control”, 147.

18. Preston, “Introduction”; Wood, *Dynamics of Human Reproduction*.

2. Socio-economic determinants. Many observed differences between social groups in intervals, age at last birth etcetera may result from factors that influence fertility but have nothing to do with deliberate control. As we mentioned above, the debate on pretransitional Chinese fertility is largely a debate on the effects of poverty versus rational planning. First, we have to consider the effects of chronic malnutrition. Although this appears not to affect fecundability as such, it may have increased the risk of miscarriage and thus lengthened average birth intervals.¹⁹ The same goes for chronic, untreated diseases. Second, factors causing the husband and wife to be separated for long stretches will increase the birth intervals. For instance, the absence of seamen and seasonal laborers from home probably reduced the number of children. Third, we need to take into account social differences in breastfeeding practices. In China, breastfeeding seems to have been practiced widely.²⁰ In western Europe, however, its incidence varied widely, both regionally and across social groups. In the 19th century Netherlands, the upper classes seem to have been ahead of the middle and working classes in adopting new insights about hygiene and breastfeeding. These insights were slowly disseminated from around the middle of the 19th century.²¹ The reports also suggest that around 1850, in particular in industrial towns and large cities, women from the lower class often did not breastfeed their children. They either worked or they hired themselves as wet nurses. Their own children were boarded out and were fed on a (often lethal) mixture of water, cow milk and sugar.²² Wet-nurses probably had longer birth intervals themselves.

3. Cultural factors. Before the transition, cultural factors that influenced fertility included customs regulating sexuality during the first period after confinement and customs with respect to breastfeeding. For instance, Confucianism prescribed a three-month reclusion of the mother and child.²³ Cultural differences between the ethnic Hakka and Hokkien were not relevant in terms of marital fertility.²⁴ In the Netherlands, interesting differences existed between religious groups. An individual-level enquiry in The Hague in 1908 showed that Catholics practiced less breastfeeding than Protestants (and both groups less than Jews).²⁵ Possibly, the difference stemmed from the second half of the 19th century when

19. Wolf and Huang, *Marriage and Adoption in China*, 167; Wolf, "Is There Evidence of Birth Control", 137-139; Campbell, Wang and Lee, "Pretransitional Fertility in China", 745.

20. Lee and Wang, *One Quarter of Humanity*, 91; Hsiung, "To Nurse the Young".

21. Van Poppel and Mandemakers, "Sociaal-economische verschillen in zuigelingen- en kindersterfte".

22. Verdoorn, *Het gezondheidswezen te Amsterdam*.

23. Servais and Arrault, "Family from East and West", 58; Furth, "Concepts of Pregnancy", 22.

24. Shepherd et. al. in this volume; Wolf and Chuang, "Fertility and Women's Labour".

25. Saltet, *Sterfte*.

the Catholic clergy campaigned against breastfeeding on the ground that exposing the breasts was shameful.²⁶ Also, religious groups differed strongly in their receptivity towards new, scientific insights in hygiene and childcare. Catholics and orthodox Protestant groups tended to reject modern, secular views from outside their group. In Taiwan, the *form of marriage* is particularly important for the subsequent fertility. Arranged marriage and the transfer of a girl to a subservient position in an unknown family probably caused a lot of distress and an initial period of antipathy towards her husband. A certain degree of premarital familiarity may have attenuated this. At least, Pasternak has found higher fertility among endogamous couples, regardless of the form of marriage.²⁷ On the other hand, in minor marriages in which future spouses grew up together as brothers and sisters, marital fertility was very low.

4. Finally, there are *deliberate* efforts to lengthen the birth intervals or to stop having children altogether. Before contraceptive techniques became available these efforts included abstinence from intercourse, coitus interruptus or the extension of breastfeeding.²⁸ In order to detect such efforts, it is crucial that we hypothesize about situations in which couples were motivated to limit childbearing. Women's work could be an important motive. When married women made an important contribution to the family income, it was sensible not to burden her for long period with young children. In the Netherlands, women working in textiles had relatively low fertility, particularly when their jobs were not compatible with nursing. Although these families were interested in a large number of (income earning) children, it was also beneficial to space births.²⁹ On Taiwan, no association between fertility and women's agricultural work was found.³⁰ Apart from household economic motives, couples may have deliberately moderated the pace of childbearing to protect the health of both mother and child. The child enjoys a longer period of close maternal attention, including a longer period of breastfeeding, and will be better established in the world before his mother turns her attention to a new infant. Second, the mother has more time to rest and recover her strength when birth intervals are longer.³¹ In principle, these advantages were visible to parents, and deliberately delaying a next birth would match

26. Meurkens, *Sociale veranderingen in het oude Kempenland*.

27. Pasternak, *Guests in the Dragon*, 98.

28. Szreter, Nye and Van Poppel, "Fertility and contraception".

29. Alter, *Family and the Female Life Course*; Szreter, *Fertility, class and gender*; Van Bavel, "Deliberate birth spacing".

30. Wolf and Chuang, "Fertility and Women's Labour".

31. Palloni and Millman, "Effects of inter-birth intervals"; Miller et al., "Birth spacing and child mortality"; Lindstrom and Berhanu, "The Effects of Breastfeeding".

well with and strengthen the basic human reproductive strategy. Spacing may partly reflect and overlap with efforts of stopping altogether. When couples felt the desired family size was reached they started trying to avoid a next birth. Detection of parity-specific stopping is quite feasible, provided we control for natural factors such as the age of the mother and the duration of the marriage. Similarly, we can try to see if spacing was in any way parity-specific as well. Another way of detecting deliberate control of reproduction is to see whether deceased children were *replaced*. Finally, conscious control of reproduction is revealed through the preferences of the parents for the sex composition of their family. For instance, a preference for a minimum number of sons may have led to longer intervals and earlier stopping when that minimum was reached.

Clearly, there is a need to approach European and Chinese marital fertility with exactly the same definitions. Also, we will have to use methods that separate deliberate manipulation of fertility from all other factors affecting it through coital frequency or breastfeeding. In this paper, we will make an effort in this direction. We will directly compare micro level datasets on fertility from Taiwan (1905-1945) and the Netherlands (1830-1940). Obviously, colonial Taiwan cannot represent the experience of mainland China in all respects. Its economic development and living standards were well in advance of the mainland, which was translated into relative high fertility and decreasing mortality levels. However, Japanese occupation hardly affected the family values of the Taiwanese.³² This means that the internal hierarchy of households, the preference for sons and the attitudes of parents towards the deployment of their offspring remained highly traditional.

In the next section we will describe the datasets and the field sites that are used. Then, we compare the marital fertility rates in these areas by looking at age-specific rates corrected for prenuptial pregnancies. Instead of concentrating on total marital fertility rates, we have chosen to compare the number of births as determined by age at marriage, age at last confinement, sterility and birth intervals. We focus in this paper on the building of multivariate models that take account of as many relevant variables as possible and that will indicate the extent and meaning of deliberate control of fertility. In the fourth section, we construct a model of spacing behavior. The sources do not enable us to define exactly the same variables in both countries, so we will have a separate model for each country. In the fifth section, this will be followed by a model on stopping. Finally, we will sum up our findings in the last section.

32. Barclay, *Colonial Development and Population in Taiwan*.

Field sites and databases

The Dutch family reconstructions used in this paper pertain to two areas in the central and western parts of the Netherlands. The first dataset is drawn from the Historical Sample of the Netherlands, a large database that contains more than 70,000 life courses. The database is built from a random sample (0.5%) in the Dutch birth certificates of 1812-1922, linking and entering all information in both the civil registers (birth, marriage and death certificates) and the continuous population registers which started in 1850.³³ We use the first, more or less completed, part of this database that covers the province of Utrecht. We limit the analysis to married sample persons. Their birthplaces were evenly spread over the urban and rural parts of the province. More important, their complete life courses were reconstructed by following them in all their successive places of residence. From 1850 onwards, Dutch population registers recorded all life events (birth, death, marriage and migration) of individuals within their households, and noted additional information on occupation and religion. We have restricted the analysis to first marriages of rural couples (N=490). The second dataset is built from a marriage cohort in one North-Holland village (1830-1879). All first-marrying couples in Akersloot (N=281), an agricultural community about thirty kilometres to the north-west of Amsterdam, were traced in their migration trajectories. However, most of them remained in or near Akersloot. This was an ordinary North-Holland village, except for the fact that its continuous population registers started already in 1830. For the analysis, we have combined the Utrecht and North-Holland data in a rural pretransitional cohort (mothers born before 1870, N=534) and a rural transitional cohort (mothers born between 1870 and 1900, N=237).

During the 17th and early 18th centuries, North-Holland and Utrecht had benefited greatly from the commercial successes of the Dutch Republic. However, the second half of the 18th century was characterized by economic decline. The Napoleonic Wars sealed the fate of the Netherlands as a leading seafaring nation. In the first half of the 19th century, the coastal province of North-Holland was only slowly recovering from this crisis. Population size of cities like Amsterdam stagnated until 1850. In the second half of the 19th century, the provinces of North- and South-Holland regained their former dominance, due to a redirection of the trade streams towards Germany. Amsterdam became a world center of financial services. Also, the area to the north of Amsterdam industrialized rapidly. The small, inland province of Utrecht had suffered less from the collapse of the sea trade. Its population grew strongly, in particular in the eastern part of the province. From around 1850 onwards, the number of factories increased with chemical, textile and cigar making industries predominating. The province, especially its major cities Utrecht and Amersfoort, profited strongly from its central location at the nexus of Dutch railway lines. This attracted railroad offices

and workshops, metallurgical industries and a host of commercial service companies.³⁴

The Netherlands as a whole was relatively late in industrializing. The industrial “take-off” did not occur until the 1890’s. In this respect, North-Holland and Utrecht were no exceptions. Apart from the service sector, their economies were built on agriculture, in particular on dairy farming which grew continuously in importance. This sector was characterized by farms that were small in size and workforce but highly oriented towards producing quality products for export. Around the cities, horticulture expanded whereas in the coastal parts of North-Holland bulb farming was of importance as well. By and large, farmers in North-Holland and the western part of Utrecht were rather prosperous. Due to the commercialized and specialized character of the economy in these areas, most people depended on wages. The labor market was clearly divided into a skilled and an unskilled segment. Up until the final decades of the 19th century, there were large numbers of unskilled day-laborers whose income was highly insecure and who often turned to charity to supplement their incomes. In fact, around 1850, 23% of the North-Holland population was on poor relief. In Utrecht, this figure was 15% and in the country as a whole 14%.³⁵

The demographic transition in the Netherlands has followed a somewhat different course from the rest of Europe. Although mortality declined early, marital fertility declined later and slower, which caused a strong population growth until well after the Second World War.³⁶ Explanations of this pattern tend to combine the late industrialization of the country with the strong impact of religious organizations on Dutch mentality and procreative behavior. Marital fertility in the Netherlands declined slowly from the 1890s onwards. In North-Holland, marital fertility started to decline from 1885 onwards, earlier and stronger than in Utrecht.³⁷ In the cities, the decline started roughly at the same time as in the countryside, but it was steeper so that by the 1930’s urban levels of marital fertility were about 30 to 40% lower than rural ones.³⁸

In Taiwan, we analyze the first marriages from two rural field sites, Chu-shan (N=1146) and Ta-chia (N=340). Chu-shan township is situated at the southeast tip of Nantou County. It is an extension of the north ridge of A-Li mountain;

33. Mandemakers, “Historical Sample of the Netherlands”.

34. Knippenberg, “Het hart van Nederland”.

35. Van Leeuwen, “Kerk, staat en burger”, 449.

36. Van Poppel, “Late Fertility Decline”;

Boonstra and Van der Woude, “Demographic transition in the Netherlands”.

37. Hofstee, *Korte demografische geschiedenis*, 132.

38. Van Poppel, *Stad en platteland*, 37.

thus, its southern part is higher, and its northern part lower in altitude. The total area occupies 247,433 sq. km.; out of which 83% is a mountainous area. It measures 18.5 km. from east to west, and 23 km. from south to north; giving it the shape of a long boot.

Chu-shan is one of the earliest areas to be cultivated in all of Taiwan, and also the earliest developed area in the whole of the Nantou region. The process started at the time of Cheng Ch'eng-kung in the Ming dynasty (around 1664 A.D.) when Lin Chi led over two hundred settlers to Dou-liu Gate, and went further east to Lin Chi Po (today's Chu-shan) to clear the land for cultivation. To commemorate Lin's achievement of cultivation and of pacifying the Aborigines, the new settlement was called Lin Chi Po. It was only in 1920, when the whole of Taiwan was divided into two prefectures, five counties, three cities, and 47 townships, that Chu-shan *chen* (township) was set up under Taichung *chou* (prefecture). It was the main gateway to east Taiwan for the Han entering Aboriginal land.

Even though Lin Chi Po had been developed as early as the time of Cheng in the Ming dynasty, it was only in the early years of Ch'ien-lung during the Ch'ing dynasty that the Han actively participated in the cultivation of the land. Some of the main irrigation systems were built in this period, and farming was first done in flooded fields.³⁹ As a result of the Japanese government's implementation of a colonization policy which was both dynamic and scientifically managed, in the short span of 50 years, Taiwan's economy experienced great progress unmatched by that under the rule of the Ch'ing dynasty.⁴⁰ The chief agricultural products of Chu-shan were rice, tea, sugar cane, sweet potatoes and bananas. Situated in the warmer forest regions, camphor trees and bamboo forests flourished. The fact that economic products like wet rice, cane sugar and camphor had already been somewhat developed and exported to overseas markets made their further and rapid development of those products easy. In addition, the rise of economic products like tobacco and bananas had led to the increasing importance of bamboo forestry in the mountain areas. These products were not only consumed throughout the whole island of Taiwan, they were further also for sale in the international market. Through the enlargement of this kind of market network, Chu-shan evolved from a state of semi-isolation to one of integration with a bigger social system.

As for population, a figure of 25,975 inhabitants was recorded in the first census conducted by the Japanese government. This almost doubled from 1906-1941, with the most largest increase coming from those whose had their ancestry was in Changchou, Fujian.⁴¹ At the same time frame, the population growth on

39. Chuang, *Lin Yi Pu: the social and economic history*, 55.

40. Chuang, *Lin Yi Pu: the social and economic history*, 70.

the island itself was the same; with almost a one-fold increase. There may be two causes for this population increase. On the one hand, the natural cause of the birth rate exceed that of the death rate; on the other hand, a influx of migrants occurred. Nevertheless, according to Chen, owing to the extremely strict mobilization laws imposed by the Japanese colonial government, relocation only had a minute influence on the population of Taiwan.⁴² Ninety six percent of the population increase was a result of natural causes. After the Cheng era General Lin Chi opened Lin Chi Po to cultivation, the Chu-shan area witnessed the gradual appearance and development of both villages and temples. These supported produce ritual field of various sizes that interlocked to form a very intricate regional organization under by increasing influence of the Han.⁴³

The second field site of this study is Ta-chia, which is located in the middle of Taiwan's west coast, about five kilometers from the seashore and at an altitude of 500 meters. Ta-chia was under the administrative supervision of Ta-chia Township. Because the Ta-an River cuts through the town and the Ta-chia River lies to the south, Ta-chia had an abundant water supply and fertile land. It was initially settled and named by Ping-pu (lowland) Aborigines of the Taokas tribe, and thus was developed very early in Taiwan's settlement history. The Han migrants moved into this area around 1700; beginning in 1706 roads were constructed and a rural township established. Ta-chia became famous for its woven sleeping mats, and in 1765 the Ta-chia mat became an item of tribute to the imperial court. In 1897, Ta-chia weavers developed the Ta-chia Panama hat, which was a very famous article and sold in the international market.

After the Japanese occupation of Taiwan, Ta-chia's administrative status was not very stable, because the Japanese authorities began to re-organize local administrative boundaries. It was only in 1922, after the completion of the North-South railway, that Ta-chia was re-vitalized. During this period, Ta-chia's surrounding areas were cultivated with sugarcane fields, and the Japanese colonial government built a railway branch line to connect Ta-chia with Ta-an harbor. The location of Ta-chia Township then became a convenient place for the distribution of goods and services to the surroundings area.

Marital fertility

Correcting for biases

Although the age-specific marital fertility rate (ASMFR) is the most accurate calculation of marital fertility, direct comparison of these rates can be misleading in several respects. Firstly, prenuptial conceptions lead to overestimation of the

41. Chuang, *Lin Yi Pu: the social and economic history*, 19.

42. Chen, "Taiwan de renkoukongzhi yu shehuibianqian", 4.

43. Chuang, *Lin Yi Pu: the social and economic history*.

ASMFR; the substantial differences between Taiwan and the Netherlands in the incidence of bridal pregnancies disturbs the comparison. Secondly, (female) infanticide causes underestimation of the ASMFR. Again, when this occurs more often in one country, the comparison is flawed. Thirdly, because the *form* of Taiwanese marriage (minor, major or uxorilocal) is directly related to fertility, we need to know the incidence of the relevant forms in Chu-shan and Ta-chia as well as the extent of their impact on fertility before comparison with the Dutch figures. Finally, strong differences in marriage duration will distort the comparison of ASMFRs. We will first discuss these problems before presenting the final comparison.

Prenuptial pregnancies occurred more often in the Netherlands than in Taiwan. In Chu-shan, 13.6% of all first born children were conceived before the wedding. In Ta-chia the corresponding figure was 11.5%. In the early Dutch marriage cohort (mothers born before 1870), the premarital pregnancy rate was 33%. In this cohort, pregnant brides married almost two years earlier than non-pregnant brides. This means that, in many cases, the marriage took place because the wife was already pregnant. The concentration of such “forced marriages” in particular age groups will bias the calculation of the ASMFR because the period “at risk” of conception after the wedding data is much shorter than in age groups with a lower incidence of pregnant brides. Thus, the denominator is smaller and the ASMFR will be higher. Interestingly, we find the same problem among minor marriages in Taiwan. No less than 40% of the first-born children of minor-marrying couples in Chu-shan and Ta-chia were conceived before the official date of marriage. According to Wolf, some parents delayed formalizing the marriage between foster-siblings until the young couple had accepted the match, a clear sign of which was a pregnancy. Only then was their marriage registered.⁴⁴ We have solved this problem following a procedure developed by Wilson.⁴⁵ We calculate the mean intervals between marriage and first births in the case of pregnant and non-pregnant brides. Then, we add the difference between these intervals (generally about a year) to the period at risk of the pregnant brides.

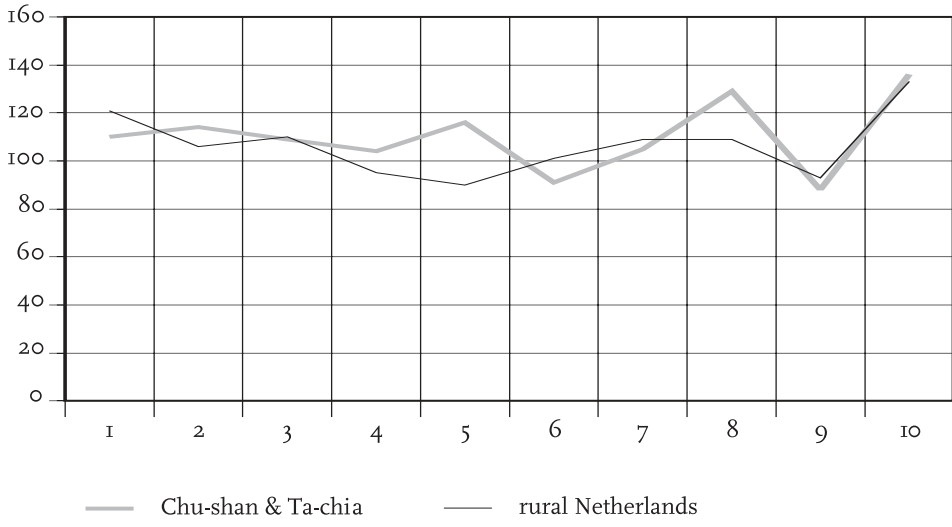
Female infanticide was probably a common phenomenon in mainland China. According to Lee and Campbell, 20 to 25% of all newborn girls in Liaoning fell victim to this practice.⁴⁶ Little is known about regional variations in infanticide, but in early 20th century Taiwan it appears to have been rare. On the basis of sex ratios in the aggregated vital statistics, Barclay calculates that in the “worst” years, 1906-1911, only two percent of newborn girls were not reported

44. Wolf, “The Women of Hai-shan”, 103.

45. Wilson, “Natural fertility in pre-industrial England”; Van Bavel, *Van natuurlijke naar gecontroleerde vruchtbaarheid*.

46. Lee and Campbell, *Fate and Fortune*, 65-70; Lavelly and Bin Wong, “Revising the Malthusian Narrative”.

Figure 1: Sex ratios by parity, Chu-shan/Ta-chia and rural Netherlands sample



and therefore probably killed.⁴⁷ Obviously, these aggregate Taiwanese data may still hide local differences. However, Pasternak reaches the same conclusion for the field sites of Lung-tu and Chung-she.⁴⁸ When we compare the sex ratios of Chu-shan and Ta-chia with those of the early Dutch cohort, we can conclude that female infanticide does not invalidate our comparison (see Figure 1).

In Chu-shan and Ta-chia, major marriage was the most common form. No less than 80% of the couples in the Chu-shan dataset had married in this fashion, whereas both minor and uxorilocal marriages each took up 10 percent. The corresponding figures in Ta-chia were 65% major marriages, 9.4% minor marriages and 25.6% uxorilocal marriages. The aggregate figures in the two Taiwanese field sites are thus highly dominated by the experiences of major marrying couples. But how strong were the differences between forms of marriages in Chu-shan and Ta-chia with respect to fertility? In Figure 2 we present the ASMFRS per type of marriage, after the correction for bridal pregnancies.

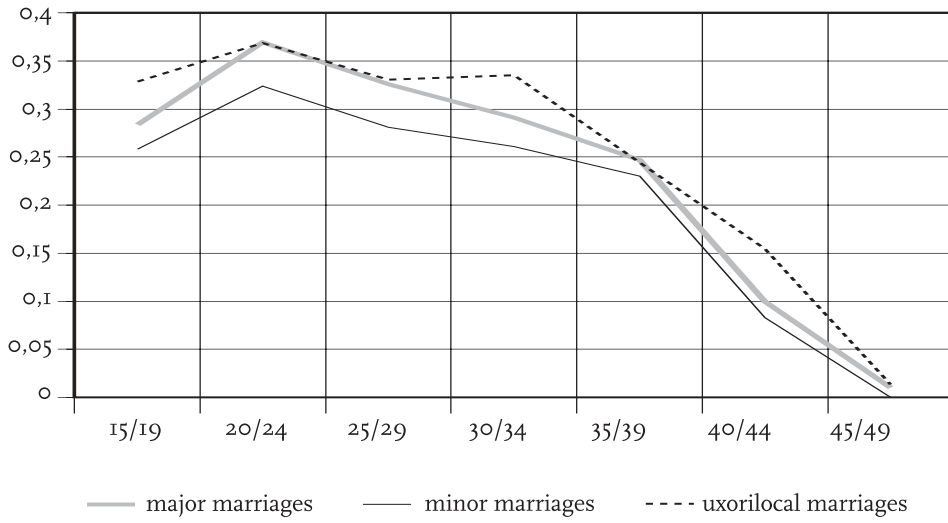
We can see that, as in Hai-shan and in Lung-tu, minor marriages were characterized by relatively low fertility.⁴⁹ Uxorilocal marriages on the other hand, had somewhat higher fertility rates than those in major and minor marriages. This has been found in other Taiwanese areas as well. According to Pasternak, couples that married uxorilocally often had the opportunity to become acquaint-

47. Barclay, *Colonial Development and Population in Taiwan*.

48. Pasternak, *Guests in the Dragon*, 112.

49. Wolf and Huang, *Marriage and Adoption in China*; Pasternak, *Guests in the Dragon*.

Figure 2: Age-specific marital fertility rates in Chu-shan and Ta-chia, by form of marriage

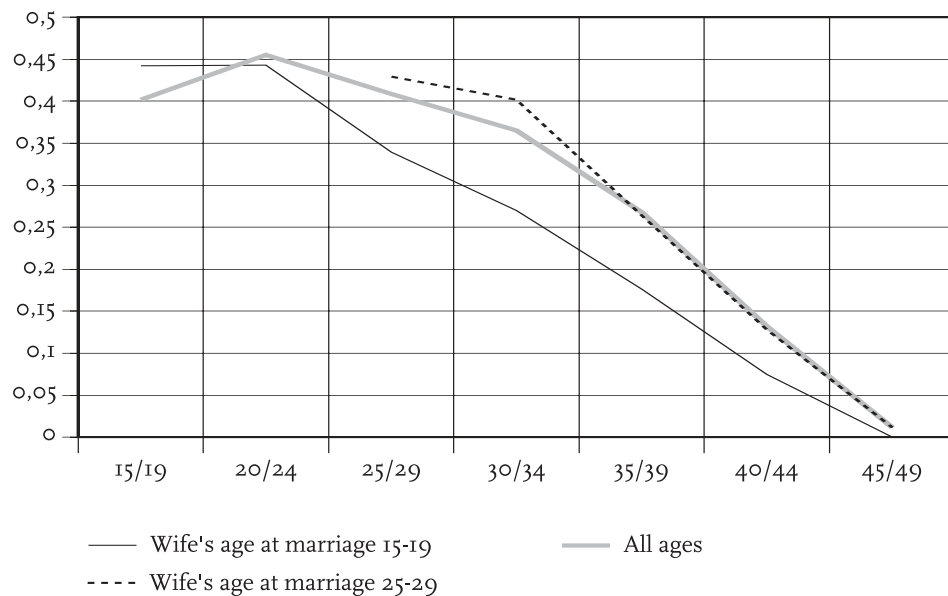


ed before marriage. Also, there was no transfer of the bride to a strange household. These factors may have diminished the emotional stress of (arranged) marriage and may explain why young uxori-local brides had relatively high fertility levels. Furthermore, when the prime purpose of the uxori-local marriage was to provide the household with labor, this could be a stimulus to the (continued) high fertility that is visible after age 40.⁵⁰

The timing of first marriage of women differed widely between Taiwan and the Netherlands. In Chu-shan the average age at first marriage was 19 years with a standard deviation of only 2.6 (N=1146). In fact, 67.6% of all Chu-shan brides married in the age group 15-19. In Ta-chia the age at marriage was the same (19.4), but the standard deviation somewhat larger (3.6, N=340). In the northwestern part of the Netherlands (rural women born before 1870) the average age at first marriage was 26 years (N=534). However, the entry into marriage was not tied to a specific age group, since the standard deviation was five years. Only 46.3% of the brides married in the age group 25-29. When comparing figures of age-specific marital fertility rates of these two populations, we will have to keep in mind that potential differences in either the level or shape of the curves can be caused by differences in marriage duration. To demonstrate the effect of marriage duration, we show in Figure 3 the “normal” aggregated ASMFRRs for the Netherlands (early rural sample, corrected for bridal pregnancy) as well as the ASMFRRs of women who married in the “Taiwanese” age groups 15-19 and in the –

50. Pasternak, *Guests in the Dragon*, 106.

Figure 3: Age-specific marital fertility rates controlling age at marriage. Rural Netherlands



more or less – standard group 25-29.

