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The Distribution of Total Work in the EU and US

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ABSTRACT

The Distribution of Total Work in the EU and US*

Using two time-diary data sets each for Germany, Italy the Netherlands and the U.S. from 1985-2003, we demonstrate that Americans work more than Europeans: 1) in the market; 2) in total (market and home production)-- there is no one-for-one tradeoff across countries in total work; 3) at unusual times of the day and on weekends. In addition, gender differences in total work within a given country are significantly smaller than variation across countries and time. We conclude that some of the transatlantic differences could reflect inferior equilibria that are generated by social norms and externalities. While an important outlet for total work, home production by females appears very sensitive to tax rates in the G-7 countries. We adapt the theory of home production to account for fixed costs of market work and adduce evidence that they, in contrast to other relative costs, vary significantly across countries.

JEL Classification: J22, E24, D13

Keywords: time use, gender inequality, household production, hours of work

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Contents

Executive summary

We have used data for Germany, Italy, the Netherlands and the US from - to confirm the widely-held belief that Americans do work more than Europeans. We also confirm the supposition that Americans tend to work at odd hours of the day and on weekends more often than Europeans. We have turned up an even more interesting aggregate regularity in high-income countries which had gone largely unnoticed and has never been explained or investigated by economists: The sum of market and household work—All Work—by men and women tends to be equal at a point in time, even while it may change over time and di er across countries—there is an iso-work fact.

The iso-work fact is challenging for economics for a number of reasons. First, economic theory should be able to explain why total work di ers so little at the aggregate level between genders, when there is so much variation within-gender. Since the market o ers little hint at the rationale for such a coordination mechanism, we propose social norms in Chapter and investigate the power of such norms to explain the facts. Second, All Work is the sum of two di erent types of labor with sharply di erent productivities—why should their sum be equal across gender, without regard to the mix? And most importantly, where does the work come from to make the iso-work fact implementable?

To consider this last question, in Chapter we examine the theory of home production and adapt it to allow for norms and fixed costs of market work. These fixed costs have a significant impact on the labor supply of households. Indeed, the most commonly invoked models of home production imply a high elasticity of substitution between market work and home production. We validate this sensitivity by demonstrating a high elasticity of female home work in response to changes labor taxation in the G- countries. This strong response makes home production a useful "sink" that enables members of society to meet the norm.

Overall, the issue of whether Europeans are lazy or Americans are crazy seems of second-order importance relative to understanding the determinants of individual behavior. A more useful, scientific approach is to assume that underlying tastes are common to both continents, while technologies,

institutions, or interpersonal influences like norms or externalities may differ and evolve di erently. The fact that Americans work on weekends or more often at odd hours of the day may simply represent a bad equilibrium that no individual agent can improve upon—and would certainly not wish to deviate from, given what all others are doing. Especially if norms and other externalities are important, one should recognize that the invisible hand may lead agents to places like this.

General introduction

Facts about work time, unemployment and labor-force participation in the US and Europe have been established for many years. Researchers have charted their changes, and transatlantic di erences in their levels and vicissitudes have been studied at great length. Facts about how Americans and Europeans spend their time away from the labor market and how these have changed over time have barely been considered. Even within the context of market work, we know almost nothing about how the timing of this activity—across a day or a week—di ers across the Atlantic. Our general purpose here is to establish a variety of new facts about both of these dimensions of human behavior—the amount of di erent types of non-work activities undertaken in Europe and the US, and the timing of market work—and to o er some theoretical explanations for them.

The issues that we study are important for a variety of reasons. If nothing else, however, simply adducing these facts has the tremendous virtue of enhancing both scholarly and public awareness about some characteristics of human behavior that are central to people's conceptions about how societies function and that can inform average citizens' views of what is occurring in their own and others' economies and societies. As such, the facts and their explanations perform, we believe, a general educational function that should not be underestimated. On narrower, economic grounds they allow us to study current di erences and recent changes in well-being (economic welfare) across countries along a variety of dimensions. We believe that this is a major step beyond merely looking at the amount of non-work activity and basing discussions of well-being on that one dimension, which is narrow both in terms of what people do and when they do it.

In Chapter we focus on data describing the time that people spend in each of the many activities that make up their day. We focus on data from the late s and early s, and for the early s, for Germany, Italy, the Netherlands and the US. We examine patterns and changes in non-work activities that we classify into several major groups. We then proceed to ask such questions as: How do patterns of work activities di er over the week, and over the day, in the EU and US? Would market work in the EU look the

same as in the US if Europeans had the same patterns of daily and weekly market activity as Americans?

In Chapter we o er a variety of explanations for some of the facts that we have discovered in Chapter . Of particular interest is our attempt to explain our findings about male-female di erences in the amount of total work—market work plus household production—that we discussed at length in the previous chapter. We examine the minimal requirements of a theory that might explain our findings, and in doing so we develop a theory of the mechanisms by which social norms can a ect sex roles in market and non-market productive activities. The chapter then proceeds to consider the welfare implications of coordinating non-market activities within a local or national economy and develops a model that helps to explain some of the findings in Chapter on the timing of market work.

While Chapter dealt with the work-leisure distinction and the timing of work, Chapter is concerned with the mix of work activities between the market and the home. We first derive some predictions about the relative importance of income and after-tax wages on market versus household work. We examine some of these ideas using data we developed in Chapter , focusing on the role of di erences in labor taxation across the various EU countries and the US. We then consider how the choice between market and home work is altered when working the market engenders set-up costs—when market work is costly in terms of money and/or time over and beyond remunerated time. We examine the role and e ects of these costs on the same current data for Germany, Italy, the Netherlands and the US that we analyzed in Chapter . This discussion allows us to infer how working in the market alters what people do outside the market; as such, it provide insights into the welfare e ects of di erent patterns of market work.

Without going into the specific findings or explanations that this essay generates, a reasonable generalization of its results and analysis is that the US really is di erent from Europe in ways that had not previously been pointed out. Nonetheless, there are striking similarities within societies that, we believe, stem from an underlying sameness in people's basic values along a number of dimensions. We hope that our analyses will pave the way for substantial additional research that compares Europeans and Americans along dimensions beyond the narrow one of the amount of market work that is undertaken on the two continents.

CHAPTER

Time use and work timing inside and outside the market

I. Introduction

An immense literature has examined U.S.-European di erences in labor-force participation rates, weekly work hours, annual work hours, vacation time, etc., making the simple distinction between market work and all other time—all non-work (e.g., recently, Prescott, ; Alesina, Glaeser, and Sacerdote,). The narrower question, "What are the di erences between the U.S. and Europe in what people do with their time when they are not on the job?" has only rarely and partially been addressed (Freeman and Schettkat,).

The answer to this question is crucial for a variety of reasons. In terms of understanding di erences in well-being within the EU, and between the EU and the U.S., we cannot simply look at the amount of time spent in work in the market and time outside the market. While the nature of work di ers across members of the labor force, at least all work can be viewed as something that individuals must be induced, through the receipt of a wage, to undertake. No such logical homogeneity exists with the broad category of non-work time. A half-hour spent changing an infant's dirty diaper is probably less enjoyable than a half-hour of sexual activity. Indeed, the two are totally di erent conceptually: The former is something that one can pay someone else to do; the latter cannot be "contracted out"—the pleasure from it generally cannot be obtained vicariously. With this consideration in mind, it seems reasonable to examine di erences in non-market time use across countries, and particularly between Europe and the U.S. Equally important, it is worth examining how these di erences might have changed in the past years.

The scholarly examination of people's choices between work and non-work has probably been the most heavily pursued aspect of labor economics (Sta ord,). The reason for this attention is partly the importance of the topic, but partly too the ready availability of data from many countries that allow us to examine demographic and economic di erences in and the determinants of the probability that people work, their weekly and annual hours of work, and the behavior of their work time over the life cycle. Despite the obvious importance of looking more closely at how

people spend their non-work time, relatively little attention has been paid to describing its patterns and examining its determinants. A few studies have considered how the price of time a ects the distribution of non-work time (Kooreman and Kapteyn, ; Biddle and Hamermesh,); others (Gronau and Hamermesh, ; Hamermesh,) have examined how economic factors a ect the diversity of activities in which people engage outside the workplace and the extent to which they seek temporal variety. Generally, however, this line of inquiry has been limited by the relative paucity of available data sets. Until recently no country provided data on a continuing basis on how its citizens spend their time, and many have never provided such information. This absence of data has begun to change, and that change is what enables us to examine issues of the allocation of non-market time.

In this initial chapter we discuss a way of classifying the myriad di erent activities that people undertake outside the market. Some classification is necessary if we are to make what is an immense amount of information manageable. We then describe how the relevant data sets are collected and the benefits—and pitfalls—associated with drawing inferences from these data. Next we present simple comparisons of time allocation for Germany, Italy, the Netherlands and the U.S. separately at a point in time and over time, for all adults and for women and men separately. We inquire into whether the observed changes and di erences in time allocations within and across the four countries studied are attributable to changes and di erences in their citizens' characteristics. The final substantive discussion deals with the timing of these various activities—does timing, along a number of different dimensions, including across the week and over the day, di er across countries, and how has it changed.

II. The economic motivation

The basic theory underlying our discussion is that of home production—the idea that people choose how much to work in the market and how to combine the remaining time with the goods that they purchase with their earnings (and unearned income) in order to maximize their satisfaction (Becker, ; Gronau,). The fundamental contribution of this idea is that on average those people with higher prices of time (higher wage rates) will substitute purchased goods for time in producing "commodities" that contribute to their well-being. Thus a high-wage American couple will spend their time flying to the Côte d'Azur for a one-week holiday, while a lower-wage American couple will take a two-week caravan trip to the Great Smoky Mountains National Park. Both households have the same amount of time; but because the former has, at least potentially, a

much higher income, unless it saves the entire di erence between its income and the lower-wage couple's income, it will enjoy holiday time that is more "goods-intensive." The well-o household must economize on its relatively scarce time; the poorer household must economize on the relative scarcity of goods it can purchase.