Although few women married in the age group 15-19, their fertility pattern clearly stands out from the rates of the 25-29 group and the rates of the whole cohort. Fertility in the young-marrying group declined already from age 20-24 onwards!

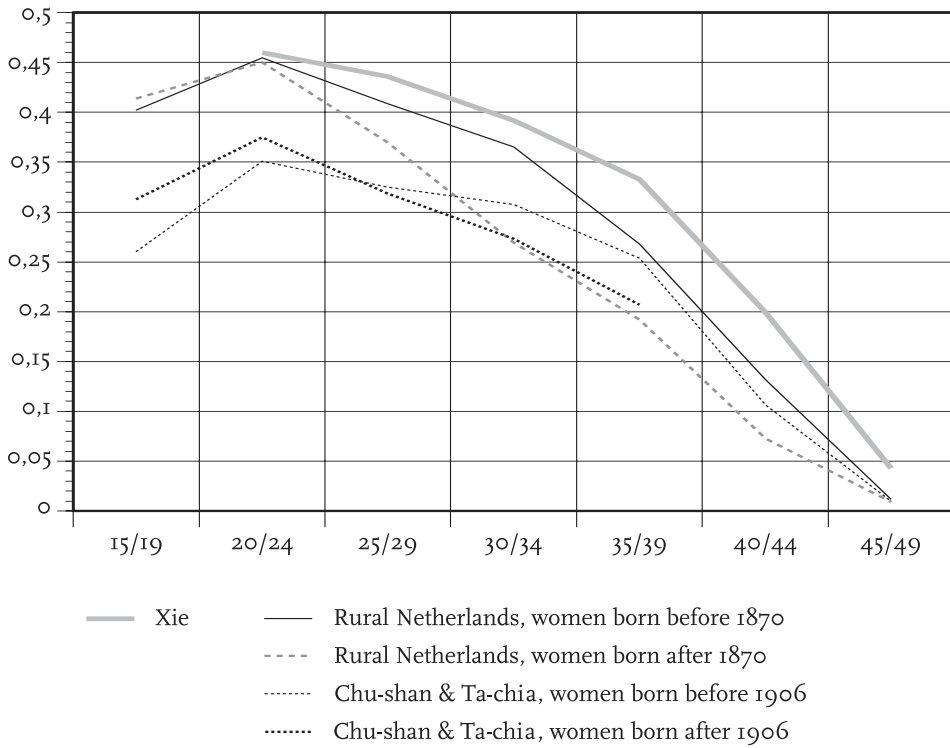
Dutch, Taiwanese and “natural” fertility

In many historical demographic studies, the extent of birth control in a given population is deduced from the divergence of the shape of the ASMR curve from a standard curve created by Coale and Trussell.⁵¹ When the curve takes a marked concave shape this is held to be evidence of parity-specific birth control. Coale and Trussell built their standard on the basis of ten historical fertility schedules. These schedules refer to populations who never practiced birth control. Recently, Coale and Trussell’s standard has been corrected by Xie,⁵² who weighted the size of the populations involved. We will use Xie’s figures to compare the Dutch and Taiwanese data (Figure 4). All rates are corrected for premarital pregnancies. The Taiwanese figure combines data from major, minor and uxori-local marriages in the two field sites. In figure 4, we will also look at a transitional Dutch birth cohort of

51. Coale and Trussell, “Model fertility schedules”.

52. Xie, “What is natural fertility”, see also Van Bavel, *Van natuurlijke naar gecontroleerde vruchtbaarheid*.

Figure 4: Age-specific marital fertility rates, Taiwan (women born before and after 1906) and the Netherlands (women born 1800-1870 and 1870-1900)

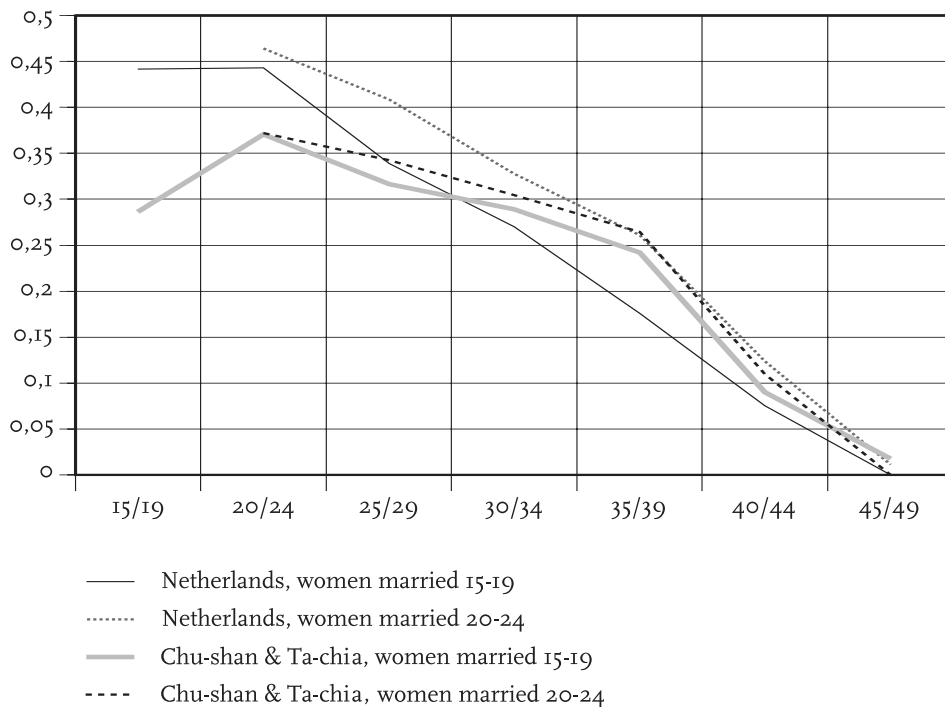


mothers born between 1870 and 1900. Finally, we will split the Taiwanese group into a cohort of women born before 1906 and a cohort born after 1906, to see whether there was any change during the period under consideration.

The rural Dutch pretransitional fertility rates were not far removed from Xie's maximum levels (Figure 4). The youngest cohort, however, had decidedly lower levels after age 20 to 24. More important, the shape of the curve was much more concave which probably reflects stopping efforts related to an ideal family size. The Taiwanese levels are lower than the pretransitional Dutch, but just as convex. So, both the Dutch (before the 1870-1900 birth cohorts) and the Taiwanese were "natural fertility" populations. In Taiwan, changes during this period are ambiguous. Women born after 1906, thus marrying roughly from 1920 onwards, had higher fertility in the youngest age groups but lower in the older age groups. Because our data end at 1945, they could not be followed after age 39.

Finally, how do the Taiwanese rates look in comparison to the Dutch when the ages at marriage are matched? In Figure 5 we compare the fertility rates of groups of Chu-shan and Ta-chia women married in the major fashion at respec-

Figure 5: Age-specific marital fertility rates, Chu-shan and Ta-chia (major marriages) and rural Netherlands (women born before 1870) controlling for age at marriage



tively 15-19 and 20-24 year with comparable Dutch groups. Even after controlling for prenuptial pregnancies, very young Dutch women seem somewhat more fertile than their Taiwanese counterparts. Possibly, this could be ascribed to a later age at menarche among Taiwanese girls. In addition, we should consider the emotional problems associated with arranged marriage versus the free choice common in the Netherlands. More important, the differences between the two countries are more moderate than in Figure 4 and certainly much less extreme than many east-west comparisons will have us believe. We can conclude that many of the differences in fertility levels reported can be ascribed to differences in marriage duration and in levels of bridal pregnancy.

Total marital fertility rates: theory and practice

Total marital fertility rates (TMFR) play an important role in the discussion on the “true” levels of Chinese fertility. They are simply the cumulative age-specific marital fertility rates and they give a final number of births provided a woman married at age 20 (or even 15) and was still married at age 50. Thus, they provide the maximum family size that is theoretically attainable given the fertility sched-

Table 1: McDonald's calculation of total number of children born to completed marriages

	Netherlands (rural women born before 1870)	Chu-shan and Ta-chia (major marriages)
%fertile (s)	89%	93%
age at first marriage (m)	26.5	19.4
average interval between marriage and first birth in years (f)	1.33	2.14
Average birth interval in years (i)	2.08	2.85
age at last confinement (l)	37.45	38.29
N	372	102
Total number of children born	5	6.38

ule for a particular population. Women from our rural Dutch cohort (born before 1870) would have had no fewer than 10.2 childbirths if they had spent all their reproductive years (15-49) in the married state. Chu-shan and Ta-chia women fall somewhat behind this with respectively 8.28 and 7.63 childbirths. To be sure, this is much higher than the (disputed) mainland figure of 5.65 calculated from the Chinese Farm Survey (1929-1931).⁵³ The $TMFR$ of 8.28 of major marriage in Chu-shan is lower than the 8.56 found in Lung-tu, but higher than the 7.52 reported for major marriages in Hai-shan and the 7.82 found in Chung-she.⁵⁴ Women marrying in the major fashion in Ta-chia had an average $TMFR$ of 7.47.

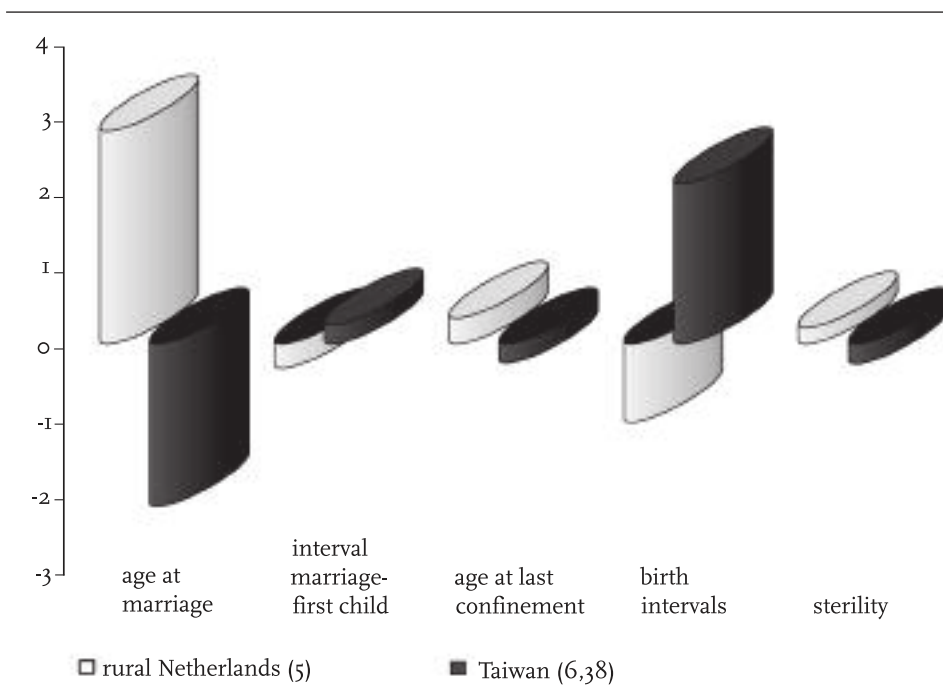
In our opinion, comparing $TMFR$ s is too abstract. Does this theoretical maximum have any actual significance? Surely, the average married woman differed strongly from a woman who fully conforms to a group fertility schedule. Also, we still we do not know *how* Taiwanese women reached a lower $TMFR$ than the Dutch women. The demographer McDonald has suggested a decomposition of average fertility of completed marriages by taking into account starting, stopping, spacing and sterility. His formula of the average number of children born to completed marriages⁵⁵ enables us to make a more realistic assessment of differences between the Netherlands and Taiwan, as well as the reasons for these differences. McDonald's formula reads $T = s(1 + (l - m - f)/i)$: T stands for the total number of children born, s is the percentage of marriages with at least one child, m is the female mean age at first marriage, f is the average interval between marriage and first

53. Wolf, "Fertility in Prerevolutionary China".

54. Pasternak, *Guests in the Dragon*, 89.

55. We have defined this as all marriages still intact when the woman was 44 years old.

Figure 6: Changes in total family size of completed families in rural Netherlands and Chu-san/Ta-chia when McDonald's parameters are exchanged



birth, i is the average birth interval and, finally, l is the mean age of the mother at last confinement.⁵⁶ In Table 1 we calculate the outcomes for our two countries.

Because the observation period is maximally restricted to the period 1906-1945 and because out-migrations lead to censored observations, the total number of “completed” marriages in Chu-shan and Ta-chia is rather limited. Also, infertile couples tended to divorce rapidly, which resulted in a very low percentage of sterile couples among completed marriages. However, the table shows convincingly that when Taiwanese couples remained married until the wife’s menopause, they would have had 1.38 *more* children than Dutch couples before the fertility transition. Also, Dutch completed marriages appear to have realized less than half of their theoretical maximum of 10.2 children. The Taiwanese on the other hand realized about 80% of the TMR (8.13).

The table shows that the difference between the Dutch and the Taiwanese in age at last confinement was unimportant. However, the Taiwanese interval between marriage and the first birth as well as the successive intervals were conspicuously longer than the Dutch intervals. Furthermore, as we already know,

56. See Van Bavel, *Van natuurlijke naar gecontroleerde vruchtbaarheid*, 47; for a modified version, see Knodel, *Demographic Behavior*, 334.

Table 2: Comparison of subsequent birth intervals by survival status and sex of of the child, Taiwan and rural Netherlands

	Taiwan (Chu-Shan)		Rural Netherlands (mothers born before 1870)	
	Male	Female	Male	Female
Birth interval when infant survived	32,8 (1554)	30,8 (1538)	24,5 (884)	25,2 (839)
Birth interval when infant died	22,5 (185)	23,2 (106)	21,1 (181)	21,9 (160)

Outcomes of T-tests for the effect of infant mortality in Dutch and Taiwan tables all $Pr > t < 0.0001$.

there was an enormous difference in age at marriage. Just how important were these features in determining final family size? We can find that out easily by substituting a Dutch parameter in the Taiwanese formula and vice versa. Doing this with the percentage of couples with at least one child (s), we can calculate that, had we found a similar percentage of sterile couples (11%) in the Taiwanese cohort, the total number of children born would still only have been 6.1 children, or 0.28 less than the 6.38 calculated above. The Dutch, on the other hand, would gain 0.23 children if given the low “Chu-shan and Ta-chia” sterility ratio. We have repeated this procedure for all the parameters in the formula. The results are graphically displayed in Figure 6.

Figure 6 unequivocally shows that what really mattered in determining family sizes were age at marriage and birth intervals. Differences in starting, stopping and sterility were, in the end, insignificant.

Were the Taiwanese birth intervals longer because the lactation period was more extended? Indirect evidence on the duration of lactation can be gleaned from looking at the effect of infant mortality on the subsequent birth interval (Table 2). In both the Netherlands and Taiwan, birth intervals were shorter when the infant died within its first year. However, the Taiwanese intervals were 8.3 months longer than the Dutch after the birth of a surviving boy and 5.6 months longer after the birth of a surviving girl. Thus, it seems likely that not only were Taiwanese infants breastfed much longer, this was particularly so for boys. We also notice that the incidence of infant mortality was much higher in the Netherlands. Thus, the impact of mortality on lowering the aggregate mean intervals is stronger in the Netherlands than in Taiwan.

Birth intervals are strongly influenced by coital frequency and breastfeeding, which may or may not be manipulated consciously to space births.⁵⁷ It is not possible to draw conclusions about the presence or absence of controlled birth spacing from a simple comparison of mean or median lengths of birth intervals between groups or time periods.⁵⁸ As we have explained in the introduction, only a multivariate approach can help us unravel this knot.

Analyzing birth intervals

Building the multivariate models

We employ multivariate Cox regression in order to model the length of the inter-birth intervals.⁵⁹ As we are interested in the *speed* of parity progression here, not in the probability of such progression, we include closed birth intervals only.⁶⁰ By definition, then, only married couples with at least two legitimate children born are included in the samples. One additional condition is that, in order to exclude sterile and extremely sub-fecund couples, only intervals closed by a birth conceived within five years after the previous one are included.⁶¹ Finally, we model all progressions together, and include the previous fertility history in the list of covariates. As we indicated in the Introduction, we distinguish four groups of factors that influence marital fertility: natural determinants, socio-economic factors, cultural factors and, finally, family composition. This categorization reflects an increasing deliberateness in fertility control.

The natural determinants of fertility are defined in both the Taiwanese and Dutch model as follows. First, mother's ages at the beginning of the birth intervals are included in the form of the commonly used five-year age categories. Second, marriage duration is included in the regressions as the exact number of year the marriage has lasted at the beginning of the birth interval. Third, we need to control for differences between individual couples with respect to fecundability and postpartum amenorrhoea. Following Van Bavel, we do this by including crude legitimate parity in the regression.⁶² Crude legitimate parity is defined as the number of children already born within the current marriage at the beginning of the interval. It represents fecundity differences because couples with on average short birth intervals in the past and, hence, relatively many births at a given age and marriage duration, can be expected to have shorter birth intervals

57. Wood, *Dynamics of Human Reproduction*.

58. Knodel, *Demographic Behavior*; David and Mroz, "Evidence of Fertility Regulation".

59. Allison, *Event History Analysis*.

60. See also Yamaguchi and Ferguson, "The stopping and spacing of childbirths".

61. Larsen and Menken, "Measuring sterility"; Van Bavel, *Van natuurlijke naar gecontroleerde vruchtbaarheid*.

62. Van Bavel, *Van natuurlijke naar gecontroleerde vruchtbaarheid*; Van Bavel, "Does an effect of marriage duration"; Van Bavel, "Deliberate birth spacing".

in the future as well. Differences between couples reflect differential fecundability and breastfeeding habits. Fourth, infant mortality is included in the regression equations as a time-varying dummy variable: from the moment the previously born infant dies, it is set to one. The death of the previous infant abruptly stops breastfeeding and restores fecundability. In principle, adopting-out an infant could have the same effect. In Chu-shan 7.5% of girls and 1.9% of boys were adopted out already before the first birthday (in Ta-chia these figures are respectively 6.1% and 1.0%). Therefore we combine premature death and adopting-out of the previous child in the Taiwanese model. Fifth, even in the absence of fertility control, final interbirth intervals tend to be much longer than non-final intervals.⁶³ Therefore, and in order to make sure that we don't mix up attempts to stop with true spacing behavior, a dummy variable differentiates final from non-final intervals.

Although the household registers in both countries are very rich in details on life course events, they contain little information on the socio-economic position of the households. At best, some information is provided on the occupation of the husband. Thus, we lack direct information on the income position, land use and tenure status, and property. Furthermore, we do not know if and how often the spouses were separated because the husband was working elsewhere. Finally, there is hardly any information on women's labor. In the model for the Netherlands we use six occupational categories. (1) elite occupations (employers in industry, professionals, high civil servants and higher military); (2) farmers (3) white collar middle class (lower level professionals, lower civil servants, foremen and supervisors of various kinds); (4) self-employed (shopkeepers, small entrepreneurs, merchants and self-employed artisans); (5) skilled workers (craftsmen, skilled laborers in small business and industry) and servants with a labor contract; (6) casual and unskilled laborers and peddlers. This occupational classification is often used in Dutch historical demography.⁶⁴ These occupational groups differ in many ways. The more (security of) income, the less motivated the couples were to space their births. Even if a woman was working after marriage, as was common in farming, she could be replaced by a servant when the children were young. The favorable economic situation of (dairy) farming in the Dutch north-west made this a feasible option. On the other hand, because casual and unskilled workers earned so little their wives were forced to work even when she had a young child. We expect the longest birth intervals in this social group. Apart from motivation to space births, coital frequency may have been low because the men were often away from home seeking work elsewhere. Final-

63. Anderton and Bean, "Birth spacing and fertility limitation"; Knodel, *Demographic Behavior*; Van Bavel, "Deliberate birth spacing".

64. Giele and Van Oenen, "De sociale structuur"; Giele and Van Oenen, "Theorie en praktijk".

ly, the women in the lower classes may have worked as wet nurses. In the Taiwan model information on the husband's occupation is often lacking. Instead, we have decided to focus on the household by combining the information on occupation of the head of the household with his wealth (the latter with land tax data). The "high" status was defined as land tax of 50 dollars or more or having an occupation as teacher, physician, or commercial professionals. Also, we placed heads in this category when they were a leader of a village and worked as a professional. The "middle" group was defined as having a land tax between 1 and 50 dollars or the head of the household being an employee of the government or a social organization, or a skilled worker of industry. Finally, the "lower" group paid no land tax or worked as coolie, as a transportation worker, as a peddler or as an unskilled worker.

In the Netherlands, religion is a prime cultural factor influencing fertility. Although the historiography on this subject is devoted mainly to the (post)transition period, the remarkable differences between the various religious groupings may have had an impact *before* the transition as well.⁶⁵ Of prime importance here, is the openness of a particular group to (secular) information from outside and the possibility of individual believers to approach the issue of fertility in an experimental and rational manner. The official church opinion in sexual matters was probably less important than internal social control mechanisms and the level of identification of followers with their church. We expect Catholics to have the shortest birth intervals. A combination of factors works in that direction: pastoral advice against breastfeeding, high internal social control, a fatalistic attitude towards life and little receptiveness of new, scientific knowledge.⁶⁶ Possibly, there was also less room for communication on sexual matters in Catholic marriages.⁶⁷ On the other hand, couples from liberal Protestant denominations were probably more willing to consider and experiment with birth spacing.⁶⁸ In our multivariate analysis, we will combine the liberal denominations in one group.⁶⁹ We expect the most birth spacing efforts in this group. Shorter intervals are expected among the orthodox Protestants. In general, they shared a fatalistic attitude and a strong social control with the Catholics. In the category "Orthodox Protestants" we have combined members of the various Calvinist secessionist churches.⁷⁰ We assign a couple to this category when at least one of the partners was orthodox. Intermedi-

65. Boonstra and Van der Woude, "Demographic transition in the Netherlands"; Engelen and Hillebrand, "Fertility and Nuptiality".

66. Wolleswinkel-van den Bosch, *The epidemiological transition in The Netherlands*.

67. Van Poppel, "Late Fertility Decline".

68. See also McQuillan, *Culture, Religion and Demographic Behaviour*.

69. This "liberal Protestant" group consists of the majority denomination of the Dutch Reformed, as well as the Mennonites, the Lutherans and the Remonstrants.

ate positions will be held by couples of mixed Protestant-Catholic religion. In our view, a mixed marriage is a sign of moderate religiousness. We also expect the Jews to be in an intermediate position. They were highly inclined to breastfeeding but had pronatalist leanings. We have also formed a group in which at least one of the partners was a member of the (liberal) Catholic secessionist church as well as a group in which at least one or both of the partners was nondenominational. Finally, we include a group with parents whose religion was unknown.

Education is also considered a very important factor in the spreading of new insights on childcare, new “bourgeois” values favoring a limited family size and, finally, knowledge on contraceptive techniques. However, in neither country do the household registers record the educational experience of individuals. For the Netherlands, we can make use of the capacity of bride and bridegroom to sign their marriage certificate. Literacy is a minimal indication of education and, thus, of responsiveness to innovative knowledge.

The “classical” Chinese marriage custom was major marriage, which was arranged by the parents and entailed the immediate transfer of the bride to the home of her husband’s family. Under certain economic and demographic conditions, other, less prestigious, forms of marriage came into existence: minor marriage, uxorilocal marriage and delayed transfer marriage. As we have discussed above, the form of marriage could have important ramifications for fertility. In Chu-shan, we have found major, minor and uxorilocal marriages with $TMFRs$ of respectively 8.28, 7.67 and 8.73. In Ta-chia, these figures were respectively 7.62, 5.36 and 9.19. Thus, we can expect minor marriages to have longer birth intervals than major marriages and uxorilocal to have shorter intervals. The majority of the marriages were arranged, which meant that, often, the spouses had not even seen one another before the wedding day. This factor alone may be responsible for low initial fertility. Exceptions to this pattern are found in uxorilocal marriages that had higher levels of prenuptial pregnancies than major marriages (e.g. 16.7% vs 9.9% in Chu-shan) and in endogamous marriages in which the spouses were more or less familiar with one another.⁷¹ We include endogamy in both the Dutch and the Taiwanese models. In the Netherlands, it is defined as

70. See Shepherd et al, this volume. Also, Dutch Reformed persons born in communities where their church was dominated by fundamentalists were counted as orthodox. The Dutch Reformed Church is actually a mixture of liberal and fundamentalist streams. It is not possible to distinguish these groups on the basis of the population registers. However, the religious orientation of the church ministers is known for the year 1920. In 33 Utrecht municipalities, all ministers belonged to the orthodox “confessionelen” and “Gereformeerde Bonders” (Historical Ecological Database). Since communities chose their own ministers, it can be assumed that they were already orthodox in the nineteenth century. In the province of North-Holland, the Dutch Reformed Church was dominated by the liberals. See Knippenberg, *De Religieuze Kaart van Nederland*.

71. Pasternak, *Guests in the Dragon*.

sharing the same birthplace. In the Taiwan registers information on birthplaces is lacking, so endogamy is defined as “both living in the Chu-shan/Ta-chia area at least five years before the marriage”. In arranged marriages, a large age difference between husband and wife may have obstructed the process of familiarization. In Europe, a large difference in age has been associated with “instrumental” marriages and low standards of marital sexuality.⁷² On the other hand, “romantic” marriage in which partners had the same age may have been more able to discuss methods of birth control. We add the difference between the spouses to our models.

Deliberate control of fertility can first of all be demonstrated by the parity-dependence of birth intervals. We analyze parity-dependence by including *net parity* in the model. Net parity is calculated as the number of children alive at the start of the interval. If birth spacing were aimed at a final family size, and if any replacement effects were at work, we would expect a negative effect of this variable on the interval. It is of crucial importance to distinguish net parity from crude parity: the former is the number of children still alive at the beginning of the current interval, while the latter includes all children already born, alive as well as deceased. Therefore, net parity equals crude parity minus the number of deceased children. If net parity has a statistically significant effect on age-specific fertility, even after controlling for crude parity (or, equivalently, the number of deceased children), this would strongly suggest that the speed of parity progression was being controlled with a desired offspring in mind.⁷³ Because we are interested in the effect of the burden of young, surviving children on fertility decisions, we also include any stepchildren and premarital children in this variable.

In Taiwan, family size was not only determined by births and deaths. Regularly, children – in particular girls – were adopted out. They were either given away to their future parents-in-law (*sim-pua*) or sold as servants (*ca-bo-kana*). Conversely, children were adopted in as well. Sons were sometimes adopted to ensure the continuance of the patriline. However, the supply of boys was limited. More often, daughters were adopted in. The reasons for this were varied. They seemed to have been adopted frequently for “therapeutic” reasons. The presence of a baby was believed to stimulate fertility and “to lead in” the arrival of a boy.⁷⁴ Also, girls were adopted as *sim-pua*, a future bride for one of the sons. Another motive was that these girls replaced children that had died. Finally, some families simply may value the presence of girls as workers.⁷⁵ Obviously, we have to take account of adopted children in assessing the impact of the family composi-

72. Mitterauer and Sieder, *The European Family*, 126; Van Poppel et al., “Love, necessity and opportunity”.

73. Van Bavel, “Does an effect of marriage duration”; Van Bavel, “Detecting Stopping and Spacing Behaviour”.

74. Wolf and Huang, *Marriage and Adoption in China*, 242-250.

75. Pasternak, *Guests in the Dragon*.

tion of fertility behavior. Did parents (temporarily) restrict their fertility when their family had become too large, either by adoption or not?

A second indication of deliberate spacing would be any dependence of the interval on the sex composition of the children alive. First of all, we look at the effect of the gender of the last-born child. Recent studies of Asian populations have reported shorter subsequent birth intervals after the birth of a girl compared with the birth of boy.⁷⁶ This may be caused by earlier weaning of girls, but parents wishing a son may also be motivated to have a next child as soon as possible. Secondly, we include a covariate indicating the proportion of girls counted among the children alive at the start of the interval. In addition, we include a dummy indicating whether there are as yet any boys. This dummy is meant to capture any preference for having at least one boy. Finally, following David and Mroz, we assess whether the effect of infant mortality was sex-selective.⁷⁷ This is done by including a dummy indicating the sex of the previous child as well as a product term for the interaction between the death of that child during infancy and its sex. David and Mroz report that in rural France during the final decades of the *ancien regime* the probability of a conception soon after the death of an infant was significantly higher when the deceased child was a girl than when it was a boy.⁷⁸ Furthermore, in line with the household economic motivation to space births, the proportion of the young, dependent children in the household may have influenced parity progression. Any influence of the proportion of small children on the hazard rate may be read as a sign of fertility control. The proportion of dependent children alive was calculated at the start of each inter-birth interval from the dates of birth and death of the previously born. As a working hypothesis, any child under age nine was considered to be dependent, i.e. a net consumer of household resources instead of a net contributor. Finally, the position of the Taiwanese father within the extended household may be relevant. It has been asserted that men in favorable positions (in particular, the head of the households and his firstborn son) were encouraged to produce more sons whereas men in inferior positions were discouraged to do so. We include the position of the father in the model in the form of dummies: head of the household, first son, non-first son and other.

Results

In Tables 3 and 4 we present our models of birth spacing in the Netherlands and Taiwan. The regression parameters are presented in an exponentiated form, which allows for more convenient interpretation. The parameters can be inter-

76. Pasternak, *Guests in the Dragon*, 152.

77. David and Mroz, "Evidence of Fertility Regulation", 173-206.

78. David and Mroz, "Evidence of Fertility Regulation", 195-196.

preted as hazard ratios. When $r=1$, there is no effect. In addition, the table gives the probability of the corresponding chi-squared statistic, testing the null-hypothesis that the regression coefficient is zero (which is equal to a hazard ratio $r=1$). In both models, the natural determinants had very strong effects on birth intervals. A crucial variable was the duration of marriage. Clearly, the longer the marriage had lasted, the less frequent sexual intercourse between the spouses took place with the result of longer time spans between conceptions. Another major factor was the death of the last-born child. When the previous child died the next child was born much earlier than when it survived: in the Chu-shan/Ta-chia model the intervals were 50% shorter ($1/0.5=2.00$) The effect was stronger in Taiwan than in the Netherlands (35.5% shorter), which suggests that breastfeeding was more extended in Taiwan. Final intervals in the Netherlands, as well as in Taiwan, were longer than other intervals, which indicates that fecundability of the mothers of penultimate children was already decreasing dramatically. On the other hand, high crude legitimate parity can be seen as an indicator of high fecundability, since there is a clear negative association: the more confinements a woman had already had, the shorter the time span until the next effective conception.

In the Netherlands, the social and cultural parameters yield a number of interesting and, sometimes, unexpected findings. Long birth intervals were not associated with experimentation and openness to innovative ideas from the outside world. On the contrary, they appear to have been associated with proletarian living conditions. We find strong associations with unskilled and casual work, with illiteracy and with local endogamy. As for the latter, it has been shown that Dutch couples with little cultural and economic capital tended towards endogamy.⁷⁹ Also, the birth cohort 1800-1829 that lived through the worst period in the recent history of Dutch living standards had long birth intervals. The links between poverty and long intervals could in principle have been forged by low coital frequency, as well as by malnourishment and miscarriages. However, it is also possible that the poorest people were adjusting the pacing of their child-bearing to accommodate for the depressed circumstances. Recent research from the Scania region in Sweden suggests that laborers anticipated strong increases in food prices by delaying the arrival of an additional child.⁸⁰ Short intervals, on the other hand, are associated with farming and with Catholicism. Farmers were probably motivated to have many children and they could afford to have a servant replace the mother during the childbearing years. What about the Catholics? Apparently, the standpoints of the clergy concerning sexuality and breastfeeding had a strong impact on daily life. This was possibly due to the contemporary

79. Kok and Mandemakers, "Vrije keuze uit een beperkt aanbod".

80. Bengtsson and Dribe, *Deliberate Control in a Natural Fertility Population*.

Table 3: Cox regression on the duration of closed birth intervals, western-central Netherlands (hazard ratios)

	Mothers born 1800-1870	Mothers born 1870-1900
<i>Mother's age</i>		
<25 years (ref.)		
25-29	0.870 *	0.849
30-34	0.912	0.898
35-39	0.848	1.118
40 and older	1.286	0.992
<i>Marriage duration in years</i>		
Final interbirth interval	0.917 ****	0.916 ****
Crude legitimate parity	0.586 ****	0.501 ****
Death of infant before birth of the next child (time dependent covariate)	1.119 ****	1.136 *
	1.550 ****	1.559 **
<i>Family composition</i>		
Net parity	1.000	0.975
Proportion of dependent children (less than 9 years old)	0.537 ***	0.578
Last child female	0.962	1.007
Last child female and deceased before birth of the next child	0.889	1.065
Proportion of girls among children alive at beginning of interval	1.030	1.022
Already one or more boys surviving at beginning of interval	1.036	1.105
<i>Occupation of father</i>		
Unskilled and casual worker (ref.)		
Elite	0.882	0.829
Farmer	1.209 ***	1.103
Official or white collar worker	1.119	1.191
Shopkeeper or artisan	1.065	0.977 *
Skilled worker	1.117	0.747 *
<i>Religion of parents</i>		
Both liberal Protestant (ref.)		
Both Catholic	1.286 ****	1.166
At least one of the parents is orthodox Protestant	1.079	1.032
Mixed Catholic-Protestant	1.171	0.755
Both Jewish	0.250	0.406
Both unknown	0.975 ***	3.669
Liberal Catholic (at least one of the parents)	2.497 *	
Nondenominational (at least one of the parents)	2.029 *	0.953
<i>Parents same age (difference less than 4 years) (ref.)</i>		
Wife older than husband (4 year or more)	1.057	1.028
Husband older than wife (4 years or more)	1.011	0.982
<i>Parents exogamous (different birth place) (ref.)</i>		
Parents endogamous (same birth place)	0.831 ***	0.913
Endogamy unknown	0.568 *	0.716
Father illiterate	1.006	0.833
Father's literacy unknown	0.927	
Mother illiterate	0.803 ***	1.066
Mother's literacy unknown	1.989	
<i>Mother born between 1800 and 1829 (ref.)</i>		
Mother born between 1830 and 1849	1.176 ***	
Mother born between 1850 and 1869	1.209	***
<i>Mother born between 1870 and 1889 (ref.)</i>		
Mother born between 1890 and 1909		0.873
<i>Utrecht sample (ref.)</i>		
Akersloot sample	0.911	0.486
Number of intervals	2068	755
Likelihood ratio Chi ²	319.30	131.00

Level of significance: * 0.1; ** 0.05; *** 0.01; **** 0.001

Table 4: Cox regression on the duration of closed birth intervals, Chu-shan and Ta-chia, Taiwan (hazard ratios)

<i>Mother's age</i>	
<25 years (ref.)	
25-29	0.954
30-34	0.988
35-39	0.981
40 and older	1.221
Marriage duration in years	0.917 ****
Final interbirth interval	0.428 ****
Possibly final interval (migration after last birth)	0.874 ***
Crude legitimate parity	1.191 ****
Death or adopting-out of infant before birth of the next child (time dependent covariate)	2.011 ****
<i>Family composition</i>	
Net parity	1.081 ***
Proportion of dependent children (less than 9 years old)	0.876 *
Last child female	1.101 *
Last child female and deceased/adopted out before birth of the next child	1.030
Proportion of girls among children alive at beginning of interval	0.923 **
Already one or more boys surviving at beginning of interval	0.900 **
Socio-economic status head of the household	
Low (ref.)	
High	1.014
Middle	1.008
Relation father to head of household	
Head of household himself (ref.)	
First son	1.052
Non-first son	1.108
Other	1.115 **
Parents exogamous (different birth place) (ref.)	
Parents endogamous (same birth place)	1.013
Parents same age (difference less than 4 years) (ref.)	
Wife older than husband (4 year or more)	1.407 **
Husband older than wife (4 years or more)	0.919 **
Type of marriage	
Major (ref.)	
Minor	0.704 ****
Uxorilocal	0.790 ****
Mother born after 1906 (ref.)	
Mother born before 1906 (ref.)	0.848 ****
<i>Chu-shan (ref.)</i>	
Ta-chia	1.266 ****
Number of intervals	4213
Likelihood ratio Chi ²	94036.645

Level of significance: * 0.1; ** 0.05; *** 0.01; **** 0.001

process of Catholic emancipation that increased the identification of Catholics with their church. In this period, mechanisms of social control were developed and strengthened which increased conformity to norms on the ideal family. Interestingly, the small minority of the liberal Catholics (*oud bisschoppelijke clere-sij*) tended towards short intervals as well.

In Chu-shan and Ta-chia, there is less evidence for a relationship between poverty and long birth intervals. Surprisingly, social class differentials in birth intervals are not statistically significant. We do find that the birth intervals were longer in the oldest cohort (mothers born before 1906). Although living standards were lower in this period, the effect may have also been caused by under-reporting of children in this period or by the depressing effect of warfare on coital frequency.⁸¹ Another interesting result is the fact that in Ta-chia intervals were shorter than in Chu-shan. Future analysis will have to disclose whether this can be attributed to differences between the two localities in living standards or in female employment.

As predicted, couples with a large age difference between the spouses tended to have longer intervals. Minor marriages had much longer intervals than major marriages, even after controlling for all other factors, such as the age of the mother and the duration of marriage. This outcome confirms Arthur Wolf's hypotheses on the fertility-depressing effects of childhood association. However, uxori-local marriages had longer intervals as well.⁸² Perhaps the husband was resenting his subjugated role in his parents-in-law's household and therefore not very keen on maximizing his offspring.⁸³

Finally, we come to the factor that interests us most. To what extent did the fertility of pretransitional couples respond to the exigencies of their households? That is, did they deliberately delay the next birth when this was considered expedient? In the Dutch pretransitional cohort, the only significant household variable was the proportion of young, dependent children. Indeed, the larger this proportion was, the longer the next birth was delayed. There is no indication that this behavior was related to a target family size (no significant effect of net parity). Neither have we found any evidence of a preference for boys or girls. In Chu-shan and Ta-chia, we find no evidence of spacing in relation to the family com-

81. Barclay, *Colonial Development and Population in Taiwan*, 242.

82. This seems to contradict our findings in figure 2 where we observed their relatively high age-specific marital fertility. A typical feature of uxori-local marriages is the age gap between the spouses – the husbands are on average 5.5 years older. However, we have already controlled for the age difference. The age at marriage is about the same as the couples marrying in the major fashion. The only difference seems to be the relatively late age at last childbirth that we can observe in completed marriages (39.2 in uxori-local marriages, N=24 and 38.3 in major marriages, N=102).

83. Pasternak, *Guests in the Dragon*, 106.

position. On the contrary, the more children were surviving (net parity) the shorter the intervals became. This may be accounted for by the dominance of fertility-maximizing families among the high parities. Interestingly, the intervals were significantly shorter when the last child was a girl (see also Table 2). Possibly, girls were weaned somewhat earlier. It is also possible that the birth of a girl motivated the parents to increase their sexual activities in order to have sons. The variable indicating the effect of the presence of at least one son does indicate that intervals were shorter when there were still no boys.⁸⁴ Finally, we have found no indication that the fertility of couples with a “low” position in the extended household was reduced, at least not by longer intervals. On the contrary, when the husband was not a son of the head of the household (but an uncle, cousin or nephew), the birth intervals were shorter.

In the Dutch transitional cohort (mothers born between 1870 and 1902), only the natural determinants explain the length of birth intervals. Apparently, social and cultural differences in breastfeeding or coital frequency had diminished. Only the skilled workers tend to have longer intervals than the reference group. Finally, birth intervals were no longer related to the family composition.

Stopping behavior

As we have seen in Table 1, both the Taiwanese and Dutch mothers tended to have their last child around age 38. At first sight, this age does not suggest widespread deliberate stopping of child bearing. Still, the aggregate figure may hide subgroups of women who did manage to stop at a relatively early age. Did these groups exist and can we reconstruct the motives for stopping? Again, we will use a multivariate technique. In the model, we include all couples with at least one child who have been followed for at least five years after the last one was born. The crucial question is: what determined the fact that a couple stopped having further children? Binary (or dichotomous) logistic regression is a suitable technique, specifically developed to analyze dependent variables with only two outcomes (thus, stopping or continuing). The probability (p) of the dependent variable being stopping or continuing is calculated in terms of *odds*, that is the probability of stopping divided by the probability of continuing ($p/(1-p)$). The regression coefficients of the independent variables are the natural logarithms of the odds. By exponentiating them, we obtain *odds ratios*. These indicate the increase in the odds of the dependent variable of stopping resulting from an increase of one unit in the independent variable.⁸⁵

Practically all variables used in the model in Tables 5 and 6 are the same as already described for the spacing analysis. Obviously, the factor “final interval” is

84. Lee and Wang, *One Quarter of Humanity*, 98.

85. Menard, *Applied Logistic Regression Analysis*.

Table 5: Logistic regression on stopping with childbearing, western-central Netherlands (odds ratios)

	Mothers born 1800-1870	Mothers born 1870-1900
<i>Mother's age</i>		
<25 years (ref.)		
25-29	1.212	1.611 *
30-34	1.632	2.183
35-39	2.687 ***	3.648 ***
40 and older	13.416 ****	31.660 ****
Marriage duration in years	1.350 ****	1.590 ****
Crude legitimate parity	0.696 ****	0.530 ****
Death of previous infant within a year	1.005	0.338
<i>Family composition</i>		
Net parity	0.844 ***	0.817
Proportion of dependent children (less than 9 years old)	0.652	0.690
Last child female	1.293	0.848
Last child female and deceased within a year	0.626	1.626
Proportion of girls among children alive	0.820	0.940
Already one or more boys surviving	0.837	0.64
Occupation of father		
Unskilled and casual worker (ref.)		
Elite	0.987	1.612
Farmer	1.281	1.099
Official or white collar worker	0.518	2.911 ***
Shopkeeper or artisan	1.321	1.423
Skilled worker	1.031	1.437
<i>Religion of parents</i>		
<i>Both liberal protestant (ref.)</i>		
Both catholic	1.038	0.317 ****
At least one of the parents is orthodox Protestant	0.795	0.650 *
Mixed Catholic-Protestant	1.521	0.117 ***
Both Jewish	15.251 *	2.319
Both unknown	1.119	2.363
Liberal Catholic (at least one of the parents)	1.962	
Nondenominational (at least one of the parents)	2.671	1.499
<i>Parents same age (difference less than 4 years) (ref.)</i>		
Wife older than husband (4 year or more)	1.046	1.211
Husband older than wife (4 years or more)	0.823	1.137
Parents exogamous (different birth place) (ref.)		
Parents endogamous (same birth place)	0.903	1.021
Endogamy unknown	0.941	1.742
Father illiterate	1.056	0.196
Father's literacy unknown	0.094	
Mother illiterate	0.792	0.424
Mother's literacy unknown	10.951 *	
Mother born between 1800 and 1829 (ref.)	1.178	
Mother born between 1830 and 1849	1.350	
Mother born between 1850 and 1869		
Mother born between 1870 and 1889 (ref.)		
Mother born between 1890 and 1909		1.862 ***
Utrecht sample (ref.)		
Akersloot sample	1.174	6.678
Number of births	2496	1007
Nagelkerkes r^2	0.35	0.43
Likelihood ratio χ^2	567.52	333.58

Level of significance: * 0.1; ** 0.05; *** 0.01; **** 0.001

Table 6: Logistic regression on stopping with childbearing, Chu-shan and Ta-chia, Taiwan (odds ratios)

<i>Mother's age</i>	
<25 years (ref.)	
25-29	0.59
30-34	1.58
35-39	3.69***
40 and older	38.09****
Marriage duration in years	1.25****
Crude legitimate parity	0.76****
Death or adoption out of previous infant within a year	0.86
<i>Family composition</i>	
Net parity	0.84**
Proportion of dependent children (less than 9 years old)	0.89
Last child female	1.18
Last child female and deceased or adopted out before birth of the next child	0.78
Proportion of girls among children alive	0.74
Already one or more boys surviving	0.93
Socio-economic status head of the household	
Low (ref.)	
High	0.88
Middle	1.11
Relation father to head of household	
Head of household himself (ref.)	
First son	0.87
Non-first son	0.79
Other	1.04
Parents exogamous (different birth place) (ref.)	
Parents endogamous (same birth place)	1.09
Parents same age (difference less than 4 years) (ref.)	
Wife older than husband (4 year or more)	0.71
Husband older than wife (4 years or more)	0.87
Type of marriage	
Major (ref.)	
Minor	1.11
Uxorilocal	0.57**
Mother born after 1906 (ref.)	
Mother born before 1906	0.68**
Chu-shan (ref.)	
Ta-chia	2.15****
Number of children	4369
McFadden's r^2	0.19
Likelihood ratio χ^2	259.16

Level of significance: * 0.1; ** 0.05; *** 0.01; **** 0.001

removed, since it is actually the dependent variable. Because logistic regression does not include time dependent variables, the definition of child mortality is modified. Now, we define it as the death of the previous child within a year after its birth.

We have seen in Figure 4 that the pretransitional Dutch cohort resembled the prototypical “natural fertility” population. Our model confirms that the end of childbearing was solely determined by biological factors. Age of the mother, marriage duration and fecundity (indicated by crude parity) are the crucial factors that predict whether stopping will occur. The death of a child did not lead to a deliberate “replacement”. Interestingly, net parity was even negatively related to stopping. Thus, the more (surviving) children a couple had, the more likely that they would have another child. Since all natural determinants are controlled, this suggests a positive interest in maximizing the number of children. Finally, we cannot detect any social or cultural “forerunners” apart from the Jews.⁸⁶

In the Dutch transitional cohort (second panel of Table 5), the natural causes of stopping had lost none of their significance. However, stopping was also associated with social class, in the sense that officials and white-collar workers stopped earlier. In the countryside, they appear to have been forerunners of birth control. Catholics and orthodox Protestants were less inclined to stop reproduction than the liberal Protestants. Clearly, the vehement opposition of their churches against contraception was having an effect. In this model, we cannot find an effect of a desired family size on stopping. However, stopping occurred more often in the birth cohort 1890-1902 compared with 1870-1889. Indeed, when we run a separate model for the youngest cohort, we do find a significant, positive effect of net parity on the odds of stopping. We may conclude that, in the north-western countryside, parity-specific birth control only began with the cohorts of women born after 1890.

In Chu-shan and Ta-chia, we find the same paramount effects from the natural covariates of age, marriage duration and fecundity. The presence of sons does not increase the odds of stopping, as has been reported for mainland Liaoning.⁸⁷ An additional finding is that couples married uxorilocally tended to continue somewhat longer with childbearing than minor and major marriages. This contradicts our first impression based on their longer intervals that they were less interested in maximizing their family size. Couples in Ta-chia stopped earlier than couples in Chu-shan. A compensation for their relatively short birth intervals? Because Ta-chia had better connections than Chu-shan to the more “urbanized” parts of Taiwan, it could have displayed “modern” behaviour. Stopping occurred somewhat more often in the youngest cohort but overall we could

86. Livi-Bacci, “Social-group forerunners”.

87. Lee and Campbell, *Fate and Fortune*.

not find any trace of deliberate birth control. On the contrary, as in the pretransitional Dutch cohort, the larger the number of children present in the family (net parity), the lower were the chances of stopping.