The number of di erent possible activities—combinations of goods and time—that one might consider is nearly infinite. All of these household activities can be viewed as part of household production—the generation of satisfaction-enhancing commodities through the combination of time and purchased goods. Yet we need to devise some way of aggregating them into useful economic categories in order to be able to talk about them and measure them. There is no single correct way of classifying these commodities and the time inputs into them: Aggregation methods are necessarily arbitrary. The one we use here has the virtue of providing fairly clear-cut economic distinctions while still reducing the number of aggregates to manageable proportions. Moreover, using arbitrary, but identical methods of aggregation across countries allows a certainty when we make international comparisons that is lacking from the few scholarly works that have made such comparisons based on published data.

The first type of activity is that for which people are paid: **Market work**. We assume that people would not be working the marginal hour in the market if they were not paid, so that at the margin market work is not enjoyable (or at least is less enjoyable than any non-work activity at the margin). Market work is the only category of activity currently included on the production side of national income accounts. In the economics literature it has, as our Introduction suggested, generally been treated as the flip-side of the aggregate of all activities outside the market.

Some of the activities in which we engage at home, using our own time and some purchased goods, are those for which we might have purchased substitutes from the market instead of performing them ourselves. We can hire someone to cook our meals (and buy the food) and clean up the dishes afterwards; we can hire nannies to care for our children instead of spending the time ourselves; and we can hire a painter rather than paint the house ourselves. Such **household production activities**, those that satisfy the third-party rule (Reid,) that substituting market goods and services for one's own time is possible, may be enjoyable, even at the margin; but they still have the common characteristic that we could pay somebody to perform them for us and we are not paid for performing them.

The extent to which household production activities are contracted out is important in evaluating levels and changes in households' well-being, since we measure economic well-being by GDP, what is produced in the

market. To the extent that in any country over time households are reducing the amount of household production that they undertake, measured GDP will be growing more rapidly than the country's actual economic welfare. For that reason alone it is crucial to measure levels of and changes in household production and to distinguish them from other household activities, and some e orts have been made to propose methods of doing that (Abraham and Mackie,).

Other activities are things that we cannot pay other people to do for us but that we must do at least some of. We must sleep or eat for ourselves in order to derive any benefits from these activities—nobody else can do these for us and still let us derive any benefit from them. Someone else can shop for food for us; but the actual production of the activity is ours alone. Such **tertiary activities** form the third general aggregate. It should be *prima facie* clear from this distinction between them and household production why it is important to disaggregate non-market time: A drop in non-market time because people are contracting out more activities has much di erent implications for their well-being than does a similar decline in tertiary activity. The two types of activities are imperfect substitutes, nor are they likely to be equally substitutable for market work (the standard condition that would allow the aggregation of these non-market activities).

The fourth and final aggregate is **leisure**. We include in this category all activities that we cannot pay somebody else to do for us and that we do not really have to do at all if we do not wish to. Television-watching, attending religious services, reading a newspaper, chatting with friends, etc., should be included in leisure. Leisure, of course, is inherently satisfying; but so is some (probably infra-marginal) household production , such as the first minute spent mowing the lawn or the first time one reads a new book to one's three-year-old; so too clearly are the first few hours of sleep in day (see Abraham and Mackie,). What distinguishes leisure from the other types of home activities is that one can function perfectly well (albeit not happily) with no leisure whatsoever: None is necessary for survival.

We believe that this fourfold distinction is theoretically useful and can be implemented empirically. Nonetheless, as with any accounting system, many of the classifications can be debated. Some might argue that religious activity should be viewed as a tertiary activity, since its ubiquity throughout human history might suggest that it is as necessary as eating. Obversely, given that most sex today is not for procreation, that activity might well be classified as leisure rather than as tertiary. While bathing is nearly universal, one could argue that it is not a human need and should be viewed as leisure.

The example that is often brought up by those concerned about national income accounting is that of volunteer work (see Abraham and Mackie,). In most of our empirical analyses we count it as leisure, but one might argue that volunteer work could be

All household production contains at least some consumption component and might be viewed at least partly as leisure; all tertiary activities have some leisure component; and many leisure components, for example, exercise, might be viewed as investments (e.g., in health) that could be classified as tertiary. The main point is that one must choose a set of aggregates that can be consistently implemented across time and space.

In what follows we examine how activities have been divided among these four aggregates in Germany, Italy, the Netherlands and the United States, and how that division has changed in the past two decades. Because one or two activities constitute the major component(s) of these aggregates—e.g., sleep in tertiary activity, television watching in leisure—we also focus attention on several sub-aggregates for the four countries that we study.

III. Data on time use—generally and in this study

A. General description. In this Section we describe time-use data generally and the main data sets that we use specifically. We do this because these data underlie both the evidence we provide in report and because such data are much less familiar to economists and the general public than are the conventional labor-force data from surveys that obtain information on time spent at work in some recent week or year.

An increasing number of national governments have fielded time-diary surveys. Such surveys have been conducted for over years (Sorokin and Berger,), but it is only recently that they have been available on regular bases in many industrialized countries. Indeed, even before then surveys were fielded (e.g., Leeds,) that elicited recall data on time spent in a set of non-exhaustive household activities during the previous week (essentially the same as is done today in major household longitudinal surveys such as the PSID). The general idea in a time-diary study is to give each respondent a diary for one recent (typically the previous) day and ask him/her to start at the day's beginning with the activity then underway and then indicate the time each new activity was undertaken and what that activity was. The respondent either works from a set of codes indicating specific activities, or the survey team codes the descriptions into a pre-determined set of categories. No matter how extensive a set of codes is, each survey will have a di erent way of coding and aggregating what might seem like the same activity to an observer. Time diaries have the virtue of forcing respondents to provide a time allocation that adds to hours in a day. Also, unlike retrospective data about last week's or even last year's time spent working,

performed by market substitutes and should be included as a secondary activity; alternatively, one might point out that it is mostly consumption and should be included as leisure.

while the time-diary information is necessarily based on recall, the recall period is only one day. The shorter recall period and the implicit time-budget constraint suggest that information on market work from time diaries is likely to be more reliable than the recall data from the standard labor-force surveys; and, of course, time diaries provide information on non-market activities that is unavailable from labor-force surveys.

In some time-diary studies only one day's diary is collected from one household member; in others, several days' diaries and/or several household members will appear in the sample. The extent of demographic and economic information available also varies across surveys, with economic characteristics in most of the surveys being fairly sparsely reported. With one old and very minor exception, none of the time-diary studies provides longitudinal information (except for the very short-term information generated because diaries are kept for two or more days within the same week).

B. The specific data. Many European countries have now generated time-diary surveys; while in most cases these have been recent one-o efforts to measure the allocation of time, there has more recently been some e ort to create some uniformity in the coding and questionnaires. Unfortunately, however, only a few countries have undertaken repeated surveys, albeit at irregular intervals, that have used identical or nearly identical categorizations of activities and that thus allow us to compare how non-market time use has changed over time. For that reason, although we recognize they can in no sense be viewed as representative of how Europeans use time, we concentrate most of our attention here on Germany, Italy and the Netherlands. We do not argue that these countries are typical of the EU in any way. Rather, all three have produced large nationally representative time-diary surveys recently and around to years earlier, and in all three the surveys and coding mechanisms were nearly identical (Germany and the Netherlands) or fairly similar (Italy) over time.

The German data are from the / and / *Zeitbudgeterhebungen* conducted by the Statistiches Bundesamt ( ). In / adult members of each household were asked to complete time diaries on two consecutive days. Nearly , individuals completed diaries, with nearly all respondents completing diaries on two days (and with minor discrepancies the days are equally distributed across the week). In / we have diaries from , people, about half with diaries on two consecutive days, half on three consecutive days, with the survey days disproportionately recorded on weekends. The categorization of activities allowed for over di erent activities, with coding being almost identical in the two surveys; and respondents could report their time use in five-minute intervals. Because the

/ survey was undertaken immediately following re-unification, we restrict almost all the discussion of the German data to the former West Germany. We do, however, present a brief discussion of the major dimensions of time use in the former East Germany.

The Italian household diaries *Uso del Tempo* were conducted over - month periods in / and / by ISTAT (see ISTAT, , for a description of the recent survey). Roughly , individuals, each in a separate household, completed a time diary for one day in / , as did roughly , people in / . Diaries were collected in roughly equal numbers in each case from among the five weekdays as a group, Saturdays and Sundays. The possible categorizations of activities in / totaled around , while in / categories were possible. There is no direct mapping from the earlier to the later data, although the market work and household production categorizations of activities are very closely comparable.

The Dutch *Tijdbestedingsonderzoek* (NIWI,) is a quinquennial cross-section time-budget study that has been conducted since . In our analyses we use the surveys conducted in October and October . The survey covered adults, the survey adults, with one from each household, whose diary records were kept for seven consecutive days (Sunday through Saturday). In each case half the sample produced diaries in one week, half in the next; but because one of the two weeks in included the Saturday/Sunday when Europe went o Summer Time, we can only use one week's data from that survey. Each individual listed the activity engaged in at each quarter-hour of the previous day. The range of possible activities encompasses over usable activities.

Until the United States lagged much of the developed world in the availability of time-diary information. There had been occasional small-scale surveys, but no large-scale nationally-representative survey had been conducted. We thus use the Time Use Survey (Robinson and Godbey,), a university-conducted survey of individuals, including both spouses in a married-couple household, each of whom kept a diary for one day that covered activities on the previous day. A total of activities was possible, covering activities in each quarter-hour of the previous day. The hebdomadal distribution of days is nearly uniform.

American backwardness in the production of time-diary data ended with the introduction of the American Time Use Survey in . The ATUS o ers one-day diaries from nearly , individuals (see

Even this large number of activities results from combining time spent reading each particular newspaper and magazine into one overall category, newspaper/magazine reading.

Hamermesh, Frazis, and Stewart,). Because exact starting and stopping times for each activity are listed in these computer-assisted telephone surveys, the duration of activities is variable to the minute. The survey offers basic categories. The ATUS collected half the diaries on the two weekend days, while the other half was spread across the five weekdays.