Discussion

Our comparative exploration of marital fertility in rural Netherlands and Taiwan has yielded a number of interesting results. Using the same definitions and corrections for potential biases we have shown that early twentieth century Taiwanese marital fertility rates were only slightly lower than Dutch fertility rates in the pretransitional period. Thus, the gap between western Europe and China with respect to fertility may be much smaller than is assumed in the current controversy on the divergence of East and West. In fact, by taking into account starting, spacing and stopping we have shown that completed marriages in Taiwan actually had more children than the Dutch. However, due to their long birth intervals, Taiwanese families remained relatively small. How can we explain the remarkable difference in intervals? We can think of three possible reasons. Firstly, the cause may have to be sought in differences in living standards. Malnutrition may have increased the incidence of miscarriages leading to longer intervals. There is some evidence for this relationship in the Dutch case. Birth intervals were longest when the father was a casual or unskilled worker, when the parents had married endogamously and when the mother was illiterate. Also, long intervals occurred during the bleak period of the 1840s and 1850s. In Taiwan, however, we find no effect of social class on intervals, nor of intra-household differences in hierarchical position. Thus, it is unlikely that Dutch-Taiwanese differentials were caused by differences in living standards. Secondly, the long Taiwanese intervals may have been caused by the conscious adjusting of births to the current or even the desired family composition. This is the viewpoint taken by "revisionists" in the current debate. However, we have found no conclusive evidence of conscious spacing. On the one hand, the intervals were relatively longer when one or more boys were already present or when the last child was a boy. The latter can also be explained by later weaning of boys. On the other hand, there was no effect of the burden of young, dependent children on the intervals. Net parity, that is the number of children present, actually tended to shorten the birth intervals. Interestingly, the oldest Dutch cohort showed more signs of conscious spacing than the Taiwanese. The positive effect of the proportion of dependent children on the birth intervals shows that Dutch couples were motivated to space their births during the worst period of the family cycle. Finally, the differences may be attributed to breastfeeding behavior. Taiwanese intervals after the birth of a surviving child were much longer than the Dutch. It seems likely that Taiwanese infants were breastfed much longer and more generally than in the (western parts of) the Netherlands.

Parity-specific stopping is often considered to be the most direct criterion

for birth control. Not surprisingly, Dutch couples did not display any parity-specific control until the birth cohort 1890-1902. The end of childbearing could be explained almost entirely by “biological factors”. The same was true for the Chu-shan and Ta-chia cohorts.

The models have proven useful in detecting deliberate fertility control while controlling for natural, social and cultural determinants of fertility. In future research they can be elaborated further. For instance, the composition of the extended Taiwanese household could have more effects than those we have detected with our simplified variables. Also, it will be very interesting to apply these models to urban contexts as well. Possibly, forerunners of stopping are to be found in Taiwanese and Dutch cities. The models have also shown the relative impact of social and cultural factors on fertility in both countries. In the Netherlands, the cultural factors surrounding breastfeeding were important in the explanation of differential fertility. Also, links are suggested between poverty on the one hand, and miscarriages, low coital frequency and deliberate spacing on the other. In Taiwan, the form of marriage mattered greatly with respect to birth intervals, probably through coital frequency.

Finally, we return to the “problem” of birth control in late imperial China. The current discussion of the demographic differences between western Europe and China centers on the levels of age-specific marital fertility. In our view, these differences, at least judging from rural Taiwan and the Netherlands, were not dramatic. By and large, lower marital fertility in Taiwan can be ascribed to longer birth-intervals due to longer breastfeeding and less infant mortality. All in all, Arthur Wolf was correct when he wrote that no elephant had walked in the living room. At least, we haven’t found one in early 20th century Taiwan.

**Malthus on China:
A brief for the
received view**

*Arthur P. Wolf &
Theo Engelen*

The argument of Malthus's *First Essay on Population* is largely developed on the basis of a comparison of three countries – England, the United States, and China. England is presented as an example of an “old state” in which population growth has been considerable in the past but is slow at present. The reason is that “a foresight of the difficulties attending the rearing of a family acts as a preventative check, and the actual distress of some of the lower classes, by which they are disabled from giving the proper food and attention to their children, acts as a positive check.” This is true of all old states because they lack the resources necessary to support further growth.¹

The United States is presented as an example of a new state in a “healthy country...with plenty of food and room” and institutions that made good land cheap and agriculture a good investment. The result was that, as in new colonies generally, the population grew “with astonishing rapidity.” Malthus underlines the point of the example by asking his reader to consider why an equal number of people did not “produce an equal increase in the same time in Great Britain.” His answer is that “the great and obvious cause...is the want of food and room, or in other words, misery.”²

China was known to Malthus as “one of the most fertile, best cultivated, most industrious, and most populous countries in the world,” but it was also thought to be a country in which “the poverty of the lowest ranks of people...far surpasses that of the most beggarly nations in Europe.”³ François Quesnay summed up the prevailing view when he noted that “in spite of...the abundance that reigns, there are few countries that have so much poverty among the humbler classes. However great the empire may be, it is too crowded for the multitude that inhabit it.”⁴

Malthus therefore presented China as the third point of a theoretical triangle. It belonged to a class of countries with periods “when population increased permanently, without an increase in the means of subsistence.” These were countries in which “population appears to have been forced, that is, the people have been habituated by degrees to live almost upon the smallest possible quantity of food.” China answered to this description because “if the accounts we have of it are to be trusted, the lower class of people are in the habit of living almost upon the smallest quantity of food and are glad to get any putrid offals that European laborers would rather starve than eat.” A country in this state “must necessarily be subject to famines.”⁵

1. Malthus, *Population: The First Essay*, 22-24.

2. *Ibid.*, 36-39.

3. Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations*, vol. 1, 80-81.

4. Quesnay, *Le despotisme de la Chine*, vol. 2, 141-142.

5. Malthus, *Population: The First Essay*, 45-46.

There is no evidence that Malthus ever doubted his views of England and the United States, but he appears to have never been entirely happy with his conclusions regarding China. What worried him most was the report that despite every acre of tillable land having long been under cultivation, marriage was early and nearly universal. In his first mention of China he called for “inquiries into the manner and habits of the lower classes and the encouragements of early marriage.” “Perhaps,” he wondered, “the fact of the universality of early marriage may not be sufficiently ascertained.”⁶ He assumed that if marriage was in fact early and universal, fertility must be high. He therefore thought it was of “the utmost importance” to ascertain “in what manner the checks to a further population operate; what are the vices, and what are the distresses that prevent an increase of numbers beyond the ability of the country to support.”⁷

To fully appreciate Malthus’s doubts we must remember that he knew little or nothing about most of the conditions that effect fertility. Most importantly, he knew nothing about lactational amenorrhea. If Chinese women married earlier and in greater numbers than English women, he could only conclude that their fertility was proportionally higher. This was guaranteed by “the passion between the sexes.” But why, then, did Chinese all marry and marry at the earliest possible age? Many people were already living on “the smallest possible quantity of food.” Why, despite the misery that this must inevitably entail, did even the poorest among them marry at the first opportunity?

Until recently most scholars agreed that developments since Malthus’s time had largely resolved his doubts while confirming his general view of China. Surveys conducted in the 1930’s and archival studies of genealogies indicated that despite early and universal marriage, Chinese fertility was not as high as Malthus appears to have imagined, largely as a result of late weaning, poor nutrition, and female infanticide. It was, however, high enough to produce a population that could appropriately be described as “forced.” All the evidence pointed to high infant and childhood mortality, low adult life expectancy, widespread poverty, and frequent famines. This is what we call “the received wisdom.” It is the view represented most effectively in Ping-ti Ho’s *Studies on the Population of China, 1368-1953*.⁸

This view has now been challenged by James Z. Lee and Wang Feng in a prize-winning book entitled *One Quarter of Humanity: Malthusian Mythology and Chinese Realities, 1700-2000*.⁹ Lee and Wang agree that marriage was early and universal in China, but otherwise reject what we call the received wisdom as well

6. *Ibid.*, 20.

7. *Ibid.*, 21.

8. Ho, *Studies on the Population of China*.

9. Lee and Wang, *One Quarter of Humanity*.

as the picture painted by Malthus himself. Their radical view is that China should not be conceived of as a third type of society distinct from both England and the United States. In their view England and China were both old states in which population was constrained by preventative rather than positive checks.¹⁰ The only difference was in how the two societies controlled fertility. The English did it by controlling marriage while the Chinese did it by controlling marital fertility. Lee and Wang sum up their argument in Malthus's own language. "Whereas European couples practiced moral restraint [i.e. they did not marry if they did not have the means to support a family] but little marital restraint, Chinese couples practiced no moral constraint but considerable marital restraint."¹¹

A large proportion of Lee and Wang's text is devoted to demonstrating that marital fertility was lower in China than it was in England and other European states. We will argue that they exaggerate the magnitude of the difference, but we accept their contention that Chinese women bore fewer children per year of marriage than European women. What we do not accept is their contention that this was because Chinese couples practiced deliberate fertility control and that as a result Chinese fertility was generally lower than European fertility. We contend that there was little, if any, effective birth control in China, and that while marital fertility was lower than in Europe, general fertility was far higher.

We will begin with our second contention because it is pivotal. Lee and Wang's primary thesis concerning the relative importance of positive and preventative checks rests on the claim that marital fertility control in China was the equivalent of marriage control in England. To maintain this they must demonstrate that Chinese fertility was no higher than English fertility, but this they fail to do. Indeed, they do not even try. They report total fertility rates for China,¹² but they never compare them with English or European total fertility rates. Again and again they contrast Chinese and European marital rates, but they never risk comparing their general rates. A paragraph claiming that "Chinese fertility overall was not much higher than European fertility, while marital fertility was significantly lower" offers data supporting the first claim but not the second.¹³

What, then, was the average total fertility rate in China prior to the 1949 revolution? And how does this compare with the average English rate? The one pre-1949 rate Lee and Wang report is the figure calculated by Ansley Coale and his Princeton colleagues on the basis of John Lossing Buck's famous farm surveys.¹⁴ The figure is 5.5. It is an estimate based on data collected by students all of

10. *Ibid.*, 12.

11. *Ibid.*, 90.

12. See Lee and Wang, *One Quarter of Humanity*, Table 6.1, 85.

13. *Ibid.*, 84-86.

14. See Barclay et al., "A reassessment of the demography of traditional rural China".

whom were males who could not interview women and therefore had to depend on their husbands or their neighbors. When Wolf revisited seven of the communities included in the study and interviewed women old enough to have been included in the Buck study he obtained a rate of 5.78.¹⁵ The fact that older women had trouble remembering children who died as infants suggests that the true rate is close to 6.0.

The best reason for suspecting that the figure from the Buck survey underestimates Chinese fertility is another survey conducted in 1930-34 by Chiao Chi-ming and Warren S. Thompson.¹⁶ Where the Buck survey was a student effort directed by an agricultural economist, the Chiao and Thompson study was a professional effort directed by one of the leading demographers of the time. Unlike Buck and his student collaborators, Chiao and Thompson did not rely on interviews. Instead, they set up their own registration system in rural Kiangsu and for four years recorded births and deaths as they occurred. The result is without doubt the most reliable demographic data collected on the Chinese mainland prior to the fertility survey conducted by the State Family Planning Commission in 1982. The fertility data recorded is reproduced in its original form in Table 1. The age-specific rates for the four years yield total fertility rates of 6.86, 6.24, 5.58, and 6.85. The decline in the second and third years of the study is interesting as evidence of the factors effecting Chinese fertility. Chiao and Thompson attribute it to a depression that lowered the marriage rate and a malaria epidemic that raised the miscarriage rate.¹⁷

One of the scholarly failings of Lee and Wang's effort is the failure to discuss the Chiao and Thompson study. The work is not even listed as a reference. Equally egregious is their failure to refer to Chi-hsien Tuan's 1958 study of fertility in rural Taiwan during the Japanese occupation.¹⁸ This is one of the seven studies that form the basis of Louis Henry's definition of natural fertility and should be a primary source for a book devoted to Chinese demography.¹⁹ Tuan's data are reproduced in Table 2 in the form of period rates for the years 1903-1953. Only the rate for 1903-07 falls below 6.0, and there is reason to believe that this figure underestimates the true rate. Concerned that some children who died as infants may not have been registered, Tuan interviewed 463 of the women included in the study. He found that 9.5 percent of births by women aged 60 or more at the time of the study did not appear in the registers. Among women aged 45-60 the figure was only 1.5 percent.²⁰

15. Wolf, "Fertility in prerevolutionary China," *Population and Development Review*, Table 9, 458.

16. Chiao et al., *An Experiment in the Registration of Vital Statistics in China*.

17. *Ibid.*, 42.

18. Tuan, "Reproductive histories of Chinese women".

19. See Henry, "Some data on natural fertility".

Table 1: Age-specific and Total Fertility in Chiang-yin County, Kiangsu, 1931-1935

Year	Age							TFR
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	
1931-32	95	337	330	259	251	95	5	6.86
1932-33	67	318	338	242	202	73	7	6.24
1933-34	80	273	277	253	179	69	4	5.58
1934-35	70	372	343	288	198	95	4	6.85

Source: C. M. Chiao, Warren S. Thompson, and D. T. Chen, *An Experiment in the Registration of Vital Statistics in China* (Oxford, Ohio: Scripps Foundation for Research in Population Problems, 1938), p. 45, Table 32.

Although Tuan's work suggests some under registration before 1915, the household registers compiled by the Japanese colonial government are the best basis we have for estimating the fertility of any large Chinese population. Household heads were required to report all births and deaths to the police within ten days, and the police visited every household at least once a year to make sure that these reports were accurate (see Chapter 2).²¹ Working with a team of anthropologists and historians at the Academic Sinica, we have computerized the registers from a number of widely scattered communities, twenty-two of which are represented in the fertility rates reported in Table 3. The localities included in the table are all localities in which the residents were Hokkien- or Hakka-speaking Han Chinese. Localities with a substantial non-Han population were excluded.

The first point to note about Table 3 is that with one slight exception, the rates for 1906-1915 are lower than the rates for the later periods. This is undoubtedly because of the under registration documented by Tuan. All of these rates should be five to ten percent higher than shown. The second point to note is that the rates for 1936-1945 are all lower than the rates for 1926-35. This is almost certainly a result of the many kinds of disruption occasioned by World War II. The third point to note is that the rates for urban Taiwan are substantially lower than those for peri-urban and rural Taiwan, and the rates for peri-urban Taiwan somewhat lower than those for rural Taiwan. Wolf and Gates have shown that the reason is that urban and peri-urban women were less likely to marry than rural women. Their evidence says that during the Japanese occupation nearly a fourth of all the women raised in Taipei City failed to marry by age fifty.²²

20. Tuan, "Reproductive histories of Chinese women," 41-42.

21. For a detailed account of the registration system see Wolf and Huang, *Marriage and Adoption in China*, chapter 2, 16-33.

22. Wolf and Gates, "Marriage in Taipei City", Figure 1, 119.

Table 2: Age-specific fertility reported by Chi-hisen Tuan for Yun-lin County in Southern Taiwan

Period	Age							
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	TFR
1903-07	90	240	240					<u>5.81</u>
1908-12	100	280	300	280				<u>6.32</u>
1913-17	100	310	330	290	210			<u>6.79</u>
1918-23	110	310	300	290	220	110		<u>6.74</u>
1923-27	120	350	330	290	250	110	10	7.30
1928-32	100	330	350	320	250	130	10	7.45
1933-37	90	350	340	300	270	120	10	7.40
1938-42	70	330	320	280	250	110	10	6.85
1943-47	50	300	310	270	210	100	10	6.20
1948-53	10	290	320	320	240	120	10	6.55

Note: Underlined figures are estimates based on data for later cohorts.

Source: Chi-hsien Tuan, "Reproductive histories of Chinese women in rural Taiwan," *Population Studies*, vol. 12 (1958), p. 45, Table 2.

What we see, then, in Table 3 is a set of figures that make two points. The first is that in rural Taiwan – where conditions were similar to those typical of rural China – total fertility averaged approximately 6.0. This is a little higher than the rates calculated on the basis of the Buck survey but not as high as those documented by Chiao and Thompson in Kiangsu. The second point is that contrary to Lee and Wang's primary thesis, fertility in Taiwan was conditioned by entry into marriage, not by deliberate control within marriage. It was only in Taipei City where a large proportion of all women failed to marry that we find rates that fall below 5.0. It took a European-like marriage pattern to produce European-like fertility rates.

The evidence cited to this point all refers to the years 1900-49. With the exception of the genealogy of the Ch'ing imperial family and the household registers of Han bannermen in Manchuria, the only evidence we have for earlier years comes from genealogies compiled by the corporate kinship groups anthropologists call "lineages." This evidence is invaluable because it is the only evidence we have, but it has serious limitations.²³ These can be overcome to extract fertility rates but only with the help of assumptions about the nature of vital events in the distant past. The most important concern the sex ratio at birth and infant and childhood mortality. These are necessary because lineage genealogists

23. See Liu, "Chinese genealogies as a source", and Harrell, "Microdemography".

Table 3: Age-specific fertility in Taiwan by location and period

Period	Age							TFR
	15-19	20-24	25-29	30-34	35-39	40-44	40-49	
<i>Rural Northern Taiwan</i>								
1906-15	132	263	243	206	165	78	6	5.46
1916-25	127	277	264	214	153	66	9	5.55
1926-35	145	319	295	256	201	86	9	6.55
1936-45	111	302	294	259	194	93	8	6.30
<i>Rural Southern Taiwan (including Pescadores Islands)</i>								
1906-15	95	270	272	256	189	72	7	5.80
1916-25	86	282	289	259	195	81	7	5.99
1926-35	87	315	324	297	227	96	7	6.76
1936-45	68	302	299	260	208	95	5	6.19
<i>Peri-urban Taiwan (Taipei Basin)</i>								
1906-15	129	251	232	209	166	85	6	5.39
1916-25	115	261	241	204	158	81	4	5.32
1926-35	128	258	263	231	174	81	6	5.71
1936-45	96	237	247	224	177	92	4	5.39
<i>Urban Taiwan (Taipei City)</i>								
1906-15	113	192	168	147	93	39	7	3.79
1916-25	99	213	195	142	122	50	4	4.17
1926-35	114	226	195	170	133	53	7	4.48
1936-45	83	202	183	158	103	47	3	3.89

did not record female births and only recorded male births if the boy survived to an age specified by lineage rules. These were usually between fifteen and twenty years.

The great majority of the fertility rates published to date are the work of Liu Ts'ui-jung and Ted A. Telford. Liu has analyzed twenty-two genealogies from six provinces in South China,²⁴ and Telford has analyzed all the genealogies

24. Liu, "Ming-Qing renkou"; Liu, "The demography of two Chinese clans"; and Liu, "A comparison of lineage populations".

25. See Telford, "Fertility and population growth".

extant from a county in Anhui province.²⁵ The rates published by Liu range from 4.47 to 6.27 and average 5.71, while those published by Telford range from 6.78 to 9.56 and average 8.21. The large difference between the two authors' figures is almost entirely a result of the way they handle the fact that lineage genealogists only recorded the births of males who survived to a certain age.²⁶ Liu bases her rates on a simple count of the births recorded, while Telford adjusts his rates to take account of infant and childhood mortality. He assumes an infant mortality rate of 250 and a childhood and adolescent rate of 100. When Liu's rates are adjusted in the same way we have a set of figures suggesting a fertility rate of approximately 7.9 for the years 1450 to 1900. This rate would be substantially higher if we assumed that infant mortality was as high in these years as it was among the children of the women included in Buck's farm surveys. The Princeton group puts their infant mortality rate at 300 and their childhood/adolescent age rate at more than 200.²⁷

The rates Liu and Telford estimate on the basis of the lineage genealogies are all marital fertility rates. To get general fertility rates we have to assume that Chinese marriage rates were as high in the Ming and Ch'ing dynasties as they were in the Republican period. We can then use the differences between the general and marital rates reported by the studies cited above to estimate general fertility in the years covered by the genealogies. These differences are 0.68 births in the case of the rates estimated from the Buck surveys,²⁸ 1.03 births in the case of the rates reported by Chiao and Thompson,²⁹ and an average of 1.43 births in the case of the rates calculated on the basis of the Taiwan household registers.³⁰ Thus the general fertility rate in the three centuries covered by the genealogies must have been at least as high as it was in the early decades of the 20th century.

We will therefore take 6.0 as the average general fertility rate in late imperial China. It is a figure that makes obvious Lee and Wang's reasons for avoiding direct comparisons of Chinese and European general fertility rates. The comparison rejects completely their claim that there was a preventative check in China as effective as that Malthus identified in Europe. E.A. Wrigley and colleagues estimate for England in the years 1541-1871 general fertility rates that vary from 3.75 to 4.50. The average estimate for the period is only 4.35.³¹ General fertility was higher elsewhere in Europe but nowhere as high as in China. Massimo Livi Bacci

26. See Harrell, "Microdemography", 15.

27. Barclay et al., "A reassessment of the demography of traditional rural China," 618-620.

28. See *ibidem*, Table 5, 614.

29. Chiao et al., *An Experiment in the Registration of Vital Statistics in China*, Table 32, 45.

30. See Wolf, "Fertility in prerevolutionary China," Tables 6 and 7, 454-455.

31. Wrigley et al., *English Population History from Family Reconstitution*, Table A9.1, 614-15. The reported gross reproduction rate (GRR) has been inflated by 2.05 to give the total fertility rate (TFR).

Table 4: Marital fertility in China by period and location

<i>Period</i>	<i>Location</i>	<i>Total marital fertility rate</i>	<i>Sample size</i>
1296-1864	Hunan	6.0	2,670
1462-1864	Anhui	6.1	1,654
1517-1877	Jiangsu	5.8	1,784
1520-1661	Anhui	5.4 to 8.2	11,804
1700-1890	Beijing	5.3	3,178
1774-1873	Liaoning	6.3	3,000
1929-1032	22 provinces	6.2	50,000

Source: James Z. Lee and Wang Feng, *One Quarter of Humanity: Malthusian Mythology and Chinese Realities* (Cambridge, Mass.: Harvard University Press, 1999), Table 6.1, p. 85.

lists 4.27, 4.27, and 4.49 for Sweden in 1800, 1850, and 1870; 5.07, 4.91, and 4.95 for Finland in 1800, 1850, and 1870; 4.60 and 5.23 for the Netherlands in 1850 and 1870; 3.38 and 3.42 for France in 1850 and 1870; and 4.88 for Italy in 1870.³²

We turn now to our second contention – that there was little, if any, effective birth control in China in Late Imperial China. The fact that general fertility was high by European standards does not necessarily mean that Chinese couples did not take steps to limit the number of children they produced. It could be that if it had not been for deliberate fertility control, Chinese fertility would have been as high as Malthus feared. We therefore need to address Lee and Wang’s claim that “Chinese couples practiced no moral restraint but considerable marital restraint.”

Lee and Wang introduce their book with the claim that “Chinese married women had a TMR [total marital fertility rate] of 6 or less.” “This low marital fertility was,” in their view, “one of the most distinctive features of the Chinese demographic system.”³³ Their evidence is summed up in a table reproduced here as Table 4. The first three figures are all from Liu Ts’ui-jung’s analyses of lineage genealogies and are gross underestimates because they take no account of infant and childhood mortality. The figures in the fourth line of the table refer to Ted Telford’s study but misrepresent his results. The range for the rates from the genealogies he analyzed was from 7.24 to 9.19 – not 5.4 to 8.2. 8.2 Was the average figure!³⁴

32. Livi Bacci, *The Population of Europe*, 136.

33. Lee and Wang, *One Quarter of Humanity*, 8.

34. See Telford, “Fertility and population growth”, Table 3.1, 51.

The fifth figure – the figure that pulls the average down to “less than 6” – should not be included in the table. The population is not relevant to the argument because it consists of Manchu noblemen who qualified for notice in the Ch’ing imperial genealogy. Lee and Wang admit that these people are “atypical, since the Qing imperial lineage was an elite population that depended solely on the state for financial support, was highly regulated, and was required to live in either Beijing or Shenyang.”³⁵ They should have added that in addition to being a welfare elite, these people were not Chinese.