The Tables in the Appendix presents information on the main categories in each of the eight surveys that are used to create the four aggregates on which we concentrate. In these Tables, we summarize the main categories (for examples, in the German data, in the ATUS) that make up each aggregate. The descriptions are translated from the originals.

Throughout this chapter we restrict comparisons for Germany, Italy, the Netherlands and the U.S. so that all the data sets are based on individuals ages through . This eliminates only a few teenagers or much older citizens. The restriction is imposed to ensure comparability across the data sets, as they di er in the minimum ages surveyed and, in a few cases, in the maximum age covered. More important, since we wish to obtain statistics describing a representative day of the week, and some of the surveys overweighted weekends, we weight all calculations to adjust for this statistical problem and thus present data for a representative day.

C. Pitfalls. There are a number of problems with time-diary data generally and with the particular data sets that we use. Unlike well-known national longitudinal or cross-section household surveys, response rates in time-diary surveys are quite low. Many more potential respondents in the sampling frame must be contacted in order to obtain a reasonably-sized sample of diaries. In the ATUS, for example, the non-response rate was over percent, and it was above percent in the Dutch data. Whether the respondents are a random sample of the population along observable dimensions is not always clear, but there is some encouraging evidence on this for the ATUS (Abraham, Maitland, and Bianchi,). The more di cult question is whether non-response is non-random along unobservable dimensions that may be correlated with the distribution of activities and/or with the observable demographic/economic variables used to describe patterns of time use. We cannot infer the extent of biases from this source with the available data; but their possible existence makes it clear that the distinct advantages of time diaries over conventional household surveys may come at a cost.

Most people engage in more than one activity at the same time during at least part of their waking hours. Unfortunately, the Dutch data allow the respondent to list only one activity at a time, as does the American TUS. The ATUS does allow people to list childcare as a secondary activity,

but it is the only secondary activity that is recorded. The German and Italian data sets do provide fully for the possibility of secondary activities. The general absence of information on secondary household production means that, to the extent that the amount of multi-tasking increases over time, as we would expect if full incomes are rising and variety of activities is a superior good (as shown in Gronau and Hamermesh, , comparisons over time will be biased. All we can hope is that these biases are minor over the fairly short periods (to years) that we examine compared to any other secular trends that we observe.

As we have noted, the di erent countries' time-diary data are based on di erent categorizations of activities. Even with the broad aggregations on which we base our analyses, we cannot be certain that an activity that we classify in the United States as, for example, leisure would be classified as leisure in Germany. Indeed, even if the same categorizations were used in all four countries, cognitive di erences due to language and culture could well generate di erent categorizations of what an outside observer would view as the same activity. One must be very careful about making cross-country comparisons of the amounts of time spent in di erent specific activities, and even of time spent in these broad aggregates. The same caveat, of course, applies to conventional labor-force surveys as well.

The problem is much less acute if we merely compare changes in time use over time within a country based on diaries using the same categorizations. Thus comparisons of changes in time allocation over a decade in the Netherlands and Germany thus seem fairly safe. Even here, however, comparisons across time can pose some problems. The more recent Dutch and German categorizations allow for the category of time spent on computers at home for work or non-work purposes. Does time spent on such activities take the place of what would have previously been leisure, such as playing games? Or does it substitute for household production, such as managing household finances using pen and pencil? We cannot be sure how the coding of activities changes when new possibilities are provided; and there are always wholly novel activities that did not even exist earlier, which pose problems analogous to those of new goods in consumer theory. The problem is somewhat greater in the comparisons within Italy over time, as the number of possible categories is much greater there, and time spent in travel cannot be specifically linked to other activities in / , while it can in / .

In constructing the aggregates for / we prorate travel time among the three aggregates that are not necessarily mainly conducted at home—market work, secondary activities and leisure.

The problem is still more severe in the U.S. data, as there are many more categories in the ATUS than in the TUS and the surveys were conducted by di erent organizations.

We believe that, because we concentrate on broad aggregates, problems with making comparisons over time within the Netherlands and Germany are minimal. Even less problematic are comparisons at a point in time, such as across demographic groups, within any of the countries that we examine. The problems may be greater in comparisons within Italy over time, and greater still for time-series comparisons in the U.S. Any cross-country comparisons of time use that we or anyone else makes should be taken with several grains of salt, and those that we do make here should be viewed as tentative.

IV. Time use in Germany, Italy the Netherlands and the United States, 1985-2003

A. Differences in time allocation. The first thing to examine is aggregate information on how people in each of the four countries spent their time and, more important, how their use of time changed across the two surveys that we have for each country. Thus Table . presents these averages for all individuals in each of the four countries, while Tables . M and . F present them separately for men and women. For each of the four main aggregates, and for four large sub-aggregates, we present the averages (minutes per representative day) and their standard errors. The data in Table . are population-weighted averages of the data that are presented in Tables . separately by sex, since women are typically over-represented in time-diary surveys.

a. *Differences within country and by gender.* As we noted, the most reliable comparisons are within countries. Looking first at the United States in and , it is quite clear and unsurprising that men spend more time in market work than do women, and that women spend more time in household production activities. Women spend more time in tertiary activities in the U.S, Germany and the Netherlands, partly because they sleep more (Biddle and Hamermesh,); but they spend less time in such activities in Italy, even though they sleep about as much as men. In the three Anglo-Saxon countries men spend somewhere between and minutes more time in leisure, than women with the di erence due entirely to their spending more time watching television. In Italy, however, they spend roughly one hour more than women enjoying leisure, with less than half the difference arising from the extra time that men spend in front of a television screen.

Table 1.1. Time Allocations (minutes), Averages and Their Standard Errors, All Individuals Ages 20-74*

	Germany		Italy		The Netherlands		U.S.	
	1991/92	2001/02	1988/89	2002/03	1990	2000	1985	2003
Individuals in survey	6,928	7,239	25,490	37,882	1,531	1,586	3,567	17,668
Days surveyed	2	2 or 3	1	1	7	7	1	1
Market work	**263.9 (2.0)**	**197.7 (1.7)**	**248.5 (1.8)**	**207.4 (1.4)**	**174.2 (2.4)**	**189.5 (2.5)**	**245.8 (4.6)**	**255.9 (2.1)**
Household production	**220.5 (1.5)**	**242.7 (1.3)**	**236.1 (1.4)**	**237.3 (1.1)**	**221.0 (1.8)**	**206.0 (1.7)**	**200.5 (3.1)**	**218.0 (1.5)**
Family care	22.6 (0.5)	29.8 (0.5)	32.1 (0.4)	29.6 (0.4)	37.0 (0.8)	34.0 (0.8)	30.0 (1.2)	44.5 (0.7)
Shopping	42.6 (0.5)	57.4 ()0.6	38.4 (0.3)	43.3 (0.3)	41.0 (0.7)	44.2 (0.7)	50.1 (1.4)	51.4 (0.6)
All work	**484.5**	**440.4**	**484.6**	**444.7**	**395.2**	**395.5**	**446.3**	**473.9**
Tertiary time	**639.3 (1.1)**	**664.9 (1.0)**	**677.6 (0.7)**	**594.0 (0.6)**	**634.9 (1.3)**	**646.8 (1.3)**	**648.0 (2.4)**	**628.5 (1.1)**
Sleep	501.2 (0.9)	503.9 (0.8)	515.0 (0.6)	497.9 (0.5)	500.1 (1.0)	513.7 (1.1)	481.2 (2.0)	503.3 (1.0)
Leisure	**316.2 (1.5)**	**334.6 (1.2)**	**278.0 (1.3)**	**401.3 (1.0)**	**409.9 (2.0)**	**397.7 (2.0)**	**345.7 (3.5)**	**337.5 (1.7)**
Radio/TV	114.3 (0.9)	117.7 (0.7)	102.4 (0.5)	101.1 (0.5)	107.9 (1.0)	108.8 (1.0)	140.8 (2.3)	147.1 (1.2)
Fraction working	0.541 (0.004)	0.443 (0.003)	0.486 (0.003)	0.422 (0.003)	0.363 (0.005)	0.389 (0.005)	0.509 (0.008)	0.521 (0.004)

*Averages of the means in Tables 1.2 weighted by the sex ratio of the population ages 20-74 in each country at each time from http://www.census.gov/ipc/www/idbpyr.html

Table 1.2M. Time Allocations (minutes), Averages and Their Standard Errors, Men Ages 20-74

	Germany		Italy		The Netherlands		U.S.	
	1991/92	2001/02	1988/89	2002/03	1990	2000	1985	2003
Individuals in survey	2,947	3,377	12,211	18,228	595	646	1,647	7,750
Market work	**296.9 (3.7)**	**262.5 (2.8)**	**361.7 (2.7)**	**290.2 (2.2)**	**256.9 (4.5)**	**254.1 (4.4)**	**308.4 (7.1)**	**312.6 (3.4)**
Household production	**199.9 (2.3)**	**173.9 (1.6)**	**85.8 (1.1)**	**115.1 (1.0)**	**144.0 (2.3)**	**144.8 (2.2)**	**138.3 (3.8)**	**163.2 (2.0)**
Family care	21.0 (0.7)	17.9 (0.4)	18.1 (0.4)	19.3 (0.4)	18.1 (0.7)	16.9 (0.8)	15.9 (1.2)	28.2 (0.8)
Shopping	39.2 (0.8)	49.0 (0.8)	24.1 (0.4)	32.8 (0.5)	32.1 (1.1)	35.6 (0.9)	41.6 (1.8)	43.3 (0.9)
All work	**496.8**	**436.4**	**447.5**	**405.3**	**400.9**	**398.9**	**446.7**	**475.8**
Tertiary time	**627.6 (1.7)**	**654.2 (1.5)**	**683.5 (1.1)**	**595.2 (1.0)**	**624.1 (2.1)**	**634.2 (2.1)**	**642.5 (3.7)**	**616.0 (1.7)**
Sleep	494.2 (1.4)	498.6 (1.2)	517.1 (1.0)	496.7 (0.8)	491.9 (1.6)	503.7 (1.7)	480.0 (3.1)	495.5 (1.5)
Leisure	**315.7 (2.4)**	**349.3 (1.9)**	**309.3 (1.9)**	**439.6 (1.6)**	**414.9 (3.5)**	**406.9 (3.4)**	**350.8 (5.5)**	**348.1 (2.7)**
Radio/TV	115.0 (1.4)	135.0 (1.2)	110.1 (0.8)	114.5 (0.8)	123.8 (1.8)	118.9 (1.7)	148.5 (3.5)	160.4 (1.9)
Fraction working	0.584 (0.006)	0.528 (0.005)	0.656 (.004)	0.547 (0.004)	0.487 (0.008)	0.472 (0.007)	0.608 (0.012)	0.601 (0.006)