The sixth figure in the list takes us back to Malthus’s view of the United States. In his view, its population was growing “with astonishing rapidity” because it was a colony “with plenty of food and room.” This was, most scholars now agree, typical of colonies. In the years covered by Lee and Wang’s data Liaoning was also a frontier with plentiful resources. Why, then, do they find that fertility was no higher than in China proper where resources were exceptionally scarce? The answer, we suspect, is that the source of their data is corrupt records maintained by the ineffective administration of a military colony. The colonists had good reason not to register their sons and ample opportunity to avoid doing so. Christopher Isett writes as follows with respects to Lee and Wang’s data from Daoyi:

Lee and Campbell's TMR figure for Daoyi [the figure used by Lee and Wang] is by their own recognition an estimate based on incomplete records. Poor official record keeping in Daoyi was entirely in keeping with what we know of bureaucratic oversight in Manchuria as a whole, where commoners lived among serf and banner communities without soliciting much official attention. It is not surprising therefore that by their own estimates Lee and Campbell believe fully one half of all persons (one third of the males and two thirds of the females) were never registered on the banner rolls, a number that is in turn predicated on their belief that all of those who survived to age 16 (15) were registered. There were good reasons to keep children, especially males, off the banner role after they reached 16 sui, however. Males in the banner system were liable for uncompensated service to the state, including military service, which heads of household would certainly wish to avoid.³⁶

The source of the final figure in the list is the Princeton group’s reanalysis of Buck’s 1930-34 farm surveys. The figure we get from the table Lee and Wang cite as their source is 6.3 rather than 6.2, but this does not matter very much. What does matter is that Lee and Wang fail to note that when Wolf revisited a number of Buck’s field sites he obtained a rate of 7.03.³⁷ And what matters even more is

35. Lee and Wang, *One Quarter of Humanity*, 151.

36. Isett, *State, Peasant, and Merchant*, Chapter 7.

37. Wolf, “Fertility in prerevolutionary China,” Table 10, 459.

Table 5: Age-specific marital fertility in Taiwan by location and period (excluding minor marriages)

Period	Age							TMR
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	
<i>Rural Northern Taiwan</i>								
1906-15	263	303	265	229	188	102	6	6.78
1916-25	314	329	287	241	171	73	12	7.14
1926-35	338	373	354	281	238	116	11	8.55
1936-45	363	372	329	298	220	117	10	8.55
<i>Rural Southern Taiwan (including Pescadores Islands)</i>								
1906-15	273	318	285	275	209	93	9	7.31
1916-25	294	353	317	283	236	104	9	7.98
1926-35	364	391	316	326	258	117	11	8.92
1936-45	338	385	332	287	242	119	9	8.56
<i>Peri-urban Taiwan (Taipei Basin)</i>								
1906-15	256	295	264	212	174	93	---	6.47
1916-25	287	336	271	231	190	74	---	6.95
1926-35	360	354	314	261	204	109	---	8.01
1936-45	368	362	316	279	214	107	---	8.23
<i>Urban Taiwan (Taipei City)</i>								
1906-15	266	262	207	155	109	39	14	5.26
1916-25	287	298	243	187	136	57	8	6.08
1926-35	377	340	267	219	167	68	10	7.24
1936-45	367	285	269	224	147	68	4	6.82

that the table does not include the evidence provided by Chiao and Thompson. The total marital fertility rates for the four years of their study were 8.00, 7.23, 6.64, and 7.80. The average was 7.41.³⁸

Many families in Northern Taiwan and the Pescadores Islands gave away their daughters as infants or small children and raised in their place wives for their sons. Wolf has shown that because of early association, couples married in this fashion had markedly lower fertility than couples joined as young adults.³⁹

38. Chiao et al., *An Experiment in the Registration of Vital Statistics in China*, Table 32, 45.

When the effect of these “minor marriages” is discounted, the data drawn from the Taiwan household registers agree with those reported by Chiao and Thompson. Allowing for five to ten percent under registration before 1915, the figures for the rural areas in Table 5 average close to 7.50 before 1925 and rise to well over 8.5 after 1925. The figures for the urban and peri-urban areas are lower but still average well above 6.0 in most years. It is only in Taipei City in the years before 1925 that we find the level of marital fertility that Lee and Wang take to be normal for all of China.

We therefore conclude that Lee and Wang’s representation of marital fertility in late traditional China is mistaken. The average rate was approximately 7.5 rather than 6.0. But this is still well below the typical European rate and far below the rate reported for such exemplary populations as the Hutterites. Thus the numbers leave room for Lee and Wang’s contention that Chinese couples practiced some form of deliberate birth control. The question is whether their failure to rise to the European level was due to deliberate control or to some involuntary condition. Lee and Wang admit that Chinese mothers “practiced extended breastfeeding” and that this “contributed to long birth intervals and low fertility,” but they nonetheless insist that their “low fertility” was the result of “their ability and even willingness to regulate coital frequency” and their use of “a wide variety of abortive techniques.”⁴⁰

This is a surprising claim because Lee and Wang recognize that Chinese fertility does not exhibit the characteristics that most demographers, following Louis Henry, take to be diagnostic of deliberate fertility control. “Control,” according to Henry, “may be said to exist when the behavior of the couple is bound to the number of children already born and is modified when this number reaches the maximum which the couple does not wish to exceed.”⁴¹ Fertility that is not bound in this way Henry terms “natural fertility.” It is high when people are young and declines slowly as they age producing a convex curve when fertility is plotted against age. Deliberate fertility control is only suspected when fertility begins high and declines abruptly producing a concave age/fertility profile.

Although the fertility of natural fertility populations is generally high, there is considerable variation. Consequently, one cannot take fertility that falls short of the highest rates recorded as evidence of control. One must look at the age/fertility relationship. In the view of most demographers, deliberate fertility control always produces a concave age/fertility profile. A convex profile is evidence of lack of control. A relevant example is provided by the Princeton team’s interpretation of the rates estimated on basis of Buck’s Farm Survey. They char-

39. Wolf, *Childhood Association and Sexual Attraction*.

40. Lee and Wang, *One Quarter of Humanity*, 91.

41. Henry, “Some data on natural fertility”, 81.

acterize Chinese marital fertility as “very low,” but rule out deliberate fertility control as an explanation because “when control of fertility is common, the fertility of older married women is especially low relative to the fertility of young women. Yet the age-specific marital fertility of older Chinese women is as high, relative to that of the younger women, as in many populations judged by Louis Henry to have uncontrolled or natural fertility.”⁴²

Lee and Wang agree that Chinese fertility was “natural” in Louis Henry’s sense of the term, but they reject the Princeton team’s conclusion regarding birth control. They insist that despite presenting a convex age/fertility profile, Chinese fertility was a product of deliberate control. This, they argue, was achieved by means of “late starting, wide spacing, and early stopping.” Chinese couples married young but deliberately delayed their first birth, deliberately avoided producing a child in their later years, and deliberately spaced all of their births as widely as possible. The result was a fertility profile that looked like natural fertility but was in fact the product of a life of deliberate control.⁴⁴

The reason Henry’s distinction has served demographers well is that control of the kind hypothesized by Lee and Wang is both difficult and risky. Difficult because it would require restraint in the early years of life when the passions are most insistent, and risky because a couple could not count on their reproductive capacity surviving the many hazards of aging. This was particularly true in historical societies like China where famine was frequent, epidemics common, and social stability uncertain. Given that Chinese couples all wanted at least two sons, why would they adopt such a difficult and risky strategy? If they were as adept at birth control as Lee and Wang argue, why not wait until they had the children they wanted and then initiate a control program? This, indeed, was the practice of Taiwanese couples during the fertility transition.

We grant that many Chinese women did not want as many children as their husband and parents-in-law and may, in their later years, have made an effort to avoid additional pregnancies. Otherwise, we contend, Chinese couples bore as many children as possible given their circumstances. What Lee and Wang characterize as abortifacients were, in most cases, emmenagogues, employed to enhance rather than reduce fertility,⁴⁵ and the fertility rates they cite as evidence of deliberate control were, with the partial exception of early stopping, the result of involuntary conditions producing unintended and largely unwanted consequences.

It is true that the interval between marriage and first birth was consider-

42. See Barclay et al., “A reassessment of the demography of traditional rural China,” 625.

43. *Ibid.*, 88.

44. Lee and Wang, *One Quarter of Humanity*, 83-84.

45. See Charlotte Furth,

ably longer in China than in Europe, and it is also true that Chinese women were younger at the birth of their last child than European women. But these are not evidence of deliberate birth control. The great majority of Chinese women married at or shortly after menarche if not before. A long first interval was therefore inevitable because “the first several years following menarche are characterized by a high fraction of anovulatory cycles” and “an elevated risk of fetal loss should conception occur.”⁴⁶ Because child bearing was an onerous burden some Chinese women may have taken steps to avoid bearing yet another child late in life, but this is only one of many possible explanations of what Lee and Wang call “early stopping.” Another is the possibility that because of poverty and a high incidence of debilitating diseases, Chinese women aged faster than European women. Yet another is suggested by William H. James’s discovery that “coital rates are much more closely related to duration of marriage than to age.”⁴⁷ By the time they were in their mid-thirties most Chinese women had been married twice as long as their European counterparts.

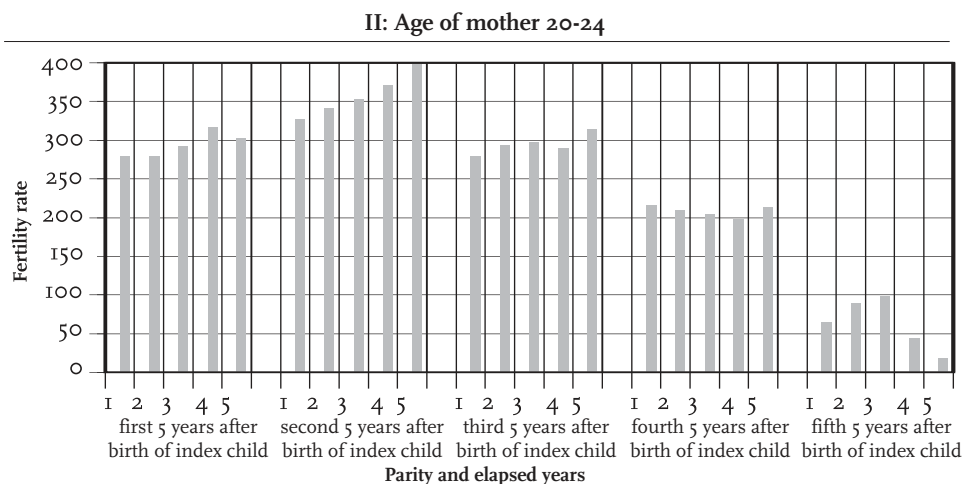
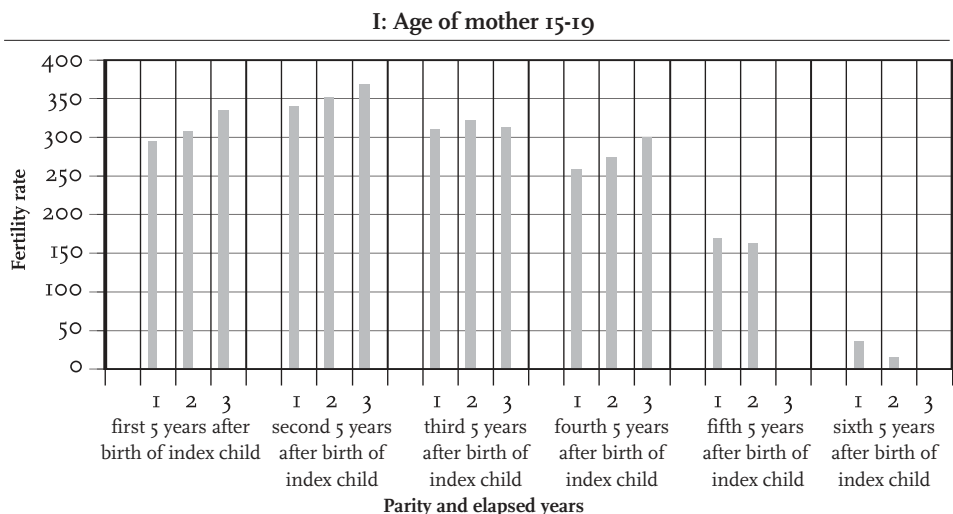
The critical claim in Lee and Wang’s argument – the plank on which their whole platform rests – is the claim that Chinese couples limited the number of children they bore by deliberately prolonging the intervals between their births. The fact that birth intervals were as long in India, Pakistan, and Bangladesh as in China tells against the argument, but the Taiwan household registers provide us with more direct and thus more conclusive evidence. They allow us to determine how many children a woman had borne by any age and how many she bore after that age. With this data we can evaluate Lee and Wang’s thesis by examining how a couple’s past reproductive performance affected their future performance. The received view of Chinese fertility is that most couples made no effort to control their fertility because they wanted as many sons as possible. This view predicts that the more children a woman has borne in the past the more she will bear in the future because her fertility history indexes her fecundity. Lee and Wang’s view is that most couples wanted only a limited number of sons and therefore spaced their births so that they would achieve but not overshoot this mark. This view predicts that if there is a relationship between past and future performance it is a negative relationship. Couples who reproduce too rapidly when they are young should make an effort to slow down later, while those who reproduce too slowly when they are young should made an effort to speed up later.

Figure 1 is designed to decide between these two views of the relationship between past and future fertility. To create the figure we took all the married women who appear in the household registers and recorded their ages at the birth of each of their children. We then partitioned the women’s lives into five

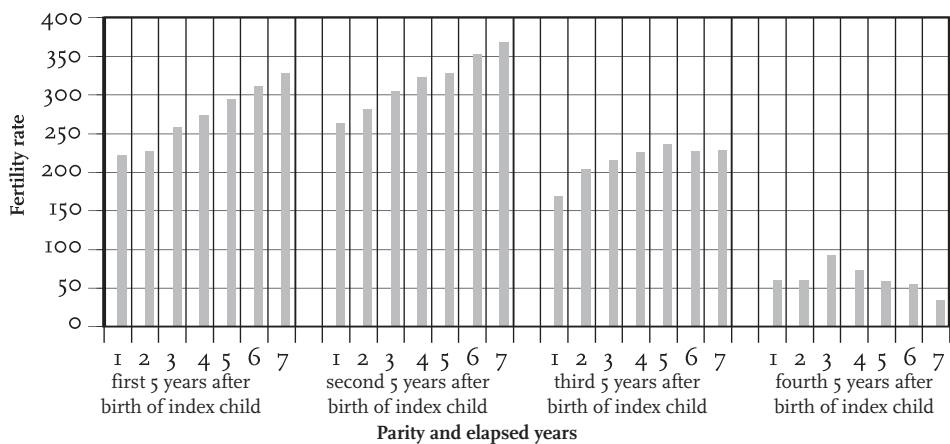
46. Wood, *Dynamics of Human Reproduction*, 405-407.

47. James, “The causes of decline in fecundability”, 333.

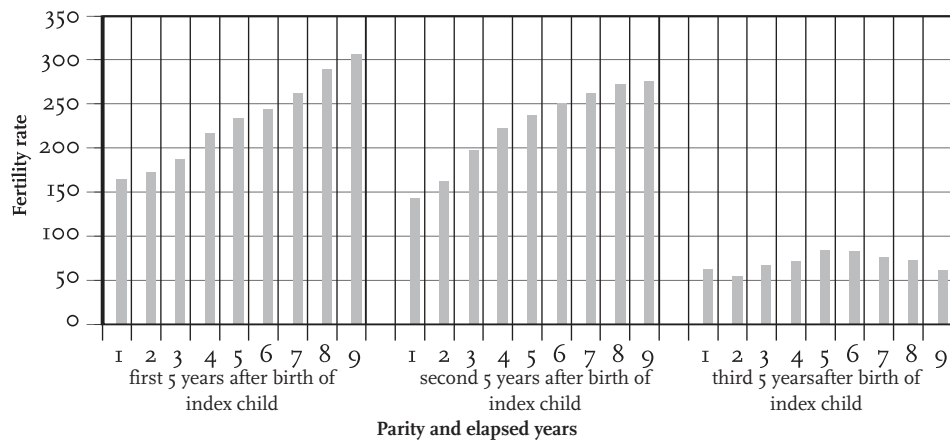
Figure 1: Fertility by Age of the Mother, Parity, and Years Elapsed since the Birth of Index Child



III: Age of mother 25-29



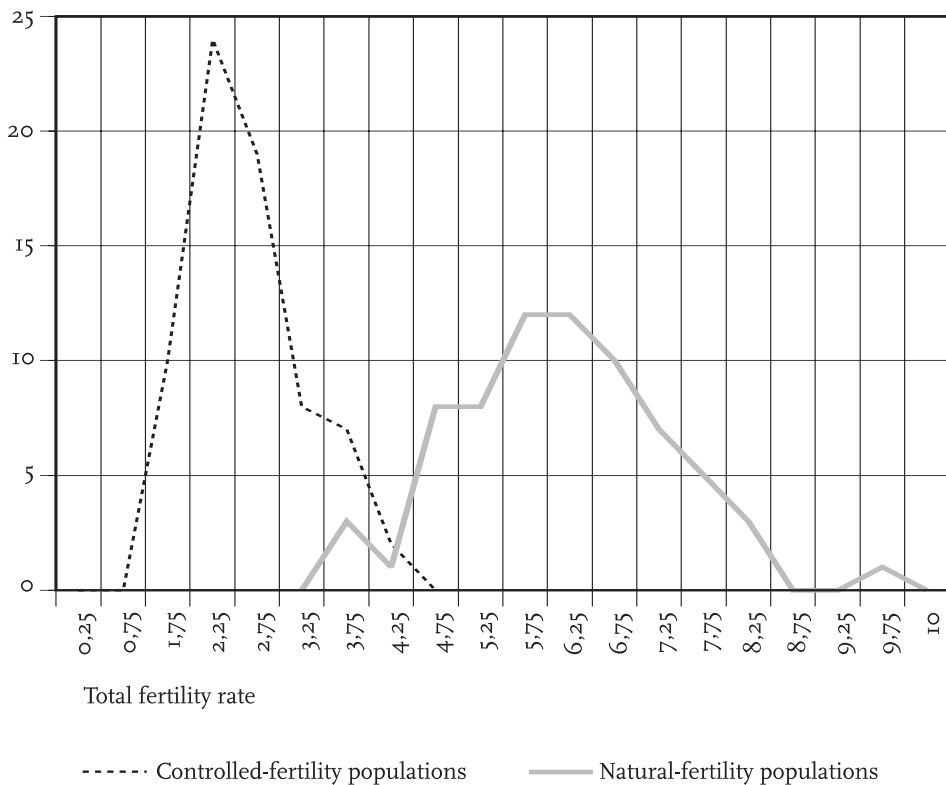
IV: Age of mother 30-34



V: Age of mother 35-39



Figure 2: Distribution of total fertility rates in natural-fertility and controlled-fertility populations



five-year age classes – 15-19, 20-24, 25-29, 30-34, and 35-39. These classes set the upper and lower limits of the figure’s five levels. The index child for each level is the last child born during the ages that define the level. Parity is the parity of the index child. Thus parity 1 says that the index child was the only child the women had borne; parity 2, that she had borne one previous child; parity 3, that she had borne two previous children, etc. The clusters of columns on each level of the figure compare the fertility of women of different parities during five-year intervals following the birth of the index child. Consider the cluster at the left of the top level. It says that among women who bore a child at ages 15-19, those who had borne two or three children bore more children during the next five years than those who had borne only one.

Reading the figure it must be kept in mind that the age intervals were calculated from the birth of the index child. This is why at the upper levels the columns in the first cluster are consistently lower than those in the second cluster. The first interval always begins with a period of post-partum amenorrhea. The effect of this is muted at the next-to-last level and disappears entirely at the

last level because by these ages many of the women in the second cluster are approaching or have already passed menopause.

Comparisons of the columns within each of the twenty clusters all point to the same conclusions – the more children women had borne by any age, the more they bore in their remaining years. With the partial exception of women nearing the end of their reproductive lives, the columns in each cluster rise in step-like fashion from the lower parities to the higher parities. In many of the clusters at the upper levels of the table the columns for the higher parities are half again as high as those for the lower parities. This is exactly what the received view of Chinese fertility predicts. People wanted as many sons as possible and therefore made little or no effort to control their fertility. The result is a positive correlation between past and future performance because fertility was largely a function of fecundability. Couples who were fecund performed well at all ages, and those who were not, performed poorly at all ages.

Lee and Wang could reasonably argue that it is because of deliberate spacing that low fertility below a certain age predicts low fertility later. What their argument cannot accommodate is the evidence showing that high fertility below a certain age predicts high fertility later. To limit their fertility by means of deliberate spacing a fecund couple had to begin spacing early in life. Why, then, if Chinese couples were adept in this regard, do we find that many couples had produced seven or eight children by the time the wife was thirty? And why, if Chinese couples wanted to limit their fertility, did these same couples bear more children later than their less fertile peers? It was only towards the ends of their reproductive lives that their fertility fell a little below that of couples with fewer children. This could be evidence of birth control, but it is not the only possibility. It could be that having already borne eight or nine children, the wife was exhausted or suffering from the wear and tear. Or it could be that having completely fulfilled her duty as a daughter-in-law, she was relieved of the burden of further child-bearing. This could be considered a form of birth control but not the strenuous form hypothesized by Lee and Wang and not a form that made much difference.

Lee and Wang build their thesis on a comparison of China and Western Europe, particularly China and England. At no point do they mention any of the other old states that, like China, were characterized by early and universal marriage. It appears that in their view China was a special case requiring a special explanation. We can therefore gain another perspective on their argument by placing China in a larger context. Was Chinese fertility low compared to the human average? Was it so low as to make deliberate birth control the only likely explanation? These are demanding questions but questions that can be answered thanks to the efforts of Kenneth L. Campbell and James W. Wood.⁴⁸ In the late

48. Campbell and Wood, "Fertility in traditional societies".

1980's they searched all the available literature for reliable data describing populations whose fertility qualified as "natural fertility" by Louis Henry's definition. They were able to find such data for 70 societies for each of which they calculated a total fertility rate. Their results are presented in Figure 2 together with the total fertility rates of 70 societies whose fertility was judged as "controlled" by Louis Henry's criterion. The mean total fertility rates for the two groups are 6.1 for the natural fertility populations and 2.6 for the controlled fertility populations.

What we find, then, when we put China in a global context is that Chinese fertility was not low by human standards. In fact, at about 6.0 it was right on the mean for natural fertility populations. This does not prove that the Chinese did not practice deliberate birth control, but it does add greatly to the burden of proof Lee and Wang must bear. They must either generalize their thesis to include most historical societies with early and nearly universal marriage. Or they must give reasons why in China birth control was necessary to achieve the level of fertility produced by involuntary means in many other societies.

The other societies at or near the norm for natural fertility populations include India, Indonesia, Pakistan, and Bangladesh. These are the societies we must look at in evaluating Lee and Wang's claims about China. Was deliberate birth control common in these societies? And if not, what kept fertility far below the recorded maximum? Bangladesh is particularly instructive because it has been the subject of intensive study and has a reproductive regime with many of the same characteristics as the Chinese regime. In both societies marriage was early (somewhere between 16 and 18 years for women); the median birth interval, long (30 to 34 months); and the average age at last birth, early compared to Europe (38 to 39 years).

There is some evidence suggesting that older Bengali couples practiced coitus interruptus as a means of preventing or delaying additional births. There is not, however, any evidence suggesting that this was a major determinant of Bengali fertility. The major determinant was a lengthy period of lactational amenorrhea – eighteen to twenty months – and consequently long interbirth intervals – thirty-three to thirty-five months.⁴⁹ Whether this was primarily due to Bengali nursing practices or to some combination of nursing practices and malnourishment is not certain.⁵⁰ What is certain is that when one subtracts from the average birth interval eighteen to twenty months of lactational amenorrhea and nine months for gestation the few months remaining do not allow much play for birth control. An average of seven or eight months is common for women who do not practice birth control.⁵¹

49. Chen et al., "A prospective study of birth interval dynamics", and Huffman, Chowdhury et al., "Nutrition and post-partum amenorrhea".

50. Huffman, Ford et al., "Nutrition and fertility in Bangladesh".

We do not have and will never have estimates of the length of lactational amenorrhea in Late Imperial China, but we do know that Chinese and Bengali women led similar lives. Like Bengali women, Chinese women were poor, and, like Bengali women, they nursed their children for two or more years. There is then no need to invoke birth control as the only likely explanation of their low marital fertility. The more likely explanation given what we know about the determinants of fertility in similar societies is a long period of lactational amenorrhea due to some combination of malnourishment and prolonged breast-feeding. This was first suggested by the Princeton team to account for estimates of Chinese fertility that were lower than our own. After ruling out deliberate birth control as a plausible explanation of the rates estimated from the Farm Survey, they wrote:

Lacking further details in the observations on low marital fertility in China, we can conjecture its causes on the basis of interesting parallel that are being discovered elsewhere. Frisch suggested that prolonged breast-feeding among inadequately nourished women may lower the fat content of their bodies sufficiently to lengthen the period of postpartum amenorrhea. An average eighteen-month period of postpartum amenorrhea (compared with nine months in a Chilean population) is revealed in records of menstruation collected from a rural population in Camilla district, Bangladesh. The Bangladesh women had average inter-birth intervals indicating a level of marital fertility not much higher than among the Chinese Farmers.⁵²

Lee and Wang quote the Princeton team when they note that “marital fertility as low as that in China would be expected by demographers only in populations in which some combination of contraception and abortion is practiced,” but they ignore them when they rule out birth control as an explanation and propose instead “prolonged breast-feeding among inadequately nourished women.”⁵³

Lee and Wang’s challenge to the received view of China fails for two reasons. The first is that there is no evidence of widespread, deliberate birth control. Marital fertility was lower than in Europe but not as low as Lee and Wang claim nor low enough to make birth control the only plausible explanation. There are other, more likely explanations. The second reason is that contrary to Lee and Wang’s central thesis, general fertility was much higher in China than in Europe. Where most European fertility rates fell far below the mean for natural fertility societies, the Chinese rate stood right at the mean. We may therefore conclude that Late Imperial China remains more or less where Malthus put it. It did not enjoy the favorable demographic conditions found in the United States,

51. Goldman et al., “Variations in natural fertility: The effect of lactation and other determinants”.

52. See Barclay et al., “A reassessment”, 625.

53. See Lee and Wang, *One Quarter of Humanity*, note 10, 189.

and it did not have the effective means of fertility control found in England. Lee and Wang treat it as a special case. It was in fact representative of the great majority of old states with organic economies.