The di erences across gender are almost the same in the two northern European countries, but are much di erent in Italy. As in all industrialized countries, however, European women work less in the market than their male counterparts, and they do more household production. Like American women, they spend as much or more time in tertiary activities than their male fellow citizens, mostly because they sleep more; and they spend

Table 1.2F. Time Allocations (minutes), Averages and Their Standard Errors, Women Ages 20-74

	Germany		Italy		The Netherlands		U.S.	
	1991/92	2001/02	1988/89	2002/03	1990	2000	1985	2003
Individuals in survey	4,001	3,862	13,279	19,654	936	940	1,920	9,918
Market work	**230.1 (3.0)**	**132.7 (1.9)**	**141.5 (2.0)**	**133.1 (1.6)**	**91.5 (2.3)**	**124.5 (2.7)**	**182.7 (5.6)**	**200.7 (2.6)**
Household production	**241.7 (2.0)**	**311.8 (1.7)**	**378.1 (1.7)**	**346.9 (1.5)**	**298.0 (2.2)**	**267.6 (2.2)**	**263.2 (4.4)**	**271.3 (2.1)**
Family care	24.3 (0.7)	41.8 (0.8)	45.4 (0.6)	38.8 (0.6)	55.8 (1.1)	51.2 (1.2)	44.2 (2.0)	60.4 (1.5)
Shopping	46.1 (0.7)	65.9 (0.7)	51.9 (0.5)	52.8 (0.5)	49.8 (0.8)	52.9 (0.9)	58.7 (2.0)	59.3 (0.9)
All work	**471.8**	**444.5**	**519.6**	**480.0**	**389.5**	**392.1**	**445.9**	**472.0**
Tertiary time	**651.4 (1.5)**	**675.7 (1.3)**	**672.1 (0.9)**	**593.0 (0.8)**	**645.6 (1.6)**	**659.4 (1.6)**	**653.6 (3.1)**	**640.6 (1.5)**
Sleep	508.3 (1.2)	509.2 (1.0)	513.0 (0.8)	499.0 (0.7)	508.2 (1.3)	523.8 (1.4)	482.4 (2.5)	510.7 (1.3)
Leisure	**316.8 (1.9)**	**319.8 (1.6)**	**248.5 (1.5)**	**367.0 (1.3)**	**404.9 (2.4)**	**388.4 (2.4)**	**340.5 (4.4)**	**327.2 (2.1)**
Radio/TV	113.6 (1.1)	100.4 (0.9)	95.2 (0.7)	89.1 (0.6)	91.9 (1.1)	98.7 (1.2)	133.0 (3.0)	134.1 (1.5)
Fraction working	0.497 (0.006)	0.358 (0.004)	0.326 (.004)	0.310 (0.003)	0.239 (0.005)	0.305 (0.006)	0.409 (0.011)	0.443 (0.005)

less time than men at leisure, partly because they spend less time watching television.

There has been a huge literature making cross-country comparisons of gender inequality in labor-force participation and hours of market work (e.g., Bertola, Blau, and Kahn,). We can go beyond that here to examine gender inequality in all aspects of time use across countries independent of any problems in categorization. The cross-country comparisons are free of problems so long as we are satisfied that di erences in how men and women's activities are aggregated into the four aggregates do not vary across countries.

For any of the four countries define an inequality index I as:

$$I = \sum_i \left| (C_{iM} - C_{iF}) / \sqrt{C_{iM} \cdot C_{iF}} \right|, \qquad (\ .\ )$$

where the subscripts i are the four main aggregates of activities, C—, the averages of market work, household production activities, tertiary activities and leisure, and M denotes men and F women. If the average amounts of time spent in the four aggregate activities are the same for men and women, this index will equal zero. Calculating I_{US} for yields . ; for Germany in / I_G = . ; for Italy in / I_I = . ; and for the Netherlands in I_{NL} = . . Part of the di erence in this index between the U.S. and the other three countries is due to the greater gender similarity of time spent in the market in the U.S. But even if we restrict the calculation in (.) to the three aggregates of non-market activities, we still find that male-female di erences are smaller in the U.S. than in the EU countries (with

the three-activity inequality index equaling . in the U.S., . in Germany and the Netherlands, and . in Italy). The data show not only that the United States currently approaches a unisex market for paid work more closely than these European countries, but also that gender inequality in the distributions of household production, tertiary time and leisure is greater in these three EU economies than in the U.S.

While the genders are not equal within each country at each point in time in terms of the allocation of time across these four main aggregates, there is another comparison that is apparent in these data. Let us define "All Work" as the sum of time spent on the representative day on the total of market work and household production. Given the definition of household production, All Work might be viewed as the sum of market and nonmarket production.

Examining Tables . M and . F one sees that All Work totals between minutes and minutes (- / to - / hours) in the samples (four countries, two years, two genders). Compare the value of All Work (again, the sum of market work and household production activities) within each country at a point in time across genders (across Tables . M and . F). Among the three Anglo-Saxon countries, except for Germany in / the di erence in All Work across genders never exceeds minutes; and even in Germany in / the excess of men's All Work over women's is only minutes (less than one-half hour on a total of over eight hours). On might conclude that **iso-work** characterizes both genders in these three wealthy northern countries. In Italy, however, the di erence was an excess of total work among women of minutes in / and minutes in / . While total work by both men and women decreased over the fourteen years

To address one of the many necessary arbitrary aggregations using the di erent categories, consider our classification of volunteer work as leisure. For the U.S. in we recalculated the means to include both volunteer work and non-household care activities. Women performed minutes of these activities, men , so that the -minute excess of men's All Work would be changed to a -minute excess of women's All Work over men's if we had included these two categories as secondary activities. Making the same calculation for the German data for / , we find that men performed minutes, women minutes of volunteer work. If added to the totals in Tables . , this would have reduced the -minute excess of female All Work to an excess of only minutes. The same calculation for the Italian data from shows that women performed minutes, men minutes of volunteer work. Doing the same thing for the Dutch data shows that men performed minutes, women minutes of volunteer work, which if added to household production would have reduced the -minute excess of male All Work to only minutes. In all three recent Anglo-Saxon data sets this slight expansion of the definition of All Work in fact equalizes still further the gender distributions of All Work, while for Italy it exacerbates the excess of female over male work.

between the two Italian surveys, the excess of total work among women remained essentially unchanged.

The similarity in All Work by gender in rich countries has been noticed by sociologists. Thus Robinson and Godbey ( ) cite a UN report showing that this fact holds on average for data from countries, and Gershuny ( ) shows that it characterizes data covering the s through mid- s for an even larger sample of data sets. No study has demonstrated it using data sets that were as well harmonized as the ones we have assembled here; and economists seem to be blissfully unaware of the fact and have never examined it. Indeed, even sociologists who have demonstrated it (e.g., Mattingly and Bianchi, , for the United States, and Bittman and Wacjman, , for several countries), quickly move beyond it to discuss why they believe that women's work is more onerous than men's, and why women's leisure provides less pleasure. All we do in this Chapter is note the existence of iso-work in three of the four wealthy countries for which we have detailed data. In Chapter we provide one explanation for this fact; but clearly, others are possible; and the causes of the iso-work phenomenon and its implications for theories of household behavior are all interesting topics that deserve much more research by economists and others.

If the equality of total work across genders holds in many countries, it contains an interesting additional implication for the e ects of macroeconomic fluctuations by gender. If this phenomenon holds in di erent countries at di erent time, and in the same country at di erent times, it suggests that the impact of macroeconomic fluctuations on All Work is the same for both sexes. Macro fluctuations may increase or decrease the total amount of (market and non-market) work; but they do so nearly identically for both men and women.

b. *Comparisons over time and across countries.* Comparisons over time within the four countries for which we have detailed data at two points in

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It is interesting to examine what activity or activities are the particular source(s) of the striking di erence between Italy and the other three countries. Taking the more recent data sets, the average di erence between genders in All Work in the three other countries is - . minutes per day (more market work and household production by men), compared to the Italian di erence of . minutes. Of the Italian women's excess of total work of . minutes (- / hours per day) compared to the di erence elsewhere, fully . minutes are accounted for by one activity, cleaning house, compared to the average amount of housecleaning by gender in the other three countries. This unusual Italian behavior appears to be well-recognized in popular literature: "Italian men… are *pueri aeterni*, who expect their wives to replace their mothers, and iron their shirts and fret about their underwear." (McEwan, , p.).

time are quite sensible for the Netherlands and Germany, but may be somewhat questionable in Italy and the U.S. because the categorization of activities di ers so sharply between the two surveys. Taking the Netherlands first, the most striking change in the s was the tremendous growth in the fraction of women who report some market work during the survey week, a rise from percent to percent of all the women ages through included in the survey. This tremendous change was accompanied by a small increase in time spent at work by women who worked, so that the average amount of time Dutch women spent at work on a representative day increased by minutes (percent) per representative day. This striking increase was accompanied by a tiny and insignificant drop in male work time (and in the propensity to work), so that the amount of market work by the average respondent increased by minutes per day (nearly hours per week).

Why this increase occurred is not at issue here (but see Jacobsen and Kooreman, for an argument that more lenient retail-hours laws might have had this e ect). Perhaps too the large increase in women's part-time work in the Netherlands had this e ect, a possibility that is corroborated by the observation that the percentage increase in minutes of work is only slightly larger than the percentage increase in the fraction of women working at all. What is of interest here, however, is how this change a ected non-market time use in the Netherlands. Interestingly, looking at Table . F, we see that the increase was almost completely o set by a decline in time spent in household production. Dependent care time did not change much, and shopping time did not change at all; rather, other household production activities, cleaning/cooking and other household activities (gardening, home repair, etc.) decreased substantially. This "Dutch Revolution" was accompanied by a decrease in leisure (not due to decreased television-watching), but that decline was o set by an equal increase in tertiary time (due to increased time reported sleeping). The shift toward market work and away from household production reported by Dutch women was rapid and striking and provides the best evidence for at least partial substitutability of these two types of activity in the aggregate and for the need to go beyond the work non-work distinction.

Over this decade West Germany saw a striking decline in the average amount of market work, which dropped by nearly one hour per day (hours per week). (The decline was also one hour per representative day in the former East Germany.) Most of this drop occurred among women, and most of the change among women resulted from a large decline in the fraction of women who reported that they were working on the diary day. (The pattern of change was the same, although the levels di ered substantially, in the former East Germany.)

Comparing the Italian data across the two years is, as we noted, somewhat more di cult, due to the greater di erences in the underlying categories. This is more the case for the aggregates of tertiary activities and leisure, as there were more changes in the coding of their component activities across the surveys. Market work seems the most consistently defined in the two samples, with household production activities falling in between. There appears to have been a decline in market work of about minutes per representative day over this period; and it has not been accompanied by any change whatsoever in household production. Rather, the entire drop has been included, along with a shift out of tertiary time, in the large rise in measured leisure. While the part of this increase leisure resulting from a shift away from tertiary time may be a classification issue, the part resulting from the decline in All Work seems real.

Comparisons over time in the U.S. are still more problematic because the classifications di er greatly across the two surveys; but it does appear that Americans were doing a bit more market work by , mainly because of the continued increased in the propensity of women to work for pay. The bigger changes, which underline the importance of distinguishing among types of non-market time use, are within non-market time itself. In particular, household production activities increased substantially, mainly because dependent care appears to have increased; while tertiary activities decreased, even though time spent sleeping went up. Finally, women's leisure activities decreased, although this was not due at all to a change in the amount of time spent watching television. The changes in men's activities appear to be in the same direction as women's, and for them too non-television leisure declined. Issues of comparability across the surveys make any of these comparisons for the U.S. somewhat shaky. Probably the most reliable comparisons are of the activities sleeping and radio/TV, which are the most specific of those listed here, so that it seems fair to conclude that Americans are now sleeping more than in the mid- s and that American men are watching even more television than before.

Over a longer time period we are doubtful whether the drop in leisure that we have demonstrated for the U.S. would be observed. Indeed, the point of Aguiar and Hurst ( ), based on their attempts to make diverse U.S. time-diary data sets commensurable, is precisely that there was a rise in the total amount of leisure consumed by the average American between and . Perhaps better evidence on this is from Norway, which has conducted four time-diary surveys, , , and , using essentially identical survey instruments. Among Norwegian men aged - the total amount of work performed fell by minutes per representative day

between and , then stayed constant or even rose slightly. Among women aged - total work fell nearly steadily, from hours minutes per day in to hours minutes per day in . Without comparable data sets for other countries we cannot be sure about trends; but there is no evidence of increasing total work in Europe, and some to the contrary.

Although the comparisons over time are problematic in some of these cases, a crucial conclusion is that the sums of market work and household production are by no means constant over time in these four countries. While the Netherlands does exhibit this constancy, with the rise in market work perfectly o set by the drop in household work, changes of more than minutes per day in total work are exhibited in the other three countries.

We can calculate the gender inequality indexes in (.) for each of the countries for the earlier years as well as for the later years presented above. The index fell from . to . in the U.S., from . to . in the Netherlands, and from . to . in Italy, but it rose from . to . in Germany. The degree of gender inequality in all activities has converged substantially among the four countries. Of course, with only two observations on each, and with a concern about the tremendous change in the macroeconomy in Germany over this period, we cannot say anything about whether or not this represents a trend.

The most problematic comparisons are across countries. It is absolutely clear that Americans watch substantially more television than do Europeans, at least the Dutch, Italians and Germans (and see also Corneo,); much of the extra roughly to minutes per day (to - / hours per week) comes from less time sleeping in the United States. More important, however, Americans of both sexes spend substantially less time in other, non-television forms of leisure than do Germans, Italians or Dutch.

Going further than this is di cult for all the reasons discussed in the last Section. These problems did not prevent Freeman and Schettkat ( ) from advancing what they called the "marketization hypothesis," namely that the amount of what we have called All Work does not di er between the U.S. and European countries. This may be the case for some comparisons, but it certainly does not seem valid in the eight possible comparisons one can make using Table . . Taking the earlier years for each country, we see from Table . that All Work in Germany was minutes more than in the U.S. at that time, and minutes more in Italy, while All Work in the Netherlands was minutes less. In the later period All Work in Germany was minutes less than in the U.S., while All Work in Italy was minutes less and in the Netherlands was minutes less per day than in the U.S. In other words, these comparisons suggest that there is no particular equality

Calculated from http://www.ssb.no/english/subjects/ / / /tidsbruk_en/.

in total work across countries at a point in time, nor is total work constant within countries over time. They also suggest that total work in the U.S. currently exceeds that in these three European countries.

The international comparisons are only of behavior on the days when diaries are recorded. Substantial research in the collection of time diaries has made it abundantly clear that diaries are much less likely to be collected on days when an individual is on holiday. Thus the cross-country comparisons based on Tables . and . ignored any international di erences across countries accounted for by vacation time. This is not just a matter (Freeman and Schettkat,) of diaries being collected only over part of the year (i.e., as in the one or two weeks in the Netherlands or the eight months in Germany).

We know that annual holiday time is generally shorter in the United States than in continental Europe Altonji and Oldham ( ). This di erence suggests that even the inference that more market work is conducted in the U.S., and less leisure is consumed there, is understated. Were we to obtain diaries from days distributed randomly across the year and independent of whether the respondent is at home or away from home, assuming that holidays include little if any market work, we would observe a still larger excess of market work in the U.S. over Germany, Italy and the Netherlands, and a still larger shortfall of leisure in the U.S. Whether the di erences in household production or tertiary time would be magnified or reduced cannot be inferred *a priori*.

B. Do these differences and changes stem from differences and changes in demographic characteristics? How much of the di erences between the amounts of time allocated to the di erent activities in each country and over time are due to cross-country and temporal di erences in the observable demographic characteristics of the sample respondents? In other

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An interesting question is why their apparent equality of All Work between the U.S. and the average of a number of EU countries in the early s seems so di erent from our conclusion. One should note that, based on a simple average of the measures of All Work in the data in Tables . for the early s for Germany, Italy and the Netherlands, one observes simple averages for the three countries of minutes of total work for men and minutes by women, very similar to the U.S. averages by gender. Thus even when we average over just three countries, we obtain roughly the same result (for the s and early s) that Freeman and Schettkat obtained in the averaged data that they published. In the early s, however, there was a shortfall of one hour per day in All Work by men in these three European countries compared to American men, and of over a half-hour per day among European women. These results suggest that averaging across European countries creates an illusion of similarity to the U.S. where none really existed, and that even that illusion was an artifact of the particular time period studied.

Table 1.3M. Predicted Time Use (minutes), Men, if All Samples Had U.S. 2003 Demographic Characteristics

	Germany		Italy		The Netherlands		U.S.	
	$\hat{G}^{1991}_{US\,2003}$	$\hat{G}^{2001}_{US\,2003}$	$\hat{I}^{1988}_{US\,2003}$	$\hat{I}^{2002}_{US\,2003}$	$\hat{N}^{1990}_{US\,2003}$	$\hat{N}^{2000}_{US\,2003}$	$\hat{U}^{1985}_{US\,2003}$	$\hat{U}^{2003}_{US\,2003}$
	1991/92	2001/02	1988/89	2002/03	1990	2000	1985	2003
Market work	**294.1**	**251.9**	**362.4**	**308.0**	**248.7**	**270.2**	**303.0**	**312.6**
Household production	**193.8**	**182.7**	**91.8**	**120.0**	**151.9**	**149.2**	**142.3**	**163.2**
All work	**487.9**	**434.6**	**454.2**	**428.0**	**400.6**	**419.4**	**445.3**	**475.8**
Tertiary time	**631.1**	**652.0**	**681.0**	**591.6**	**631.0**	**623.2**	**643.1**	**616.0**
Leisure	**321.0**	**353.4**	**304.9**	**420.4**	**408.3**	**397.3**	**351.6**	**348.1**

words, how much of the di erence that we observe across countries represents true di erences in behavior, and how much is due to di erences in the heterogeneous characteristics of the populations? We thus ask what the allocation of time would look like in Germany, Italy, the Netherlands and the U.S. in each year and for each sex if the sample respondents had the same characteristics on average as did Americans of the same sex and ages in . Viewed obversely, we are asking how much of the di erence between time allocation in the other country/at another time and the U.S. in results from di erences in underlying demographic characteristics.

Examining these decompositions is important. We know, for example, that Italian fertility in the last decade has been far below that of the U.S. and the Netherlands. Adjusting for di erences in the age distribution of the populations and for the age and presence of children, adjustments that account for pre-labor market outcomes that may a ect choices about time use, makes sense. There have also been substantial di erences in unemployment rates between, on the one hand, the U.S. and the Netherlands, and on the other hand, Germany and Italy. It makes no sense, however, to disaggregate time use by employment status: To at least some extent the choice between employment and unemployment is endogenous to other decisions about time use, including the split between All Work and tertiary activities/leisure; and, in any case, we are interested comparisons throughout the labor market.