Appendix

Table A-1: Woman-years for fertility rates shown in Table 3

Period	Age						
	15-19	20-24	25-29	30-34	35-39	40-44	45-49
<i>Rural Northern Taiwan</i>							
1906-15	4,865	4,539	4,570	4,262	3,573	2,888	2,362
1916-25	6,922	5,469	4,399	4,057	3,940	3,727	3,067
1926-35	7,383	6,815	5,971	4,808	3,870	3,307	3,262
1936-45	9,654	7,662	6,663	6,174	5,385	4,245	3,361
<i>Rural Southern Taiwan (including Pescadores Islands)</i>							
1906-15	4,237	4,342	4,380	3,907	3,174	2,364	1,814
1916-25	5,249	4,368	3,986	3,803	3,665	3,161	2,617
1926-35	6,910	6,143	4,882	3,963	3,402	3,172	3,073
1936-45	7,871	7,204	6,626	5,620	4,393	3,439	2,912
<i>Peri-urban Taiwan (Taipei Basin)</i>							
1906-15	4,570	4,452	4,659	4,098	3,345	2,704	2,132
1916-25	6,775	5,525	4,263	4,116	4,292	3,403	2,830
1926-35	8,040	7,266	6,208	4,998	3,891	3,806	3,832
1936-45	10,318	8,314	7,273	6,554	5,669	4,503	3,472
<i>Urban Taiwan (Taipei City)</i>							
1906-15	1,770	1,744	1,796	1,702	1,389	1,087	765
1916-25	3,671	3,091	2,502	2,461	2,420	2,195	1,808
1926-35	4,793	4,750	4,126	3,116	2,406	2,244	2,207
1936-45	5,216	4,534	4,273	4,090	3,398	2,604	1,959

Table A-2: Woman-years for fertility rates shown in Table 5

Period	Age						
	15-19	20-24	25-29	30-34	35-39	40-44	45-49
<i>Rural Northern Taiwan</i>							
1906-15	1,365	2,360	2,467	2,224	1,730	1,194	728
1916-25	1,707	3,077	2,491	2,163	1,978	1,718	1,266
1926-35	1,903	4,078	3,750	2,938	2,109	1,634	1,409
1936-45	2,047	4,876	4,383	3,785	3,218	2,369	1,592
<i>Rural Southern Taiwan (including Pescadores Islands)</i>							
1906-15	1,176	2,873	3,106	2,597	1,882	1,199	765
1916-25	1,140	2,794	2,667	2,366	2,094	1,647	1,183
1926-35	1,229	4,081	3,645	2,765	2,032	1,610	1,442
1936-45	1,340	5,001	5,045	4,112	3,029	2,093	1,447
<i>Peri-urban Taiwan (Taipei Basin)</i>							
1906-15	998	2,085	2,182	1,783	1,381	1,036	---
1916-25	1,102	2,465	2,206	2,028	1,185	1,373	---
1926-35	1,287	3,214	3,234	2,561	1,913	1,684	---
1936-45	1,465	3,847	3,860	3,510	2,906	2,180	---
<i>Urban Taiwan (Taipei City)</i>							
1906-15	425	913	967	927	745	460	219
1916-25	719	1,494	1,422	1,332	1,213	1,006	713
1926-35	785	2,224	2,269	1,727	1,268	1,097	926
1936-45	680	1,967	2,298	2,244	1,813	1,304	858

Table A-3: Age-specific fertility rates shown in Figure 1

Parity	Years since birth of index child					
	0-4	5-9	10-14	15-19	20-24	25-29
<i>Age of mother at birth of index child – less than 20</i>						
One	294	340	310	258	170	36
Two	307	352	321	274	163	16
Three	334	368	313	300	---	---
<i>Age of mother at birth of index child – 20-24</i>						
One	279	328	280	216	65	0
Two	280	341	293	210	89	0
Three	292	353	297	204	99	0
Four	317	371	290	198	45	0
Five	302	400	314	214	19	0
<i>Age of mother at birth of index child – 25-29</i>						
One	222	264	169	61	1	---
Two	228	282	204	60	0	---
Three	259	305	216	93	0	---
Four	274	323	226	74	0	---
Five	294	329	236	59	0	---
Six	312	352	227	55	0	---
Seven	329	368	229	34	0	---
<i>Age of mother at birth of index child – 30-34</i>						
One	165	143	63	1	---	---
Two	172	162	55	1	---	---
Three	187	198	67	0	---	---
Four	216	222	72	0	---	---
Five	234	238	84	0	---	---
Six	244	251	83	0	---	---
Seven	263	263	76	0	---	---
Eight	290	272	73	0	---	---
Nine	307	276	61	0	---	---
<i>Age of mother at birth of index child – 35-39</i>						
Two	112	53	0	---	---	---
Three	127	69	1	---	---	---
Four	142	74	1	---	---	---
Five	146	75	0	---	---	---
Six	167	81	0	---	---	---
Seven	179	87	0	---	---	---
Eight	189	95	0	---	---	---
Nine	204	95	0	---	---	---
Ten	208	43	0	---	---	---
Eleven	212	81	0	---	---	---

Table A-4: Woman-years for fertility rates shown in Figure 1

Parity	Years since birth of index child					
	0-4	5-9	10-14	15-19	20-24	25-29
<i>Age of mother at birth of index child – less than 20</i>						
One	16,892	11,845	8,140	5,268	3,101	1,680
Two	4,123	2,867	1,878	1,161	664	318
Three	415	283	179	110	50	11
<i>Age of mother at birth of index child – 20-24</i>						
One	17,248	11,754	7,751	4,873	3,035	1,627
Two	21,239	14,701	9,785	6,130	3,484	1,824
Three	13,395	9,170	5,955	3,549	2,030	1,106
Four	4,543	3,115	1,983	1,160	640	305
Five	981	645	382	215	105	59
<i>Age of mother at birth of index child – 25-29</i>						
One	3,131	2,097	1,399	940	580	---
Two	7,019	4,882	3,267	2,179	2,093	---
Three	11,816	8,178	5,486	3,480	1,548	---
Four	13,084	8,805	5,727	3,481	2,011	---
Five	8,668	5,817	3,629	2,155	1,164	---
Six	3,754	2,457	1,447	770	376	---
Seven	1,230	800	446	205	89	---
<i>Age of mother at birth of index child – 30-34</i>						
One	993	686	413	331	---	---
Two	1,917	1,295	923	639	---	---
Three	3,706	2,600	1,807	1,237	---	---
Four	5,739	3,935	2,759	1,854	---	---
Five	7,533	5,102	3,329	1,126	---	---
Six	7,349	4,868	3,079	1,875	---	---
Seven	5,162	3,311	2,029	1,139	---	---
Eight	2,598	1,627	897	456	---	---
Nine	1,099	613	278	94	---	---
<i>Age of mother at birth of index child – 35-39</i>						
Two	741	569	404	---	---	---
Three	1,354	1,045	751	---	---	---
Four	2,163	1,618	1,210	---	---	---
Five	2,914	2,117	1,518	---	---	---
Six	3,579	2,538	1,710	---	---	---
Seven	3,866	2,611	1,753	---	---	---
Eight	3,475	2,263	1,423	---	---	---
Nine	2,446	1,557	885	---	---	---
Ten	1,381	806	438	---	---	---
Eleven	617	345	168	---	---	---

Bibliography

Adair, Richard, *Courtship, Illegitimacy and Marriage in Early Modern England* (Manchester: Manchester University Press, 1996).

Alberts, Karin, Gevallen, niet gebroken. Overlevingsstrategieën van ongehuwde moeders en de houding van de armenzorginstellingen ten opzichte van deze groep vrouwen in de eerste helft van de negentiende eeuw in Rotterdam (MA thesis, Erasmus Universiteit, Rotterdam, 1996).

Allison, Paul D., *Event History Analysis: Regression for Longitudinal Event Data* (Newbury Park, Cal: Sage, 1984).

Alter, George, *Family and the Female Life Course. The women of Verviers, Belgium, 1849-1880* (Madison: Wisconsin University Press, 1988).

Alter, George, "Theories of Fertility Decline. A Nonspecialist's Guide to the Current Debate", in: John R. Gillis, Louise A. Tilly and David Levine (eds), *The European Experience of Declining Fertility. A Quiet Revolution 1850-1970* (Cambridge MA. and Oxford: Blackwell, 1992) 13-27.

Anderton, Douglas L., and Lee L. Bean, "Birth spacing and fertility limitation: A behavioral analysis of a nineteenth-century frontier population", *Demography* 22 (1985) 169-183.

Barclay, George W., *Colonial Development and Population in Taiwan* (Princeton: Princeton University Press, 1954).

Barclay, George W., Ansley J. Coale, Michael A. Soto, and T. James Trussell, "A reassessment of the demography of traditional rural China", *Population Index* 42 (1976), 606-633.

Barclay T., "The Aboriginal Tribes of Formosa", in: *Records of the General Conference of the Protestant Missionaries of China* (Shanghai: American Presbyterian Mission Press, 1890) 668-75.

Barclay, Paul David, The Taiwanese 'Banfu' in Imperial Japan: Bi-Cultural Interpreters, Marriage Alliances, and Sexual Slavery in the Tribal Zone. Paper presented at the Association of Asian Studies Annual Meeting. Washington, D.C., April 4-7 2002.

Barclay, Paul David, "'Gaining Confidence and Friendship' in Aborigine Country: Diplomacy, Drinking, and Debauchery on Japan's Southern Frontier", *Social Science Japan Journal*, 6 (2003) 77-96.

Barrett, Richard E., "Short-term trends in Bastardy in Taiwan", *Journal of Family History* 5 (1980) 293-312.

Barth, Fredrick, (ed.), *Ethnic groups and boundaries: The social organization of culture difference* (Boston: Little, Brown, 1969).

Bavel, Jan van, *Van natuurlijke naar gecontroleerde vruchtbaarheid? Geboortebeperving in Leuven, 1846-1910* (Leuven University Press, Leuven, 2002).

Bavel, Jan van, "Does an effect of marriage duration on pre-transition fertility signal parity-dependent control? An empirical test in 19th century Leuven, Belgium", *Population Studies*, 57 (2003) 55-62.

Bavel, Jan van, "Birth spacing as a family strategy: evidence from 19th century Leuven, Belgium", *History of the Family. An International Quarterly* 8 (2003) 585-604.

Bavel, Jan van, "Deliberate birth spacing before the fertility transition in Europe. Evidence from 19th century Belgium", *Population Studies* 58 (2004) 95-107.

Bavel, Jan van, "Detecting Stopping and Spacing Behaviour in Historical Demography", *Population-E* 59 (2004) 117-128.

Bavel, Jan van, and Jan Kok, "Birth spacing in the Netherlands. The effects of family composition, occupation and religion on birth intervals, 1820-1885", *European Journal of Population* 20 (2004) 119-140.

Bax, Bonham Ward, *The Eastern Seas* (London: John Murray, 1875).

Beekink, Erik, Onno Boonstra, Theo Engelen and Hans Knippenberg (eds), *Nederland in verandering. Maatschappelijke ontwikkelingen in kaart gebracht 1800-2000* (Amsterdam: Aksant 2003).

Bengtsson, Tommy, and Martin Dribe, Deliberate Control in a Natural Fertility Population: Southern Sweden 1766-1865. Paper presented at the conference of the Population Association of America, Boston, MA, 2004.

Blaikie, Andrew, *Illegitimacy, sex, and society: northeast Scotland, 1750-1900* (Oxford: Oxford University Press, 1993).

Blayo, Yves, "Illegitimate births in France from 1740 to 1829 and in the 1960s", in: Peter Laslett, Karla Oosterveen and Richard M. Smith (eds), *Bastardy and Its Comparative History. Studies in the history of illegitimacy and marital nonconformism in Britain, France, Germany, Sweden, North America, Jamaica and Japan* (Cambridge, Ma.: Harvard University Press, 1980) 278-283.

Bongaarts, John, and Robert G. Potter, *Fertility, Biology and Behavior. An analysis of the proximate determinants* (New York: Academic Press, 1983).

Boonstra, O.W.A.,

and A.M. van der Woude, "Demographic transition in the Netherlands. A statistical analysis of regional differences in the level and development of the birth rate and fertility, 1850-1890", *A.A.G. Bijdragen* 24 (1984) 1-57.

Botsman, Daniel, Rediscovering the Lash: Japanese Debates about Flogging in Colonial Taiwan, c.1904. Paper presented at the American Historical Association Annual Meeting, Boston 2001.

Branner, David P., *Problems in Comparative Chinese Dialectology: the classification of Miin and Hakka* (Berlin: Mouton de Gruyter, 2000).

Bras, Hilde, and Jan Kok, "'They live in indifference together'. Marriage mobility in Zeeland (The Netherlands) 1795-1922", *Supplement International Review of Social History* 2005.

Bray, Francesca, *Technology and Gender: Fabrics of Power in Late Imperial China* (Berkeley, California: University of California Press, 1997).

Brown, Melissa, "We Savages Didn't Bind Feet". The Implications of Cultural Contact and Change in Southwestern Taiwan for an Evolutionary Anthropology (Ph.D. dissertation, University of Washington, Seattle, 1995).

Brown, Melissa, *Is Taiwan Chinese? The Impact of Culture, Power, and Migration on Changing Identities* (Berkeley: University of California Press, 2004).

Bruijn, Jan de, *Geschiedenis van de abortus in Nederland: een analyse van opvattingen en discussies, 1600-1979* (Amsterdam: Van Genneep, 1979).

Caldwell, John and Pat Caldwell, "The cultural context of high fertility in sub-Saharan Africa", *Population and Development Review* 13 (1987) 409-437.

Campbell, K.L. and J. W. Wood, "Fertility in traditional societies," in *Natural Human Fertility: Social and Biological Determinants* (London: Macmillan, 1988), 39-69.

Campbell, Cameron, Wang Feng and James Z. Lee, "Pretransitional Fertility in China", *Population and Development Review* 28 (2002) 735-750.

Campbell, William, *Sketches from Formosa* (London: Marshall Brothers Limited, 1915).

Carroll, Vern (ed.), *Adoption in Eastern Oceania* (Honolulu: University of Hawaii Press, 1970).

Chakrabarty, Dipesh, *Habitations of Modernity. Essays in the Wake of Subaltern Studies* (Chicago: University of Chicago Press, 2002).

Chang, Han-yu, and Ramon Myers, "Japanese Colonial Development Policy in Taiwan, 1895-1906", *Journal of Asian Studies* 22 (1963) 433-449.

Chang, Lung-chih, "Kuo-chia chien-kou, she-hui chuan-hsing yü chih-min hsian-tai-hsing: Kuan-yu shih-chiu shih-chi Tai-wan li-shih chuan-hsing-ch'i yen-chiu te tsai sze-k'ao" [Nation-building, Social Transformation, and Colonial Modernity: Reflection on Research about the Historical Transformation of Taiwan during the Nineteenth Century]. Paper presented at the 5th Conference for Academic Exchanges between Junior Scholars in Japan and Taiwan. Yilan, Taiwan, August 19-21, 2001.

Chang, Mau-kuei, "On the Origins and Transformation of Taiwanese National Identity", *China Perspectives* 28 (2000) 51-70.

Chatterjee, Partha, *The Nation and its Fragments: Colonial and Postcolonial Histories* (Princeton: Princeton University Press, 1993).

Chen Ching-chih, "The Japanese Adaptation of the *Pao-chia* System in Taiwan", *Journal of Asian Studies* 34 (1975) 391-416.

Chen, Ching-chih, "Police and Community Control Systems in the Empire", in: Ramon H. Myers and Mark R. Peattie (eds), *The Japanese Colonial Empire, 1895-1945* (Princeton: Princeton University Press, 1984) 213-239.

Chen, Ching-chih, "Impact of Japanese Colonial Rule on Taiwanese Elites", *Journal of Asian History* 2 (1988) 25-51.

Chen, Lincoln C., Shamsa Ahmed, Melita Gesche, and W. Henry Mosely,

“A prospective study of birth interval dynamics in rural Bangladesh”, *Population Studies*, vol. 28 (1974), 277-297.

Ch'en, Edward I-te, “Japanese Colonialism in Korea and Formosa: A Comparison of the Systems of Political Control.” *Harvard Journal of Asiatic Studies*, 30 (1970) 126-158.

Ch'eng, Ta-hsüeh, *Tai-wan hsien-hsien lieh-chuan (Ti erh chi): Yü Ch'ing-fang chuen* [Biographies of Taiwan's Former Worthies (Second Series): The Biography of Yü Ch'ing-fang] (Nantou: Taiwan Provincial Documents Commission, 1978).

Chiao, C.M., Warren S. Thompson, and D. T. Chen, *An Experiment in the Registration of Vital Statistics in China* (Oxford, Ohio: Scripps Foundation for Research in Populations Problems, 1938).

Ching, Leo T.S., *Becoming “Japanese”: Colonial Taiwan and the Politics of Identity Formation* (Berkeley: University of California Press, 2001).

Chiu, Cheng-lueh, “Jih-chi shih-ch'i hu-chi tse-liao ti shih-liao t'e-sze yu li-yung – Yi Hsi-lai An shih-chien wei li” [The Historiographical Value and Usage of Household Registers from Taiwan's Colonial Era – A Case Study of the Xilai An Incident]. *Taiwan shiliao yanjiu* 20 (2003) 94-118.

Chiu, Cheng-lueh and Paul R. Katz (Kang Bao), “Wu-chuang k'ang-chung yü ti-fang she-hui – Yi Hsi-lai An shih-chien tui-yu Sha-tzu-t'ien teng shih-wu ts'un-chuang jen-k'ou chie-kou ti ying-hsiang wei li” [Armed Resistance and Local Society – A Study of Demographic Change in the Fifteen Villages Most Affected by the Hsi-lai An Incident]. In *Tai-wan chih-mi-ti-shih hsueh-shu yen-t'ao-hui lun-wen-chi* [Proceedings of the Conference on Taiwan's Colonial History] (Taipei: Hai-hsia hsueh-shu ch'u-pan-she, 2004) 170-243.

Chuang, Pei-rou, Jih-chih shih-ch'i k'uang-yeh fa-chan yu ti-fang she-hui – Yi Ruifang ti-ch'u wei li (1895-1945) [The Development of the Mining Industry and Local Society during the Colonial era – A Case Study of Ruifang, 1895-1945]. M.A. thesis, National Central University, 2000.

Ch'u, T'ung-tsu, *Law and Society in Traditional China* (Paris: Mouton & Co, 1961).

Chuang, Ying-chang, *Lin Yi Pu: the social and economic history of a Chinese township in Taiwan* (Institute of Ethnology, Academia Sinica, Monograph series. B ; no.8, 1977)

Chuang, Ying-chang, “Chinese T'ung-yang-hsi Marriage: The Ch'en Family of T'ou-fen, Taiwan”, *Proceeding of the National Science Council, R.O.C., Part C: Humanities and Social Sciences* 1 (1991) 174-185.

Chuang, Ying-chang, *Chia-tsu yü hun-yin* (Family and Marriage, Hokkien and Hakka Villages in North Taiwan) (Taipei: Institute of Ethnology, Academia Sinica, 1994).

Chuang, Ying-chang, and Arthur P. Wolf, “Marriage in Taiwan, 1881-1905, An Example of Regional Diversity”, *Journal of Asian Studies* 54(1995) 781-95.

Coale, Ansley J. "The decline of fertility in Europe from the French Revolution to World War II", in: S.J. Behrman, Leslie Corsa and Ronald Freedman, (eds), *Fertility and family planning. A world view* (Ann Harbor: University of Michigan Press, 1969) 1-24.

Coale, Ansley J., and T. James Trussell, "Model fertility schedules: variations in the age structure of childbearing in human populations", *Population Index* 40 (1974) 185-258.

Coale, Ansley J., and Susan C. Watkins (eds), *The Decline of Fertility in Europe* (Princeton: Princeton University Press, 1986).

Cohen, Myron L., "The Hakka or 'Guest People': Dialect as a sociocultural variable in Southeastern China", *Ethnohistory* 15 (1968) 237-292.

Cohen, Myron L., *House United, House Divided, the Chinese Family in Taiwan* (New York: Columbia University Press, 1976).

Coleman, David and Joop Garssen, "The Netherlands: Paradigm or Exception in Western Europe's Demography?", *Demographic Research* 7 (2002) 433-468.

Connell, K.H., "Illegitimacy before the famine", in: K.H. Connell (ed.), *Irish peasant society; Four historical essays* (Oxford: Clarendon Press, 1968) 113-161.

David, Paul A., and Thomas A. Mroz, "Evidence of Fertility Regulation Among Rural French Villagers, 1749-1789. A Sequential Econometric Model of Birth-Spacing Behavior", *European Journal of Population* 5 (1989) 1-26 and 173-206.

Davidson, James W., *The Island of Formosa, Past and Present* (Taipei: smc Publishing, 1988) (Originally Published by Macmillan & Co., London 1903.)

Delger, Henk, and Jan Kok, "Bridegrooms and biases: a critical look at the study of intergenerational mobility on the basis of marriage certificates", *Historical Methods* 31 (1998) 113-121.

Dickinson, Frederick R, *War and National Reinvention. Japan in the Great War, 1914-1919*. (Cambridge and London: Harvard University Press, 1999).

Dirks, Nicholas B., *Castes of Mind: Colonialism and the Making of Modern India* (Princeton: Princeton University Press, 2001).

Dûpaquier, Jacques, "L'autorégulation de la population française (xvie-xviii^e siècle)", in: Jacques Dûpaquier (ed.), *Histoire de la population française. II De la renaissance à 1789* (Paris: Presses Universitaires de France, 1988) 413-436.

Dupuis, Pierre, *Sex in Nederland* (Utrecht: het Spectrum, 1969).

Duus, Peter, *The Abacus and the Sword. The Japanese Penetration of Korea, 1895-1910* (Berkeley: The University of California Press, 1995).

Eberhard, Wolfram, *Studies in Hakka Folktales* (Taipei: Orient Culture Service. (Asian Folklore and Social Life Monographs, 61, 1974.)

Eberhard, Wolfram, *Guilt and Sin in Traditional China* (Taipei: Rainbow Bridge, 1967).

Eisei chosa sho (kihon chosa no ichi), *Taiwan ni okeru saikin jukonenkan no genju jinko oyobi shussho, shibo*. 1924. Taiwan sotokufu keimukyoku eiseika.

Eitel, E.J., "Ethnographical sketches of the Hakka", *The China Review* 20 (1891-92) 263-67.

Engelen, Th.L.M., and H. Hillebrand, "Fertility and Nuptiality in the Netherlands, 1850-1960", *Population Studies* 40 (1986) 487-503.

Engelen, Theo, and Hans Hillebrand, "Fertility and Class. The reproductive behaviour of Dutch labourers married between 1919 and 1933", in: L. Heerma van Voss and F. van Holthoon (eds), *Working Class and Popular Culture. Papers delivered at the Anglo-Dutch Conference on Labour History* (Amsterdam: Stichting Beheer IISG, 1988) 161-172.

Engelen, Theo, and Arthur P. Wolf, *Marriage and the Family in Eurasia: Perspectives on the Hajnal Hypothesis* (Amsterdam: Aksant, 2005).

Engelen, Theo, "Leven en dood onder controle. De bevolking in de negentiende en twintigste eeuw", in: *Nijmegen. Geschiedenis van de oudste stad van Nederland*, 3 Negentiende en twintigste eeuw (Nijmegen, 2005) 32-51.

Ellison, Peter T, *On Fertile Ground: A Natural History of Reproduction* (Cambridge, Mass.: Harvard University Press, 2001).

Eskildsen, Robert, "Of Civilization and Savages: The Mimetic Imperialism of Japan's 1874 Expedition to Taiwan", *The American Historical Review* 102 (2002) 388-418.

Fan, Yen-ch'iu, Jih-chu ch'ien-ch'i Tai-wan chih kung-kung wei-sheng: Yi fang-yi wei cheng-hsin chih yen-chiu (1895-1920) [Public Health in Taiwan during the Early Japanese Occupation Era: A Study Centering on Plague Prevention (1895-1920)]. M.A. thesis, National Taiwan Normal University, 1994).

Ferguson, R. Brian, and Neil L. Whitehead, *War in the Tribal Zone: Expanding States and Indigenous Warfare* (Santa Fe, Mexico: School of American Research Press, 1992).

Fine, Agnes, "Enfant et normes familiales", in: Jacques Dupâquier (ed.), *Histoire de la population Française. III De 1789 à 1914* (Paris : Presses Universitaires de France 1988) 436-463.

Flinn, Michael W, *The European Demographic System, 1500-1820* (Baltimore: Johns Hopkins University Press, 1981).

Freedman, Maurice, "Colonial Law and Chinese Society", *Journal of the Royal Anthropological Society* 80 (1950) 97-126.

Freedman, Ronald and John Y. Takeshita, *Family Planning in Taiwan: An Experiment in Social Change* (New Jersey: Princeton University Press, 1969).

Fricke, Thomas, Jui-Shan Chang and Li-Shou Yang, "Historical and Ethnographic Perspectives on the Chinese Family", in: Arland Thornton and Hui-Shen Lin (eds), *Social Change and the Family in Taiwan* (Chicago: The University of Chicago Press, 1994) 22-48.

Friedlander, Dov, Barbara Okun and Sharon Segal, "The Demographic Transition Then and Now: Processes, Perspectives and Analyses", *Journal of Family History* 24 (1999) 493-533.

Furth, Charlotte, "Concepts of Pregnancy, Childbirth, and Infancy in Ch'ing Dynasty China", *Journal of Asian Studies* 46 (1987) 7-35.

Furth, Charlotte, *A Flourishing Yin: Gender in China's Medical History, 960-1665* (Berkeley, California: University of California Press, 1999).

Gandy, G.N., *Illegitimacy in a Handloom Weaving Community: Fertility Patterns in Culcheth, Lancashire* (Ph. D. dissertation, University of Oxford, Oxford, 1978).

Gardella, Robert. 1999. "From Treaty Ports to Provincial Status, 1860-1894", in: Murray Rubinstein (ed.), *Taiwan: A New History* (Armonk: M.E. Sharpe, 1999) 163-200.

Gates, Hill, *China's Motor: A Thousand Years of Petty Capitalism* (Ithaca NY: Cornell University Press, 1996).

Gates, Hill, "Cultural Support for Birth Limitation among Urban Capital-owning Women," in Deborah Davis and Stevan Harrell (eds), *Chinese Families in the Post-Mao Era* (Berkeley: University of California Press, 1993) 251-276.

Gates, Hill, "Owner, Worker, Mother, Wife: Taipei and Chengdu Family Businesswomen", in: Elizabeth J. Perry (ed.), *Putting Class in Its Place. Worker Identities in East Asia* (Berkeley: UC Berkeley, Institute of East Asian Studies, 1996) 127-165.

Gates, Hill, "Chinese Modernity in Taiwan: the View from the Bound Foot", in: Hsu Ch'eng-kuang and Lin Mei-rong (eds), *Jen-lei hsueh tsai T'ai-wan ti fa-chan* [Anthropological Studies in T'ai-wan] (T'ai-p'ei: Institute of Ethnology, Academia Sinica, 1999) 291-318.

Gates, Hill and Hsieh Yinghui, *Willful Women: T'ai-p'ei Single Mothers and their Children*. Manuscript.

Gates, Hill, "Girls' work in China and North-Western Europe: of guniang and meisjes", in: Theo Engelen and Arthur P. Wolf (eds), *Marriage and the family in Eurasia. Perspectives on the Hajnal hypothesis* (Amsterdam: Aksant, 2005) 319-341.

Giele, Jacques J., and Gert J. van Oenen, "De sociale structuur van de Nederlandse samenleving rond 1850", *Mededelingenblad van de Nederlandse Vereniging voor Sociale Geschiedenis* no. 45 (1974) 2-32.

Giele, Jacques J., and Gert J. van Oenen, "Theorie en praktijk van onderzoek naar de sociale structuur", *Tijdschrift voor Sociale Geschiedenis* 2 (1976) 167-185.

Goldman, Noreen, Charles F. Westoff, and Lois E. Paul, "Variations in natural fertility: The effect of lactation and other determinants", *Population Studies* 41 (1987) 127-146.

Goody, Esther N., *Parenthood and Social Reproduction* (Cambridge: Cambridge University Press, 1982).

Goody, Jack, *Production and Reproduction* (Cambridge: Cambridge University Press, 1976).

Chris Gordon, *The bevolkingsregisters and their use in analyzing the co-residential behaviour of the elderly* (Den Haag: NIDI, 1989).

Hajnal, John, "European marriage patterns in perspective", in: D. V. Glass and D. E. C. Eversley (eds), *Population in History* (London: Edward Arnold, 1965), 101-143.

Harrell, Stevan, "Microdemography and the modeling of population process in Late Imperial China," in *Chinese Historical Microdemography* (Berkeley, Calif.: University of California Press, 1995), 1-20.

Harris, Marvin and Eric A. Ross, *Death, Sex, and Fertility: Population Regulation in Preindustrial and Developing Societies* (New York: Columbia University Press, 1987).

Hashimoto, Mantaro J., *The Hakka Dialect: a linguistic study of its phonology, syntax and lexicon* (Cambridge: Cambridge University Press, 1973).

Heeren, Hendrik and Hein Moors, *Gezinnen in groei: een onderzoek naar de gezinsplanning van vrouwen van het huwelijkskohort – 1961 te Utrecht* (Utrecht: s.n., 1968).

Hendrickx, François, 'In order not to fall into poverty'. *Production and reproduction in the transition from proto-industry to factory industry in Borne and Wierden (the Netherlands), 1800-1900* (Amsterdam: IISG, 1997).

Henry, Louis, "Some data on natural fertility," *Eugenics Quarterly* 8 (1961), 81-91.

Hershatter, Gail, "Prostitution and the Market in Women in Early Twentieth-Century Shanghai", in: Rubie R. Watson and Patricia Buckley Ebrey (eds), *Marriage and Inequality in Chinese Society* (Berkeley and Oxford: University of California Press, 1991) 256-285.

Hillebrand, Hans, *Van motivatie tot acceptatie. Een onderzoek naar de daling van de vruchtbaarheid in de provincies Utrecht en Groningen, 1879-1960* ('s-Gravenhage: LEI Drukkerij, 1991).

Ho, Ping-to, *Studies on the Population of China, 1368-1953* (Cambridge, Mass.: Harvard University Press, 1959).

Hofstee, Evert W., *Korte demografische geschiedenis van Nederland van 1800 tot heden* (Haarlem: Fibula-Van Dishoeck, 1981).

Hsieh, T'ing-yu, "Origin and Migrations of the Hakkas", *The Chinese social and political science review* 13 (1929) 202-26.

Hsien, Chin Hu, *The Common Descent Group in China and its Functions* (New York: Viking Fund, 1948).

Hsiung, P'ing-Chen, "To nurse the young: Breastfeeding and infant

feeding in Late Imperial China”, *Journal of Family History* 20 (1995) 217-238.

Huang Chao-t'ang, *T'ai-wan ts'ung-tu-fu* [*The Governor-General's Office in T'ai-wan*]. Huang Ying-che trans. (T'ai-p'ei: Avant Garde Publishing Company, 1994). Originally published in Japanese in 1981.

Huffman, Sandra L., A. K. M. Chowdhury, J. Charkraborty, and W. Henry Mosley, “Nutrition and post-partum amenorrhea in rural Bangladesh”, *Population Studies* 32 (1978) 251-260.

Huffman, Sandra L., Kathleen Ford, Hubert H. Allen, Jr., and Peter Streble, “Nutrition and fertility in Bangladesh: Breastfeeding and post partum amenorrhea”, *Population Studies* 41 (1987) 447-462.

Hung, Ch'iu-fen, “Jih-chu shih-ch'i T'ai-wan ti pao-chia chih-tu (1895-1903)” [The *hokō* System in Japanese Occupation Taiwan (1895-1903)], *Bulletin of the Institute of Modern History, Academia Sinica* 21 (1992) 439-471.

Hung, Ch'iu-fen, *Jih-chih ch'u-ch'i Taiwan she-hui hsin ling-tao chieh-ts'eng ti ch'an-sheng – Fei k'e-chu, hsing pao-chia* [The Formation of Taiwan's New Leading Classes during the Early Years of the Colonial Era – Abolishing the Exam System, Promoting the Hokō System]. Lecture presented at the Institute of Modern History, Academia Sinica. August 29, 2002.

Hung, Ju-mao (ed.), *Jih-chih shih-ch'i hu-chi teng-chi fa-lü chih yung-yu pien-yi* [Edited Translations of Regulations and Terms About Colonial-era Household Registers] (T'ai-chung: T'ai-chung County Government, 2001).

Hung, Li-wan, “Tang-an li-yung yü P'ing-p'u-tsu yen-chiu: Yi Jih-chih shih-ch'i chih hu-chi chiu-pu wei chung-hsin” [Archives and Research on Plains Aborigines: A Case Study of Household Registers from the Colonial Era], *T'ai-wan wen-hsien* 50 (1999) 17-59.

Hwang, Kyung Moon, “Citizenship, Social Equality, and Government Reform: Changes in the Household Registration System in Korea, 1894-1910”, *Modern Asian Studies* 38 (2003) 355-387.

Isett, Christopher, *State, Peasant, and Merchant on the Manchurian Frontier* (Stanford, Calif.: Stanford University Press, forthcoming).

Jaffe, Richard, “The Buddhist Cleric as Japanese Subject: Buddhism and the Household Registration System”, in: Helen Hardacre and Adam L. Kern (eds), *New Directions in the Study of Meiji Japan* (Leiden: Brill, 1997) 507-530.

James, William H., “The causes of decline in fecundability with age”, *Social Biology*, vol. 26 (1979).

Jankowiak, William, “Romantic Passion in the People's Republic of China,” in William Jankowiak (ed), *Romantic Passion: A Universal Experience?* (New York: Columbia University Press, 1995).

Janssens, Angélique, *Family and social change. The household as a process in an industrializing community* (Cambridge: Cambridge University Press, 1993).

Jaschok, Maria, *Concubines and Bondservants: The Social History of a Chinese Custom* (London: Zed Books, 1988).

Jones, Huw R., *Population Geography* (London: Paul Chapman, 1990) 144-149.

Jukuban kokyō oyobi engaku chōsa to [Files of the Investigations on the Plains Aborigine Population and its History] (Taipei: Minseihō kesatsu honshō, 1910).

Ka, Chih-ming, *Japanese Colonialism in Taiwan. Land Tenure, Development and Dependency, 1895-1945* (Boulder: Westview Press, 1995).

Katz, Paul R., "Commerce, Marriage and Ritual: Elite Strategies in Tung-kang During the Twentieth Century", In Chuang Ying-chang and Pan Ying-hai (eds), *T'ai-wan yü Fu-chien she-hui wen-hua yen-chiu lun-wen-chi* [Collection of Essays on Society and Culture in Taiwan and Fukien] (Nankang: Institute of Ethnology, Academia Sinica, 1994) 127-165.

Katz, Paul R., "Germs of Disaster: The Impact of Epidemics on Japanese Military Campaigns in Taiwan", *Annales de Démographie Historique* (1996) 195-220.

Katz, Paul R., "Social Structure and Marriage Patterns in East Haven: A Preliminary Analysis", in: Yu Chien-ming (ed.), *Voices of the Voiceless (II): Women and Society in Modern China, 1600-1950* (Nankang: Institute of Modern History, Academia Sinica, 2003) 203-233.

Katz, Paul R., *When Valleys Turned Blood Red: The Ta-pa-ni Incident in Colonial Taiwan*. (Honolulu: University of Hawaii Press, 2005).

Kerklaan, Marga (ed.), 'Zodoende was de vrouw maar een mens om kinderen te krijgen': 300 brieven over het roomse huwelijksleven (Baarn: Ambo, 1987).

Ketting, Evert, *Van misdrijf tot hulpverlening: een analyse van de maatschappelijke betekenis van abortus provocatus in Nederland* (Alphen aan den Rijn: Samson, 1978).

Keyes, Charles F., "The Dialectics of Ethnic Change", in: Charles Keyes (ed.), *Ethnic Change* (Seattle: University of Washington Press, 1981).

Knippenberg, Hans, *De Religieuze Kaart van Nederland. Omvang en geografische spreiding van de godsdienstige gezindten vanaf de Reformatie tot heden* (Assen/Maastricht: Van Gorcum, 1992).

Knippenberg, Hans, "Het hart van Nederland. De provincie Utrecht in de periode 1800-1940", in: Kees Mandemakers and Onno Boonstra (eds.), *De levensloop van de Utrechtse bevolking* (Assen: Van Gorcum, 1995) 7-36.

Knippenberg, Hans, "Een veelkleurig palet. De godsdienstkarte in de negentiende en twintigste eeuw", [A multicoloured palette. The religious map in the 19th and 20th century], in: E. Beekink, O. Boonstra, Th. Engelen and H. Knippenberg (eds), *Nederland in verandering. Maatschappelijke ontwikkelingen in kaart gebracht, 1800-2000* (Amsterdam: Aksant, 2003) 95-122.

Knodel, John, *Demographic Behavior in the Past: A Study of Fourteen German Village Populations in the Eighteenth and Nineteenth Centuries* (Cambridge: Cambridge University Press, 1988).

Knodel, John, and Steven Hochstadt, "Urban and rural illegitimacy in Imperial Germany", in: Peter Laslett, Karla Oosterveen and Richard M. Smith (eds), *Bastardy and its Comparative History. Studies in the history of illegitimacy and marital nonconformism in Britain, France, Germany, Sweden, North America, Jamaica and Japan* (Cambridge, Ma.: Harvard University Press, 1980) 284-312.

Knotter, A., and A.C. Meijer (eds), "De gemeentelijke bevolkingsregisters 1850-1920", in: *Broncommentaren 2* (Den Haag: Instituut voor Nederlandse Geschiedenis, 1995) 75-116.

Kok, Jan, "Voorechtelijke verwekkingen in Noord-Holland in de negentiende eeuw", *Bevolking en gezin* (1989) 49-81.

Kok, Jan, "The moral nation. Illegitimacy and bridal pregnancy in the Netherlands from 1600 to the present", *Economic and social history in the Netherlands 2* (1990) 7-35.

Kok, Jan, *Langs verboden wegen. De achtergronden van buitenechtelijke geboorten in Noord-Holland 1812-1914* (Hilversum: Verloren, 1991).

Kok, Jan, Frans van Poppel and Ellen Kruse, "Mortality among Illegitimate Children in Mid-Nineteenth Century The Hague", in: Carlo A. Corsini and Pier P. Viazzo (eds), *The Decline of Infant and Child Mortality. The European Experience: 1750-1990* (Dordrecht: Martinus Nijhoff, 1997) 193-211.

Kok, Jan, "Choices and Constraints in the Migration of Families. Central Netherlands 1850-1940", *History of the Family. An International Quarterly* 9 (2004) 137-158.

Kok, Jan, "Passion, reason and human weakness. The European marriage pattern and the control of adolescent sexuality", in: Theo Engelen en Arthur P. Wolf (eds), *Marriage and the Family in Eurasia. Perspectives on the Hajnal hypothesis* (Amsterdam: Aksant, 2005) 343-367.

Kok, Jan, and Kees Mandemakers, "Vrije keuze uit een beperkt aanbod. De huwelijksmarkt in Utrecht en Zeeland, 1840-1940", in: Jan Kok and Marco H.D. van Leeuwen (eds), *Gelegenheid en genegenheid. Twee eeuwen partnerkeuze en huwelijk* (Amsterdam: Aksant, 2005) 213-230.

Komagome, Takeshi, *Shokuminchi Teikoku Nihon no Bunka Tjygy* [Cultural Integration in Imperial Japan's Colonies] (Tokyo: Iwanami Shoten, 1996).

Kooy, G.A., and M. Keuls, *Enforced marriage in the Netherlands. A statistical analysis in order to test some sociological hypotheses* (Wageningen: Afdelingen voor sociale wetenschappen aan de Landbouwhogeschool, 1967).

Kreager, Philip, "Population and Identity", in: David. I. Kertzer and Tom Fricke (eds), *Anthropological Demography. Towards a New Synthesis* (Chicago: University of Chicago Press, 1997) 139-174.

Kurihara, Jun, Taiwan Sÿtokufu kÿbun ruisan ni mieru tÿchi shoki no kokÿ seido ni tsuite [The Household Register System during the Early Period [of Japanese Colonial Rule over Taiwan] as seen in the *Official Documents of the Governor-General's Office*]. Paper presented at the International Conference on Taiwan's Social and Economic History held in Honor of Wang Shih-ch'ing's 75th Birthday. Nankang, Taiwan. May 8-9, 2003.

Lamley, Harry J., "Subethnic Rivalry in the Ch'ing period", in: Emily M. Ahern and Hill Gates (eds), *The Anthropology of Taiwanese Society* (Stanford Ca.: Stanford University Press, 1981) 282-318.

Lamley, Harry J., "Taiwan under Japanese Rule, 1895-1945: The Vicissitudes of Colonialism", in: Murray Rubinstein (ed.), *Taiwan: A New History* (Armonk: M.E. Sharpe, 1999) 201-260.

Larsen, Ulla and Jane Menken, "Measuring sterility from incomplete birth histories", *Demography*, 26 (1989) 185-201.

Laslett, Peter, "Introduction: Comparing Illegitimacy over Time and between Cultures", in: Peter Laslett, Karla Oosterveen and Richard M. Smith (eds), *Bastardy and Its Comparative History. Studies in the history of illegitimacy and marital nonconformism in Britain, France, Germany, Sweden, North America, Jamaica and Japan* (Cambridge, Ma.: Harvard University Press, 1980) 1-70.

Laslett, Peter, "The bastardy prone sub-society", in: Peter Laslett, Karla Oosterveen and Richard M. Smith (eds), *Bastardy and Its Comparative History. Studies in the history of illegitimacy and marital nonconformism in Britain, France, Germany, Sweden, North America, Jamaica and Japan* (Cambridge, Ma.: Harvard University Press, 1980) 217-248.

Lavelly, William, and Roy Bin Wong, "Revising the Malthusian Narrative: The Comparative Study of Population Dynamics in Late Imperial China", *Journal of Asian Studies* 57 (1998) 714-748.

Leavell, James B., "The Policing of Society", in: Hilary Conroy, Sandra T.W. Davis, and Wayne Patterson (eds), *Japan in Transition: Thought and Action in the Meiji Era, 1868-1912* (London and Toronto: Associated University Presses, 1984) 22-49.

Lechler, Rev. Rudolf, "The Hakka Chinese", *The Chinese Recorder and Missionary Journal* 9 (1878) 352-59.

Lee, James Z., and Cameron D. Campbell, *Fate and Fortune in Rural China: Social Organization and Population Behavior in Liaoning, 1774-1873* (Cambridge: Cambridge University Press, 1997).

Lee, James Z., and Wang Feng, "Malthusian Models and Chinese Realities: The Chinese Demographic System 1700-2000", *Population and Development Review* 24 (1998) 33-65.

Lee, James Z., and Wang Feng, *One Quarter of Humanity. Malthusian*

Mythology and Chinese Realities, 1700-2000 (Cambridge Mass. and London: Harvard University Press, 1999).

Lee, James Z., Cameron Campbell and Wang Feng, "Positive Checks or Chinese Checks", *Journal of Asian Studies* 61 (2002) 591-607.

Leeuwen, Marco H.D. van, "Kerk, staat en burger. Armenzorg en moderne charitas, 1795-2001", in : Thimo de Nijs and Eelco Beukers (eds), *Geschiedenis van Holland IIIb 1795 tot 2000* (Hilversum: Verloren, 2003) 435-485.

Leffingwell, Albert, *Illegitimacy and the Influence of Seasons upon Conduct. Two Studies in Demography* (London: Swan Sonnenschein & Co, 1892).

Lentz, Brigitte, Vrouwen uit Roermond en omgeving over werk, seksualiteit en geboortenbeperking na 1945. (Master thesis, Radboud University Nijmegen, 1986).

Leridon, Henri, *Human Fertility* (Chicago: The University of Chicago Press, 1977).

Levesque, Leonard, *Hakka Beliefs and Customs* (Taichung: Kuang chi press, 1969).

Levy, Howard S., *Chinese Footbinding* (New York: Walton Rawls, 1966).

Liang, Sow-theng, *Migration and Ethnicity in Chinese History; Hakkas, Pengmin, and Their Neighbors* (Stanford: Stanford University Press, 1997).

Lin, Ch'ing-shui, "Yueh tung Chiao-ling hsien Hsin-p'u chen Shang-nan ts'un min-su tiao-ch'a" [Investigation of customs in Shang-nan village, Hsin-p'u township, Chiao-ling county], in: Fang Hsueh-chia (ed.), *Mei-chou ti-ch'u ti miao-hui yü tsung-tsu* [Temple festivals and lineages in Mei-chou] (Mei-chou: Kuo-chi k'e-chia hsueh hui, 1996) 58-99.

Liu, Pin-hsiung, "T'ai-wan nan-pu ti-ch'u P'ing-p'u-tsu ti A-li Tsu Hsin-yang" [The A-li Tribe's Worship of Southern Taiwan Plains Aborigines], *T'ai-wan feng-wu* 37 (1987) 1-62.

Liu, Ts'ui-jung, "Chinese genealogies as a source for the study of historical demography," in *Studies and Essays in Commemoration of the Golden Jubilee of Academia Sinica* (Taipei, Taiwan: Academia Sinica, 1978), 849-870.

Liu, Ts'ui-jung, "Ming-Ch'ing jen-k'ou chih tseng-chih yü ch'ien-yi (Growth and migration of the population in the Ming-Qing period)," in *Chung-kuo She-hui Ching-chi Shih Yen-t'ao Hui Lun-wen-chi* (Papers from the seminar on Chinese social and economic history), ed. Hsu Cho-yun, Mao Han-kuang, and Liu Ts'ui-jung (T'ai-p'ei, T'ai-wan: Center for Chinese Studies, 1983), 283-616.

Liu, Ts'ui-jung, "The demography of two Chinese clans in Hsiao-shan, Chekiang, 1650-1850," in *Family and Population in East Asian History*, ed. Susan B. Hanley and Arthur P. Wolf (Stanford, Calif.: Stanford University Press, 1985), 13-61;

Liu, Ts'ui-jung, "A comparison of lineage populations in South China," in *Chinese Historical Microdemography*, ed. Stevan Harrell (Berkeley, Calif.: University of California Press, 1995) 94-120.

Lin, Sheng-ch'in, "Jih-chih shih-ch'i hu-chi tse-liao ti nei-jung chih ch'i shih-liao chia-chih: Yi Yu-li, Ch'i-shang wei li" [The Contents and Value of Household Registers from the Colonial Era: A Case Study of Yu-li and Ch'i-shang], *Shih-ta ti-li yen-chiu pao-kao* 23 (1995) 27-54.

Lindstrom, David P., and Betemariam Berhanu, "The Effects of Breast-feeding and Birth Spacing on Infant and Early Childhood Mortality in Ethiopia", *Social Biology* 47 (2000) 1-17.

Livi-Bacci, Massimo, "Social-group forerunners of fertility control in Europe", in: Ansley J. Coale and Susan C. Watkins (eds), *The Decline of Fertility in Europe* (Princeton: Princeton University Press, 1986) 182-200.

Livi Bacci, Massimo, *The Population of Europe* (Oxford: Blackwell, 1999).

Lü, Shao-li, *Shuei-luo hsiang-ch'i: Jih-chu shih-ch'i T'ai-wan she-hui ti sheng-huo tso-hsi* [Whistle from the Sugarcane Factory: The Transition of Time Cognition and Rhythms of Social Life in Taiwan under Japanese Rule, 1895-1945]. (T'ai-p'ei: Yuan-liu Publishing Company, 1998).

Lutz, Jessie G., and Rolland R. Lutz. 1998, *Hakka Chinese Confront Protestant Christianity, 1850-1900* (Armonk, N.Y.: M.E.Sharpe, 1998).

Lutz, Wolfgang, *Distributional Aspects of Human Fertility: A Global Comparative Study* (London: Academic Press, 1989).

Maarsseveen, Jacques van, "Volkstellingen 1795-1971", in: J.G.S.J. van Maarsseveen (ed.), *Algemene tellingen in de twintigste eeuw* (Voorburg/Heerlen: Centraal Bureau voor de Statistiek, 2002) 15-85.

Mackay, George Leslie, *From Far Formosa* (New York: Fleming H. Revell, 1895).

Malthus, Thomas Robert, *Population: The First Essay* (Ann Arbor, Michigan: University of Michigan Press, 1959).

Mandemakers, Kees, "Historical Sample of the Netherlands", in Pat Kelly Hall, Robert McCaa, Gunnar Thorvaldsen (eds), *Handbook of International Historical Microdata for Population Research* (Minneapolis: Minnesota Population Center, 2000) 149-177.

Menard, Scott, *Applied Logistic Regression Analysis* (Thousand Oaks CA, London and New Delhi: Sage Publications, 1995).

Meskill, Johanna Menzel, *A Chinese Pioneer Family. The Lins of Wu-feng, Taiwan 1729-1895* (Princeton: Princeton University Press, 1979).

Meurkens, Peter, *Sociale veranderingen in het oude Kempenland, demografie, economie en cultuur van een pre-industriële samenleving (1840-1910)* (Bergeijk: Stichting Eicha, 1985).

Miedema, N., "The Orthodox Protestants in the Netherlands and

Enforced Marriage”, *The Annual Review of the Social Sciences and Religion* 3 (1979) 213-236.

Miller, Jane E., James Trussell, Anne R. Pebley and Barbara Vaughan, “Birth spacing and child mortality in Bangladesh and the Philippines”, *Demography* 29 (1992) 305-318.

Mitterauer, Michael, *Ledige Mütter. Zur Geschichte unehelicher Geburten in Europa* (München: Beck, 1983).

Mitterauer, Michael, and Reinhard Sieder, *The European Family. Patriarchy to Partnership from the Middle Ages to the Present* (Oxford: Basil Blackwell, 1982).

McQuillan, Kevin, *Culture, Religion and Demographic Behaviour. Catholics and Lutherans in Alsace, 1750-1870* (Montreal: McGill-Queens’s University Press, 1999).

McQuillan, Kevin, “When does religion influence fertility”, *Population and Development Review* 30 (2004) 25-56.

Montgomery, Mark R., and Barney Cohen (eds), *From Birth to Death: Mortality Decline and Reproductive Change* (Washington, D.C.: National Academy Press, 1998).

Mukōyama, Hirō, *Riben tongzhi xia de Taiwan minzu yundong* [Nationalist Movements in Taiwan under Japanese Rule], Yang Hung-ju, ed. and trans. (Taipei: Fulushou xingye gufen youxian gongsi, 1999. Originally published in Japanese in 1987, based on Ph.D. thesis completed in 1961.