In Tables . we present the means of each of the four aggregates for the three European countries measured at the means of a number of demographic variables in the United States in . The averages are adjusted to account for di erences in age (a quadratic relationship), marital status, the age of one's spouse if married (again a quadratic relationship), spouse's hours of market work or work status (if married), and the presence of children under age , and between ages and . Calling this vector of control variables X, we are thus making the adjustment for, e.g., Germany in /

Table 1.3F. Predicted Time Use (minutes), Women, if All Samples Had U.S. 2003 Demographic Characteristics

	Germany		Italy		The Netherlands		U.S.	
	$\hat{G}^{1991}_{US\,2003}$	$\hat{G}^{2001}_{US\,2003}$	$\hat{I}^{1988}_{US\,2003}$	$\hat{I}^{2002}_{US\,2003}$	$\hat{N}^{1990}_{US\,2003}$	$\hat{N}^{2000}_{US\,2003}$	$\hat{U}^{1985}_{US\,2003}$	$\hat{U}^{2003}_{US\,2003}$
	1991/92	2001/02	1988/89	2002/03	1990	2000	1985	2003
Market work	**246.8**	**130.9**	**149.8**	**133.2**	**83.8**	**121.2**	**189.5**	**200.7**
Household production	**242.1**	**315.7**	**373.4**	**374.1**	**291.6**	**271.6**	**262.2**	**271.3**
All work	**488.9**	**446.6**	**523.2**	**507.3**	**375.4**	**392.8**	**451.7**	**472.0**
Tertiary time	**641.8**	**672.5**	**671.4**	**587.8**	**646.8**	**660.1**	**653.4**	**640.6**
Leisure	**309.2**	**320.9**	**245.4**	**344.9**	**417.7**	**387.0**	**335.0**	**327.2**

as:

$$\hat{G}^{1991}_{US2003} = \beta^{G1991} X^{*}_{US2003}, \qquad (\ .\ )$$

where X^{*} is the vector of means of the control variables X, measured for the U.S. in .

Tables . make it very clear that these adjustments to account for cross-sectional di erences in the underlying characteristics of the populations do not alter any of the inferences that we have made about di erences in time use across countries or over time. Just as one example, comparing the Dutch data in Tables . and . , we see that there are some di erences (never more than minutes per category) between the adjusted and unadjusted means. These di erences are not large, even though they are among the larger of those in the tables, and in no way do they change any of our conclusions about the sharp changes in time allocation in the Netherlands over the decade. The Netherlands would have seen sharp increases in market work and decreases in household production among women even if the Dutch had on average possessed the same demographic characteristics in both and as the U.S. had in .

The inferences about Germany in Tables . and . would not be altered if German demographics were the same as those in the United States in . West Germany experienced a tremendous economic boom in the early s as a result of re-unification, which was followed by more than a decade of very slow growth. The substantial drop in market work among women and the very partially o setting rise in household production would have occurred had the women's characteristics not changed. To the extent that one believes the classifications of activities that we have made, the di erences implicit in Tables . and . are real, the result of changing behavior, and are not an artifact of underlying di erences in demographic characteristics among the countries.

The quantitative conclusions about the changes over time in Italy would be somewhat a ected had the demographic structure remained the same

over time (and the same as in the U.S.). In particular, the observed drop in men's market work would not have been so large, and the observed decline in women's household production time would not have occurred, if the demographic characteristics of the Italian sample had remained unchanged. Nonetheless, the comparisons to the U.S. for the early part of this decade remain unchanged: If Italy had the same demographic structure as the U.S. we would still observe less total work among Italian men and more among Italian women than among their American counterparts.

Because of the lack of comparability of the data in the two surveys, the decompositions for the U.S. shown in Tables . are less reliable than those for the two European nations. Nonetheless, they are interesting too. Among both men and women demographic change alone would have led us to expect only tiny changes in time allocation. In fact, leisure time and tertiary time dropped, while market work and household production increased.

Do these changes in the U.S. represent a still more harried existence for Americans? Perhaps; but, as noted above, issues of comparability may be important here. Even if they are not important, it is quite possible that household production activities took on new meaning over the nearly two decades covered by the data. Shopping may have become more enjoyable—high-end shopping may have replaced grocery shopping (and there is strong evidence that the latter did decrease between these surveys, Hamermesh, a). The unexpected drop in leisure time may have resulted from a shift at the margin toward enjoyable household production activities and away from less pleasant leisure activities. The lack of comparability of the detailed categories in the two surveys in the U.S. precludes distinguishing between these possibilities and renders any comparisons somewhat dubious.

Despite these caveats, the answer to the sub-titular question posed here is a resounding No. The di erences that we have noted in time use within countries over time, across countries, and in the EU countries compared to the U.S. exist independent of any di erences in the age, marital or fertility structures of the countries.

V. Weekdays or weekends, days or hours, nights or days—does it matter?

All of the comparisons thus far are for the representative day in the week. We have made no distinctions among when the activities are performed. But **when** people do things does matter: Doing an activity on the same time each day reduces set-up costs, but generates boredom (Hamermesh,); undertaking an activity when others, especially one's spouse, are doing it is more enjoyable in many types of tertiary activities and leisure; and jointly undertaking an activity increases productivity in many kinds of

market and household production (Hamermesh, ; Jenkins and Osberg,). While there are many possibilities for comparisons of di erences and changes in the timing of activities in these four economies, here we deal only with three of the simplest: How do the amounts of the di erent activities performed di er among the countries and between sexes on weekdays as compared to weekends, and how did these di erences change over the past years? How does the pattern of activities vary across the days of the week more generally? How does the timing of market work over the twenty-four hours of the working day di er among countries?

A. Weekday-weekend differences. Unlike the cross-country comparisons in Section . , where potential di erences in the underlying categorizations required us to exercise great care, here such comparisons are less problematic. Most di erences in categorizations will wash out when we compare weekday-weekend di erences in time allocations in one country to weekday-weekend di erences in time allocations in another. In this Section we thus start with these international comparisons, since they are striking. Tables . M and . F present the average time allocations for the four major aggregates and the four sub-aggregates; here, however, we present these averages separately for weekdays and weekend days.

Unsurprisingly, there is less market work by both men and women in all four countries on weekends than on weekdays. What is somewhat surprising is how much more work is performed in the United States on weekends than in the two northern European countries, and how little Italy di ers from the U.S. in this regard. In both the Netherlands and Germany the increase in leisure time on the weekends is much more pronounced than in the U.S. Northern Europeans work in the market (less than Americans) during the week, and concentrate their leisure (much more than Americans) on weekends. No doubt some of this is due to di erent rules on store-opening hours that generate increased retail employment on weekends. Given the size of the retail sector, however, the much smaller di erence in market work between weekdays and weekends in the U.S. than in northern Europe must be due to di erences in other industries, most likely services. Perhaps that explains the similarity between the Italian and U.S. results too.

International di erences in the hebdomadal patterns of household production and tertiary activities are also fascinating. Tertiary activity is greater on weekends in all four countries, due almost entirely to the extra nearly one hour of sleep that the typical adult gets each weekend day compared to each weekday. The major cross-country di erence is in the distribution of household production over the week. In all three European countries women undertake more household production on weekdays than on weekends; the opposite is true among American women. We believe this result stems at

Table 1.4M. Time Allocations (minutes), Men, Averages and Their Standard Errors, Weekdays and Weekends Separately

		Germany		Italy		The Netherlands		U.S.	
		1991/92	2001/02	1988/89	2002/03	1990	2000	1985	2003
	No. week-day diaries	4,369	6561	4238	6424	2975	3230	1177	3844
	No. week-end diaries	1,485	3546	7973	11,804	1190	1292	470	3906
Market work	Week-days	**385.4 (4.1)**	**340.4 (3.5)**	**438.4 (4.3)**	**357.1 (3.6)**	**340.3 (5.3)**	**332.8 (5.3)**	**373.0 (8.2)**	**392.0 (4.7)**
	Week-ends	**77.5 (4.6)**	**67.6 (2.8)**	**172.7 (2.8)**	**123.5 (2.1)**	**48.4 (4.2)**	**57.4 (4.5)**	**152.5 (11.2)**	**112.0 (3.6)**
Household production	Week-days	**194.6 (2.8)**	**172.1 (2.0)**	**80.1 (1.8)**	**110.1 (1.7)**	**137.4 (2.6)**	**138.3 (2.6)**	**132.7 (4.6)**	**146.0 (2.6)**
	Week-ends	**213.0 (4.3)**	**178.4 (2.6)**	**99.9 (1.4)**	**127.3 (1.3)**	**160.7 (4.5)**	**159.6 (4.2)**	**152.0 (7.1)**	**206.5 (3.1)**
Family care	Week-days	18.9 (0.8)	17.1 (0.5)	17.1 (0.6)	18.9 (0.6)	16.6 (0.8)	15.6 (0.9)	15.7 (1.4)	27.7 (1.1)
	Week-ends	26.4 (1.68)	20.1 (0.8)	21.0 (0.5)	20.4 (0.5)	21.9 (1.5)	20.1 (1.6)	16.3 (2.2)	29.5 (1.3)
Shopping	Week-days	40.6 (0.9)	52.5 (1.0)	23.0 (0.7)	31.6 (0.8)	32.1 (1.2)	34.9 (1.1)	40.5 (2.1)	39.5 (1.2)
	Week-ends	35.7 (1.5)	40.2 (1.32)	26.6 (0.6)	35.7 (0.6)	32.1 (2.2)	37.1 (2.0)	44.2 (3.4)	52.9 (1.5)
All work	Week-days	**580.0**	**512.5**	**518.4**	**467.2**	**477.7**	**471.1**	**505.7**	**538.0**
	Week-ends	**290.5**	**246.0**	**272.6**	**250.8**	**209.1**	**217.0**	**304.5**	**318.5**
Tertiary time	Week-days	**597.5 (1.4)**	**623.4 (1.6)**	**667.3 (1.8)**	**577.5 (1.5)**	**603.3 (2.3)**	**611.3 (2.3)**	**628.1 (4.2)**	**598.2 (2.4)**
	Week-ends	**702.3 (3.4)**	**731.7 (2.6)**	**723.2 (1.4)**	**639.3 (1.3)**	**676.2 (3.9)**	**691.5 (4.2)**	**677.0 (7.2)**	**661.4 (2.5)**
Sleeping	Week-days	471.2 (1.4)	478.2 (1.4)	504.5 (1.5)	484.8 (1.3)	477.0 (1.7)	486.7 (1.9)	469.1 (3.5)	478.3 (2.0)
	Week-ends	551.1 (3.0)	549.8 (2.1)	548.1 (1.3)	526.6 (1.1)	529.1 (3.1)	546.2 (3.4)	506.2 (6.1)	538.9 (2.2)
Leisure	Week-days	**262.5 (2.3)**	**304.1 (2.1)**	**254.6 (3.1)**	**395.3 (2.5)**	**359.0 (3.8)**	**357.1 (3.7)**	**306.2 (5.9)**	**303.8 (3.6)**
	Week-ends	**447.3 (5.1)**	**462.4 (3.2)**	**444.4 (2.5)**	**549.9 (1.92)**	**554.6 (5.7)**	**531.5 (5.8)**	**458.6 (10.4)**	**460.0 (3.8)**
Radio/TV	Week-days	104.7 (1.4)	122.7 (1.3)	104.8 (1.3)	108.4 (1.2)	113.2 (2.0)	105.0 (1.8)	134.8 (3.8)	142.8 (2.5)
	Week-ends	140.6 (3.2)	165.9 (2.3)	123.2 (1.15)	129.9 (1.0)	150.5 (3.7)	153.6 (3.9)	181.6 (7.7)	204.9 (3.0)