Noordam, Dirk Jaap, *Leven in Maasland. Een hoogontwikkelde plattelandsamenleving in de achttiende en het begin van de negentiende eeuw* (Hilversum: Verloren, 1986).

Notestein, Frank W., “Population. The Long View”, in: Theodore W. Schultz (ed.), *Food for the World* (Chicago: University of Chicago Press, 1945) 36-57.

Oehler, Wilhelm, “Christian Work Among the Hakka”, in: Milton T. Stauffer (ed.), *The Christian Occupation of China* (Shanghai: China Continuation Committee, 1922) 351-353.

Oguma, Eiji, “Nihonjin” no Kyōkai: Okinawa, Ainu, Taiwan, Chōsen, *Shokuminchi kara Fukki Undō made* [The Boundaries of the “Japanese”: From Colonial Rule to the Restoration of Okinawa, the Ainu, Taiwan, and Korea] (Tokyo: Shin’yōsha, 1998).

Okamatsu, Santaro, *Provisional Report on Investigations of Laws and Customs in the Island of Formosa* (Kobe: Kobe Herald, 1902).

O’Neill, Brian Juan, *Social inequality in a Portuguese hamlet. Land, late marriage, and bastardy, 1870-1978* (Cambridge: Cambridge University Press, 1987).

Ortner, Sherry B., “Identities: The Hidden Life of Class”, *Journal of Anthropological Research* 54 (1998) 1-17.

Overdiep, G., *Rechtsbescherming van de feitelijke verhouding tussen het onwettige kind en zijn ouders, gezien in het licht dier verhouding in Drente* (Groningen/Djakarta: J.B. Wolters, 1955).

Palloni, Alberto, and Sara Millman, "Effects of inter-birth intervals and breastfeeding on infant and early childhood mortality", *Population Studies* 40 (1986) 215-236.

Pan, Ying-hai, "A Study on the Pragmatics of Human Understanding" (Ph.D. dissertation, University of Oregon, 1989).

Pan, Ying-hai, "T'ou-she ts'un ti chu-luo fa-chan yü tsu-ch'un kuan-hsi" [The Ethnic Relations and Settlement Development of Toushe Village]. Paper presented at Tsu-ch'un kuan-hsi yu chu-yu fa-chan [Symposium on Ethnic Relations and Regional Development]. Institute of Ethnology, Academia Sinica, T'ai-wan, September 1-2 1989.

Pan, Ying-hai, "Wen-hua he-chang yü he-cheng wen-hua – T'ou-she tsun T'ai Tsu nien-tu chi-yi wen-hua yi-han" [Cultural Recombination and Recombinatory Culture: The Implications of the T'ai Tsu Annual Festival of T'ou-she Village], in: Chuang Ying-chang and Pan Ying-hai (eds), *T'ai-wan yu Fukien she-hui wen-hua yen-chiu lun-wen-chi* [Collected Essays on Research on Taiwan and Fukien Society and Culture] (T'ai-p'ei: Institute of Ethnology, Academia Sinica, T'ai-wan, 1994) 235-56.

Pan, Ying-hai, and John Shepherd, Marriage and Ethnicity: Hakka, Hokkien and P'ing-p'u. Paper presented at the conference "Marriage Patterns in Taiwan and the Netherlands". Elzendaal Conference Centre, Boxmeer, the Netherlands, August 18-25, 2001.

Pasternak, Boris, *Guests in the Dragon. Social Demography of a Chinese District 1895-1946* (New York: Columbia University Press, 1983).

Perrenoud, Alfred, "Malthusianisme et protestantisme: Un modèle démographique Weberien", *Annales ESC* 29 (1974) 975-988.

Pickering, W.A., *Pioneering in Formosa* (London: Hurst and Blackett, Limited, 1898).

Pomeranz, Kenneth, *The Great Divergence. China, Europe and the Making of the Modern World Economy* (Princeton NJ: Princeton University Press, 2000).

Van Poppel, F.W.A., Differential fertility in the Netherlands: an overview of long term trends with special reference to the post-World War I marriage cohort. Working papers 39 (Voorburg, NIDI 1983).

Poppel, F.W.A. van, *Stad en platteland in demografisch perspectief: de Nederlandse situatie in de periode 1850-1960* (Voorburg: NIDI, 1984)

Poppel, Frans W.A. van, "Late Fertility Decline in The Netherlands: The Influence of Religious Denomination, Socio-economic Group and Region", *European Journal of Population* 1 (1985) 347-373.

Poppel, Frans van, "Family Breakdown in Nineteenth-Century Nether-

lands: Divorcing Couples in the Hague”, *History of the Family. An International Quarterly* 2 (1997) 49-72.

Poppel, Frans van, Aart C. Liefbroer, Jeroen K. Vermunt and Wilma Smeenk, “Love, necessity and opportunity: Changing patterns of marital age homogamy in the Netherlands, 1850-1993”, *Population Studies* 55 (2001) 1-13.

Poppel, Frans van, Kees Mandemakers, “Sociaal-economische verschillen in zuigelingen- en kindersterfte in Nederland, 1812-1912”, *Bevolking en gezin* 31 (2002) 5-40.

Poppel, Frans van, Jona Schellekens and Aart C. Liefbroer, “Religious Differentials in Infant and Child Mortality in Holland, 1855-1912”, *Population Studies* 56 (2002) 277-289.

Poppel, Frans van, Christiaan. Monden and Kees Mandemakers, Intergenerational transmission of age at marriage, Netherlands 1812-1920, Paper presented at the Seminar Inherited Dimensions of Human Populations in the Past: Exploring intergenerational dimensions of human behavior, Mahón, Menorca (Spain), 19-21 May 2005

Pott-Buter, Hettie A., *Facts and Fairy Tales about Female Labor, Family and Fertility. A Seven-Country Comparison 1850-1990* (Amsterdam: Amsterdam University Press, 1993).

Potter, Sulamith Heins, and Jack M. Potter, *China's Peasants: The Anthropology of a Revolution* (Cambridge: Cambridge University Press, 1990).

Preston, Samuel H., “Introduction”, in: Samuel H. Preston (ed.), *The Effects of Infant and Child Mortality on Fertility* (New York: Academic Press, 1978) 1-18.

Pullum, Thomas W., L. Tedrow and J. R. Herting, “Measuring Change and Continuity in Parity Distributions”, *Demography* 26 (1989) 485-498.

Quesnay, François, *Le despotisme de la Chine* (Paris, 1767), trans. by Lewis Maverick in *China: A Model for Europe* (San Antonio, Texas: Paul Anderson, 1946).

Ramsey, Robert S., *The Languages of China* (Princeton NJ: Princeton University Press, 1987).

Randeraad, Nico, “Negentiende-eeuwse bevolkingsregisters als statistische bron en middel tot sociale beheersing”, *Tijdschrift voor Sociale Geschiedenis* 21 (1995) 319-342.

Republic of China, Ministry of Interior, *Taiwan Demographic Quarterly*, various years.

Ruggles, Steven, “Migration, Marriage, and Mortality: Correcting Sources of Bias in English

Family Reconstitutions.” *Population Studies* 46 (1992) 507-522.

Rutten, Willibrord, ‘*De vreselijkste aller harpijen*’. *Pokkenepidemieën en pokkenbestrijding in Nederland in de achttiende en negentiende eeuw: een sociaal-historische en historisch-demografische studie* (Wageningen: Landbouwwuniversiteit, 1997).

Said, Edward W., "Intellectuals in the Post-Colonial World." In Diana Brydon (ed.), *Postcolonialism: Critical Concepts in Literary and Cultural Studies* (London and New York: Routledge, 2000) 29-46.

Saltet, R.H., *Sterfte, in verband met voedingswijze en sociale omstandigheden, onder de kinderen beneden het jaar in 1908 geboren te 's-Gravenhage en Scheveningen. Deel 1 Afl. 1 (vervolg)* ('s-Gravenhage: Gezondheidscommissie, 1912).

Sando, Ruth Ann, *The Meaning of Development for Rural Areas: Depopulation in a Taiwanese Farming Community* (Ph.D. dissertation, University of Hawaii, 1981).

San Juan, E. Epifanio, "Postcolonial Theory versus the Revolutionary Process in the Philippines", in: Diana Brydon (ed.), *Postcolonialism: Critical Concepts in Literary and Cultural Studies* (London and New York: Routledge, 2000) 358-386.

Sangren, P. Steven, *History and Magical Power in a Chinese Community* (Stanford Ca.: Stanford University Press 1987).

Schak, David C., *A Chinese Beggars' Den: Poverty and Mobility in an Underclass Community* (Pittsburgh: Pittsburgh University Press, 1988).

Schellekens, Jona, and Frans van Poppel, *Religious Differentials in Marital Fertility in Urban Holland 1860-1909* Paper presented at the workshop Culture and the Decline of Fertility: Religious Norms, Education and the Changing Status of Women. Venice International University, San Servolo, October 2004.

Schoonheim, Marloes, *Mixing Ovaries and Rosaries: Catholic Religion and Reproduction in the Netherlands, 1870-1970* (Amsterdam: Aksant 2005).

Scott, David, "Colonial Governmentality", *Social Text* 43 (1995) 191-200.

Scott, James C., *Seeing like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven: Yale University Press, 1998).

Seaman, Gary, "The Sexual Politics of Karmic Retribution," in: Emily Martin Ahern and Hill Gates (eds), *The Anthropology of Taiwanese Society* (Stanford, California: Stanford University Press, 1981) 381-396.

Servais, Paul, and Alain Arrault, "Family from East and West between Christianity and Confucianism", in: Muriel Neven and Catherine Capron (eds), *Family Structures, Demography and Population. A Comparison of Societies in Asia and Europe* (Liège: Laboratoire de Démographie de l' Université de Liège, 2002) 23-71.

Sheieh [Hsieh], Bao Hwa, *Concubines in Chinese Society from the Fourteenth to the Seventeenth Centuries* (Ph.D. dissertation, University of Illinois at Urbana-Champaign, 1992).

Shepherd, John R., "Sinicized Siraya Worship of A-li-tsu", *Bulletin of the Institute of Ethnology, Academia Sinica* 58 (1986) 1-81.

Shepherd, John R., "Marriage Mode and Marriage Market: Spatial, Temporal and Class Variation in Taiwan", ms. 1991

Shepherd, John R., *Statecraft and Political Economy on the Taiwan Frontier, 1600-1800* (Stanford: Stanford University Press, 1993).

Shepherd, John R., *Marriage and Mandatory Abortion among the 17th-Century Siraya*. American Ethnological Society Monograph Series, Number 6, 1995.

Shepherd, John R., "Demographic Studies of Plains Aborigines". (Revision of a Paper presented at the International Conference on Plains Aborigines and Taiwanese Society. Taipei, Academia Sinica, October 23-25, 2000) unput. ms. 2001.

Shepherd, John R., "Siraya Marriage Practices in Late Nineteenth and Early Twentieth Century Taiwan: Preliminary Explorations in the Household Registers, a Working Paper." chapter submitted for the conference volume, *Ethnicity and Cultural Identity*, Academia Sinica, 2003.

Shih, T'ien-fu, Jih-pen chih-min chu-yi hsia ti tung T'ai-wan: Ti erh T'ai-wan ti lun-shu [Eastern T'ai-wan under Japanese Colonialism: Discourse on the Second T'ai-wan]. Paper presented at the International Conference on Taiwan's Social and Economic History held in Honor of Wang Shih-ch'ing's 75th Birthday. Nan-kang, T'ai-wan. May 8-9, 2003.

Shih, Wan-shou, *T'ai-wan ti pai-hu min-tsu* [The Ethnic Groups of Taiwan that Worship Vases], (T'ai-p'ei: T'ai-yuan Ch'u-pan-she, Hsieh-he T'ai-wan Ts'eng-k'an 15, 1990).

Shiomi Shuni, "Jih-chu shih-tai T'ai-wan chih ching-ch'a yu ching-chi" [The Police and the Economy in Taiwan during the Japanese Occupation]. *T'ai-wan ching-chi-shih ch'u-chi* [Economic History of Taiwan, Volume 1] (T'ai-pei: Bank of T'ai-wan, 1954).

Skinner, G. William, "Family Systems and Demographic Processes", in: David Kertzer and T. Fricke (eds), *Anthropological Demography* (Chicago: University of Chicago Press, 1997) 53-95.

Smethurst, Richard J., *Agricultural Development and Tenancy Disputes in Japan, 1870-1940* (Princeton: Princeton University Press, 1986).

Smith, Adam, *An Inquiry into the Nature and Causes of the Wealth of Nations*.

Smits, Luc J.M., *Preconceptional Determinants of the Fecundity of Female Offspring* (Nijmegen, 1998).

Sommer, Matthew H., *Sex, Law, and Society in Late Imperial China* (Stanford Cal.: Stanford University Press, 2000).

SPCF *The Special Population Census of Formosa, 1905*. The Committee of the Formosan Special Census Investigation (Tokyo: Imperial Printing Bureau. 1909).

Steere, Joseph B., "Formosa", *Journal of the American Geographical Society of New York* 6 (1874) 302-34.

Stockard, Janice E., *Daughters of the Canton Delta: Marriage Patterns and*

Economic Strategies in South China, 1860-1930 (Stanford Ca.: Stanford University Press, 1989).

Sun, Te-Hsiung, *An Overall View of Fertility Control Policies in Taiwan, R.O.C.* (Taiwan: Taiwan Provincial Institute of Family Planning).

Szreter, Simon, *Fertility, class and gender in Britain 1860-1940* (Cambridge: Cambridge University Press, 1996).

Szreter, Simon, Robert A. Nye and Frans van Poppel, "Fertility and contraception during the demographic transition: qualitative and quantitative approaches", *Journal of interdisciplinary history* 34 (2003) 141-154.

Taeuber, Irene B., *The Population of Japan* (Princeton: Princeton University Press, 1958).

Taishō yonnen Dainichi rinji Taiwan kokō chōsa gairanhō [Tables of the Second Provisional Census on Taiwan of 1915]. Taipei: Taiwan Sōtoku kambo rinji kōkō chōsa bu, 1917; survey was completed on October 31, 1915.

Taiwan genjū jinkō tōkei [Statistical Data on the Population Currently Living in Taiwan] (Taihoku: Taiwan Sōtokufu kambō chōsaka, 1905-1943).

Taiwan zaiseki kan'minzoku kyōkanbetsu chosa [An investigation of the native places of Taiwan's Han population] (Taiwan Sotoku kambo chosaka, 1928).

Taiwan demographic fact book, Republic of China (Nan-t'ou: Department of Civil Affairs, Taiwan Provincial Government).

Taiwan demographic fact book, Republic of China (Nan-t'ou: Department of Civil Affairs, Taiwan Provincial Government).

Tavares, Antonio C., *Savages, Camphor Crystals and Mountain Fees: The Limits of Primitive Accumulation and the Dissolution of the Late Imperial Frontier Exchange Economy on Taiwan*. Paper presented at the Association of Asian Studies Annual Meeting. Washington, D.C., April 4-7, 2002.

Teichman, Jenny, *Illegitimacy: A Philosophical Examination* (Oxford: Oxford University Press, 1982).

Telford, Ted A., "Fertility and population growth in the lineages of Tongcheng County, 1520-1664," in Steven Harrell (ed.), *Chinese Historical Microdemography* (Berkeley, Calif.: University of California Press, 1995), 48-93.

Thomson, John, *China and its People in Early Photographs* (New York: Dover Publications, 1873/4, reprint edition, 1982).

Timmermans, Lambert, *Huwelijksbeleving van katholieke jonggehuwden: een onderzoek middels een enquête in de westelijke mijnstreek van Limburg* (Utrecht: Dekker & Van de Vegt, 1964).

Tomita, Tetsu, "1905 nen Rinji Taiwan rinji Taiwan kokō chōsa ga goru Taiwan shakai? Shuzoku, gengo, kyōiku o chūshin" [Taiwanese Society as Depicted in the Provisional Household Census of 1905 – Ethnicity, Language, and Education] *Nihon Taiwan gakukaihō* 5 (2003) 87-106.

Townsend, Susan C., *Yanaihara Tadao and Japanese Colonial Policy* (Richmond, Surrey: Curzon, 2000).

Ts'ai, Hui-yü, *One Kind of Control: The hokō System in Taiwan under Japanese Rule, 1895-1945*. Ph.D. thesis. Columbia University, 1990.

Ts'ai, Hui-yü, "Jih-chih shih-tai T'ai-wan ti pao-chia hu-chi hsing-cheng" [The Administration of the hokō and Household Register Systems during the Colonial Era]. *T'ai-wan feng-wu* 44 (1994) 107-136.

Tsuchida, Shigeru, Yamadea Yukihiro and Moriguchi Tsunekazu, *Linguistic Materials of the Formosan Sinicized Populations I: Siraya and Basai* (Tokyo: Department of Linguistics, University of Tokyo, 1991).

Tsurumi, E. Patricia, *Japanese Colonial Education in Taiwan, 1895-1945* (Cambridge, MA: Harvard University Press, 1977).

Tuan, Chi-hsien, "Reproductive histories of Chinese women in rural Taiwan," *Population Studies* 12 (1958), pp. xx-xx.

Vanderveest, Peter, and Nancy Lee Peluso, "Territorialization and State Power in Thailand", *Theory and Society* 24 (1995) 385-426.

Verdoorn, J.A., *Het gezondheidswezen te Amsterdam in de 19e eeuw* (Utrecht/Antwerpen: Het Spectrum, 1965).

Viazzo, Pier Paolo, "Illegitimacy and the European marriage pattern: comparative evidence from the Alpine area", in: Loyd Bonfield, Richard M. Smith and Keith Wrightson (eds), *The worlds we have gained. Histories of population and social structure. Essays presented to Peter Laslett on his seventieth birthday* (Oxford, Oxford University Press, 1986) 100-121.

Vries, Hille de, *Landbouw en bevolking tijdens de agrarische depressie in Friesland (1878-1895)* (Wageningen: landbouwuniversiteit, 1971).

Vries, Jan de and Ad van der Woude, *The First Modern Economy: Success, Failure, and Perseverance of the Dutch Economy, 1500-1815* (Cambridge: Cambridge University Press, 1997).

Vulsma, R.F., *Burgerlijke stand en bevolkingsregister* (Den Haag, Centraal Bureau voor Genealogie, 2002).

Walle, Etienne van de, "Illegitimacy in France during the nineteenth century", in: Peter Laslett, Karla Oosterveen and Richard M. Smith (eds), *Bastardy and Its Comparative History. Studies in the history of illegitimacy and marital non-conformism in Britain, France, Germany, Sweden, North America, Jamaica and Japan* (Cambridge, Ma.: Harvard University Press, 1980) 264-277.

Wang, Feng, James Lee, and Cameron Campbell, "Marital fertility control among the Qing nobility: implications for two types of preventive check", *Population Studies* 49 (1995) 383-400.

Wang, Feng, and Yang Quanhe, "Age at Marriage and the First Birth Interval: The emerging change in sexual behavior among young couples in China", *Population and Development Review* 22 (1996) 299-320.

Wang, Shih-ch'ing, "Religious Organization in the History of a Chinese Town", in: Arthur P. Wolf (ed.), *Religion and Ritual in Chinese Society* (Stanford: Stanford University Press, 1974) 71-92.

Wang, Shih-lang, "Yü Ch'ing-fang shih-chien ch'u'an-mao" [A Complete Account of the Yü Ch'ing-fang Incident]. In *Yü Ch'ing-fang k'ang-jih ke-ming an chuen-tang* [Complete Archives of Yü Ch'ing-fang's Anti-Japanese Revolution]. Lin Heng-tao, Ch'eng Ta-hsüeh, Wang Shih-lang, et. al., ed. and comp. 8 volumes. Nan-t'ou: Taiwan Provincial Documents Commission, Volume 1, 1974) 1-32.

Wakabayashi, Masahiro and Wu Mi-cha (eds.), *Kuajie de Taiwanshi yanjiu: Yu Dongya de jiaocuo* [Transcending the Boundary of Taiwanese History: Dialogue with East Asian History] (T'ai-p'ei: Po-chung-che wen-hua, 2004).

Wang, Tay-sheng, *Legal Reform in Taiwan under Japanese Colonial Rule, 1895-1945: The Reception of Western Law* (Seattle and London: University of Washington Press, 2000).

Will, Pierre-Etienne, Roy Bin Wong and James Lee, *Nourish the People: The State Civilian Granary System in China, 1650-1850*. Michigan Monographs in Chinese Studies, No.60. (Ann Arbor: University Michigan Press, 1991).

Wilson, Chris, "Natural fertility in pre-industrial England", *Population Studies* 38 (1984) 225-240.

Wolf, Arthur P., "The Women of Hai-Shan: A Demographic Portrait", in: Margery Wolf and Roxanne Witke (eds), *Women in Chinese Society* (Stanford: Stanford University Press, 1975) 89-110.

Wolf, Arthur P., "Women, Widowhood, and Fertility in Pre-Modern China", in: Jacques Dupâquier, Etienne Helin, Massimo Livi-Bacci and Solvi Sogner (eds), *Marriage and Remarriage in Populations of the Past*, (New York: Academic Press, 1981) 139-147.

Wolf, Arthur P., "Fertility in prerevolutionary China," *Population and Development Review*, vol. 10 (1984).

Wolf, Arthur P., "Fertility in Prerevolutionary China", in: Susan B. Hanley and Arthur P. Wolf (eds), *Family and Population in East Asian History* (Stanford: Stanford University Press, 1985) 154-185.

Wolf, Arthur P., *Sexual attraction and childhood association: a Chinese brief for Edward Westermarck* (Stanford: Stanford University Press, 1995).

Wolf, Arthur P., "Is There Evidence of Birth Control in Late Imperial China?", *Population and Development Review* 27 (2001) 133-154.

Wolf, Arthur P., "Women and Tea in the Taipei Basin: An Essay in Honor of Wang Shih-ch'ing." Paper presented at the International Conference on Taiwan's Social and Economic History held in Honor of Wang Shih-ch'ing's 75th Birthday. Nankang, Taiwan. May 8-9, 2003.

Wolf, Arthur P., "Europe and China: Two kinds of patriarchy," in *Mar-*

riage and the Family in Eurasia: Perspectives on the Hajnal Hypothesis (Amsterdam: Aksant, 2005), pp. 215-238.

Wolf, Arthur P., and Chieh-shan Huang, *Marriage and Adoption in China, 1845-1945* (Stanford: Stanford University Press, 1980).

Wolf, Arthur P., and Ying-Chang Chuang, "Fertility and Women's Labour: Two Negative (but Instructive) Findings", *Population Studies* 48 (1994) 427-433.

Wolf, Arthur P., and Hill Gates, "Marriage in Taipei City. Reasons for Rethinking Chinese Demography", *International Journal of Asian Studies* 2 (2005) III-133.

Wolf, Margery, *Women and the Family in Rural Taiwan* (Stanford, Ca.: Stanford University Press, 1972).

Wolleswinkel-van den Bosch, Judith, *The epidemiological transition in The Netherlands* (Rotterdam: Erasmus University 1998).

Wood, James W., *Dynamics of Human Reproduction. Biology, Biometry, Demography* (New York: Aldine De Gruyter, 1994).

Wrigley, E.A., R.S. Davies, J.E. Oeppen, and R.S. Schofield, *English population history from family reconstitution 1580-1837* (Cambridge: Cambridge University Press, 1997).

Wrigley, E.A., "Elegance and experience: Malthus at the bar of history", in: David Coleman and Roger Schofield (eds), *The State of Population Theory* (Oxford: Basil Blackwell, 1986).

Yamaguchi, Kazuo, and Linda R. Ferguson, "The stopping and spacing of childbirths and their birth-history predictors: rational-choice theory and event-history analysis", *American Sociological Review* 60 (1995) 272-299.

Yamanaka, Einosuke (ed.), *Shin-Nihon kindai hōron* [New Discourses on Modern Japanese Law] (Kyoto: Hōritsu bunka sha, 2002).

Yang, Ching-Kun, *Religion and Chinese Society* (Cambridge: Cambridge University Press, 1961).

Yao, Jen-to, "Jen-shih T'ai-wan: Chih-shih ch'üan-li yü Jih-pen tsai T'ai chih chih-min chih-li-hsing" [Knowing Taiwan: Knowledge, Power and the Japanese Colonial Governmentality of Taiwan]. *Taiwan: A Radical Quarterly in Social Sciences* 42 (2001) 119-182.

Yao, Jen-to, *Governing the Colonised: Governmentality in the Japanese Colonisation of Taiwan, 1895-1945*. Ph.D. thesis, University of Essex, 2002.

Yeh, Shih-t'ao, *Hsi-la-ya tsu ti mo yi* [The last Siraya] (Taipei: Ch'ien wei ch'u pan she, 1990).

Xie, Yu, "What is natural fertility? The remodeling of a concept", *Population Index* 56 (1990) 656-663.

Zanden, Jan Luiten van and Arthur van Riel, *The Strictures of Inheritance: The Dutch Economy in the Nineteenth Century* (Princeton: Princeton University Press, 2004).

Zhao Zhongwei, "Deliberate Birth Control Under a High-Fertility Regime: Reproductive Behavior in China Before 1970", *Population and Development Review* 23 (1997) 729-767.