least in part from the di erences in store-opening hours (Burda and Weil,) between Europe and the U.S., since much of the di erence we observe occurs in time spent shopping. It is interesting to note that the loosening of store-opening restrictions in the Netherlands did not result in much of a convergence in time spent shopping on weekdays and weekends there.

The much greater distinction between weekdays and weekends that we have observed for market work carries over to the weekly distinction in All Work—it is not simply due to di erences in market behavior that are o - set by household production. As the averages in Table . M for All Work show, in both the Netherlands and Germany men perform over twice as much total work on weekdays than on weekends, and Italian men perform nearly percent more market work on weekdays than on weekends. In the U.S. men perform only percent more work on weekdays than on weekends. The international di erences among women are somewhat smaller:

Table 1.4F. Time Allocations (minutes), Women, Averages and Their Standard Errors, Weekdays and Weekends Separately

		Germany		Italy		The Netherlands		U.S.	
		1991/92	2001/02	1988/89	2002/03	1990	2000	1985	2003
	No. week-day diaries	5871	7494	4664	6879	4680	4700	1390	4869
	No. week-end diaries	2131	4076	8615	12,775	1872	1880	530	5049
Market work	Week-days	**304.4 (3.6)**	**172.9 (2.6)**	**173.3 (3.5)**	**164.6 (2.8)**	**118.4 (3.0)**	**161.3 (3.4)**	**224.8 (6.8)**	**256.6 (3.9)**
	Week-ends	**58.6 (3.3)**	**32.7 (1.7)**	**61.6 (1.7)**	**55.2 (1.4)**	**24.4 (2.3)**	**32.6 (2.7)**	**76.5 (7.9)**	**62.5 (2.3)**
Household production	Week-days	**240.5 (2.4)**	**330.1 (2.2)**	**385.6 (3.0)**	**354.8 (2.5)**	**318.3 (2.7)**	**281.8 (2.7)**	**260.6 (5.2)**	**264.6 (3.0)**
	Week-ends	**244.5 (3.5)**	**266.1 (2.5)**	**359.2 (2.0)**	**327.5 (1.7)**	**247.1 (3.6)**	**232.3 (3.8)**	**269.6 (8.2)**	**288.0 (2.8)**
Family care	Week-days	22.5 (0.7)	46.0 (1.0)	45.9 (1.0)	42.1 (1.0)	60.1 (1.4)	55.7 (1.4)	47.0 (2.5)	66.0 (1.6)
	Week-ends	28.0 (1.4)	31.3 (1.1)	54.4 (0.8)	30.9 (0.7)	45.2 (1.8)	40.1 (1.9)	37.1 (3.2)	46.5 (1.4)
Shopping	Week-days	50.5 (0.8)	76.1 (0.9)	45.6 (0.7)	55.3 (0.8)	54.2 (1.0)	56.3 (1.1)	57.9 (2.3)	55.3 (1.2)
	Week-ends	36.0 (1.2)	40.5 (1.0)	33.2 (0.7)	46.8 (0.7)	38.6 (1.6)	44.4 (1.8)	60.7 (4.1)	69.4 (1.4)
All work	Week-days	**544.9**	**503.0**	**558.9**	**519.5**	**436.7**	**443.1**	**485.4**	**521.2**
	Week-ends	**303.1**	**298.8**	**420.9**	**382.8**	**271.5**	**264.9**	**346.1**	**350.5**
Tertiary time	Week-days	**626.7 (1.6)**	**647.5 (1.4)**	**660.0 (1.5)**	**579.3 (1.3)**	**630.5 (1.8)**	**641.7 (1.8)**	**641.8 (3.6)**	**620.6 (2.0)**
	Week-ends	**708.5 (2.7)**	**745.9 (2.2)**	**702.5 (1.2)**	**626.8 (1.1)**	**683.1 (3.2)**	**703.8 (3.2)**	**683.5 (5.9)**	**689.9 (2.1)**
Sleeping	Week-days	488.4 (1.3)	491.1 (1.2)	505.1 (1.3)	491.0 (1.1)	498.3 (1.4)	510.2 (1.6)	472.0 (2.9)	494.3 (1.7)
	Week-ends	554.5 (2.3)	554.1 (1.7)	532.7 (1.1)	518.6 (1.0)	533.0 (2.4)	557.8 (2.8)	508.6 (4.8)	551.3 (1.8)
Leisure	Week-days	**268.4 (1.9)**	**289.5 (1.8)**	**221.3 (2.4)**	**341.3 (2.1)**	**372.7 (2.7)**	**355.3 (2.7)**	**312.7 (5.1)**	**298.0 (3.0)**
	Week-ends	**428.5 (3.8)**	**395.4 (2.7)**	**316.8 (1.9)**	**430.5 (1.6)**	**485.5 (4.4)**	**471.3 (4.5)**	**410.4 (8.2)**	**399.4 (3.0)**
Radio/TV	Week-days	138.4 .2.4)	93.7 (1.0)	94.4 (1.1)	87.9 (1.0)	85.6 (1.3)	93.9 (1.3)	130.8 (3.6)	128.5 (2.0)
	Week-ends	117.3 (2.0)	116.9 (1.6)	97.2 (0.2)	92.0 (0.8)	107.8 (2.4)	110.8 (2.5)	138.6 (5.4)	147.9 (2.2)

German and Dutch women perform roughly percent more total work on weekdays than on weekends, American women perform only percent more total work on weekdays. Italian women perform only percent more work on weekdays—their household production decreases relatively little on weekends.

Very clearly, the European norm, at least among men, is to perform a much greater fraction of their total work (both in the market and at home) on weekdays than on weekends, leaving weekends especially free for personal care and leisure. Americans—especially men—mix their work and non-work (tertiary activities and leisure) much more between weekdays and weekends than do Europeans.

Interestingly, the only available evidence suggests this homogenization of the week among Americans was not always the case. Using the data in (Szalai, , Tables III. and III.), one can calculate that among employed men in the U.S. in the ratio of total work time on weekdays to that

Table 1.5. Indexes of Similarity, Weekday and Weekend Activities

	Germany		Italy		The Netherlands		U.S.	
	1991/92	2001/02	1988/89	2002/03	1990	2000	1985	2003
Men	**2.57**	**2.42**	**1.83**	**1.69**	**2.98**	**2.66**	**1.54**	**2.20**
Women	**2.45**	**2.53**	**1.58**	**1.54**	**2.35**	**2.34**	**1.50**	**2.02**

on weekends was . ; among working women it was . ; and even among housewives it was . times weekend work. While the data are not entirely comparable to those in Tables . , it does seem likely that the weekly allocation of time in the U.S. nearly one-half century ago was much more concentrated—much more European–than it is now.

Table . calculates indexes similar to those based on (.), but instead of measuring the extent of similarity in time allocations across gender, for each gender and within each country and year we infer the degree to which the allocation of time on weekdays across the four aggregates is like that on weekends. A lower value of the index implies that the representative individual's time allocations on weekdays and weekends are more similar. The calculation of this index reinforces our inference from Tables . that Americans do not distinguish between weekdays and weekends nearly so much as northern Europeans—that the distribution of activities on di erent days of the week is more similar in the U.S. than in northern Europe. Italians, on the other hand, distinguish even less in their weekly distribution of all activities.

Despite the lesser degree of temporal specialization of activities in the U.S. than in northern Europe, clear-cut changes have occurred in the recent past. The index rose substantially in the U.S. over the eighteen years to , especially among men. Among Dutch men, on the other hand, it fell during the s, but there was no change among Dutch women. The changes in Germany were small for both genders, as they were in Italy. While there has been convergence across the Atlantic Ocean, the change has resulted from changed behavior in the U.S. alone.

There is no reason for the optima to be the same in the two areas. While technologies are undoubtedly similar, or at least approximate each other rapidly in response to technological shocks, the optima that result from the interactions of di ering preferences (including those expressed in governmental mandates) and technology will surely di er. Thus while the sharp decline in weekend work in the U.S. is consistent with the observation that work at unusual times is undesirable (Hamermesh,) and will diminish in a growing economy with unchanging preferences and time-neutral technologies, the increase in weekend work in the Netherlands cannot be

Table 1.6. Percent of Difference from U.S. in Average Daily Minutes of Market Work Due to Difference in Fraction of Adults Working

	Germany		Italy		The Netherlands	
	1991/92	2001/02	1988/89	2002/03	1990	2000
All adults	86.2	137.3	435.6	100.3	97.8	96.8
Men	104.2	107.3	129.5	49.6	124.0	118.8
Women	85.8	160.6	84.1	88.2	71.4	74.0

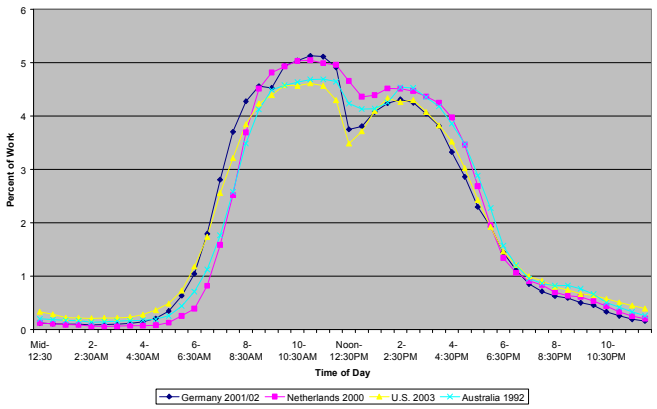
explained without reference to changes outside the workplace that have affected the timing of other activities and work too. Drawing inferences about changes in welfare from even such clear-cut changes as are shown in the tables in this Section is very tricky.

B. Workdays or workhours? These comparisons show that weekends and weekdays are more distinct in Europe than in the U.S. But is that true for all days across the week? More generally, how much of the di erence in the number of minutes worked in the market on a representative day in the U.S. and the European countries is due to di erences in the probabilities that people work in the market and, given that they do, that they work on a particular day? We are thus asking how much of the gap between minutes worked on a representative day is attributable to di erences in the fraction of adults working on that day.

For the two German, Italian and Dutch samples Table . shows the percentage of the di erence from the U.S. in the average amount of time worked per adult due to di erences in the probability of working on the day. The percentages cluster around , with Italian men in the recent survey being the only exception. These results suggest that the major di erence across the Atlantic is in the probability that the representative adult is working in the market on a particular day, not in the amount of time spent working on a day on which some market work is performed. Since in the recent surveys that we have used the average minutes of market work are greater in the U.S. than in Germany, Italy or the Netherlands, the table implies that the result is due entirely to Germans and Dutch of both genders, and to Italian women being less likely to work on a particular day (and less likely to work in the market at all during the week). When they do work in the market they work just as long as Americans on workdays. This corroborates the weekend/weekday di erence that we demonstrated earlier in this Section, since it implies more concentration of work activities across days of the week in Europe than in the U.S.

C. Work Timing over the Workday. Having seen that Americans tend to mix market work and non-market activities more evenly over the week,

Figure 1.1. Percent of Working Time Spent at Each Half-Hour of the Day, Germany, Netherlands, U.S. and Australia



one wonders whether they also mix them more evenly over the day. To examine this issue we considered the timing of work at each minute of the day among those who work on the particular day. We again consider Germany in / , the Netherlands in and the U.S. in (excluding Italy, since we lack Italian data on the timing of activities). For purposes of comparison to another English-speaking country, we also examine how Australians spread their work time over the day, using data from (ABS,). We examine the allocations of working timing on Wednesdays, the weekday on which the largest fractions of workers in these data perform at least some work. (The international comparisons are essentially identical on other weekdays.)

Figure . presents the results for every half-hour interval over the day between midnight and the subsequent midnight. The Figure shows the percentage of the day's work done at each half-hour; it thus abstracts from cross-national di erences in the amount of time the average worker spends on the job during the day. Until AM, and after PM, a higher fraction of those who work at all on the day are at work in the U.S. than in the other three countries. Workers in Germany and the Netherlands are at work disproportionately only during prime daylight hours—very few are working between midnight and AM, and not very many are working after PM. The timing of work in Australia is somewhere between that in the U.S. and

Because the activities are coded in -minute intervals in the Dutch data, and to avoid masses of repetitive information, we aggregate the time intervals to half-hour periods in this analysis.

northern Europe. The main conclusion from these results is that, just as with their timing of work over the week, so too do Americans mix their market work and non-work over the day. Unlike northern Europe, where most workers are either at work or not, in the U.S. many workers are working at non-standard times of the day.

VI. What have we learned?

As noted in the Introduction, EU-U.S. di erences in patterns describing the amount of market work have been studied nearly *ad nauseam*; we thus refrain from repeating those findings that simply reproduce what others in that vast literature have shown. Instead, we can divide our novel, or at least somewhat novel results into three categories.

A. General findings.

( ) *While household production falls when time devoted to market work increases, the trade-off is not one-for-one.* Both within a country over time and across countries at a point in time, there is no constancy of total work.

( ) *Fluctuations in aggregate demand alter the mix of total work between the market and the home.*

B. EU vs. U.S..

( ) *Americans enjoy less leisure (not merely less time away from market work) than Europeans.* The di erence in non-television leisure time is even greater, since Americans watch TV over one-half hour more per day than Europeans.

( ) *Americans work more than Europeans—the American excess of market work is not fully offset by less home work.*

( ) *Americans mix their activities over the week more than Europeans.* Their weekends look more like their weekdays than do those in northern Europe.

( ) *Market work is more spread out over the twenty-four hours of the day in the U.S. than in the EU or elsewhere.*

C. Gender differences.

( ) *Men and women spend the same amount of time in All Work—the total of paid and unpaid work.* This phenomenon holds in the three northern countries we examined, but not in Italy. Sociologists have shown that it appears to be true in most wealthy countries.

A similar calculation by Callister and Dixon ( ) using the New Zealand Time Use Survey shows a pattern that is more tilted toward standard business hours than is Australia's.

( ) *Women spend less time in leisure than men.* They spend much more time in household production, slightly more time in tertiary activities.
( ) *Gender differences in how people spend time are smaller in the U.S. than in the European countries studied here.* This di erence is partly due to the lesser di erence in market work time in the U.S., partly to a greater similarity across genders in the U.S. in the distribution of time spent outside the market.

Appendix: classification of basic activities into the main aggregates in the eight samples

Note: In many of the survey a very small part of the day was not classified or truly miscellaneous. In each case those totals were prorated across the four main aggregates.

Activity	Description
Market work	Employment and job search
Secondary	Home work activities; handicraft/gardening; care and sitting
Tertiary	Personal activities; physiological regeneration
Leisure	Volunteer and other social help; education; contacts/conversation/friendship; media usage/free-time activities

Table 1.7. Germany: / , /

Activity	Description
Market work	Professional activities; training
Secondary	Domestic activities; family care; purchasing goods and services
Tertiary	Sleeping eating, including at work
Leisure	Nonwork-related education; religious/civic/political activities; free time. Travel time is prorated across market work, secondary time and leisure in / , and is specifically assignable in /

Table 1.8. Italy: / , /

Activity	Description
Market work	Occupational work and related travel
Secondary	Household work, do-it yourself, gardening, etc; childcare; shopping
Tertiary	Personal needs
Leisure	All else

Table 1.9. Netherlands: ,

Activity	Description
Market work	All working and work-related activities; travel related to work
Secondary	Cooking, cleaning, child care, shopping; travel related to these
Tertiary	Personal care outside the house; eating and drinking; sleeping, sex; travel related to these
Leisure	Schooling and training; organized activities; entertainment; sports; reading, writing; travel related to these

Table 1.10. US:

Activity	Description
Market work	All working and work-related activities; travel related to work
Secondary	All household activities; caring for and helping household members; consumer purchases; professional and personal care services; household services; government services; travel related to these
Tertiary	Sleeping, other personal activities; eating and drinking; travel related to these
Leisure	Non-household care activities; education; socializing-relaxing-leisure; sport; religious; etc.; volunteering; travel related to these

Table 1.11. US:

CHAPTER

Explaining the data

In the previous chapter, we have established two fundamental features of time use: *total work*, defined as the sum of time spent on market work and on home production, is almost invariant, in most economically advanced countries, at a given point in time, to gender. Furthermore, the way Americans and Europeans use their time during weekends is strikingly di erent: US weekends look much more like weekdays than is true in Europe. This chapter explores possible theoretical explanations of these facts.

I. The iso-work fact

In most economically advanced countries, *total work*, defined as the sum of time spent on market work and on secondary activity (or, to use a somewhat more common terminology, the total time spent on market and home production) is almost invariant to gender. This is what we called the *iso-work fact*. Only one country, Italy, is a distant outlier.

To understand the economic content of the equal work fact, it is best to point out what it does *not* mean:

- It does not mean that total work is the same across countries. This is simply not true. There is little support in the data for the Freeman and Schettkat ( ) "marketization hypothesis."
- It does not mean that total work is constant over time in a given country. Quite on the contrary, there is evidence in our data that total work might be sensitive to the state of the business cycle, and it stands to reason that it should have a downward secular trend.
- It does not mean that all individuals choose, in a given country and at a given date, the same allocation of time between market and home production. Time use does depends on gender, but the point is that, in the aggregate, total work does not: gender only a ects the division of total work between market work and secondary activity, not its level.

The invariance of total work to gender means that there is a mechanism at work, at a given date and in a given country, that on average leads both

Our total work fact is thus much stronger the Freeman and Schettkat ( ) "marketization hypothesis."

Table 2.1M. Time Allocations (minutes), Married People, Means and Their Standard Errors, Men and Women Separately

		Germany		Italy		The Netherlands		U.S.	
		1991/92	2001/02	1988/89	2002/03	1990	2000	1985	2003
Market work	Men	**340.9** (4.8)	**269.8** (3.3)	**373.5** (3.1)	**228.2** (2.9)	**266.5** (5.1)	**258.6** (5.3)	**314.8** (8.7)	**329.1** (4.4)
	Women	**253.3** (3.8)	**111.1** (2.1)	**124.9** (2.2)	**95.6** (1.9)	**87.0** (2.6)	**111.0** (3.1)	**159.9** (16.9)	**182.4** (3.4)
Secondary time	Men	**174.0** (2.6)	**175.1** (1.8)	**94.5** (1.3)	**133.7** (1.5)	**152.7** (2.7)	**155.0** (2.7)	**149.9** (4.8)	**179.0** (2.6)
	Women	**222.0** (2.3)	**336.3** (2.0)	**435.5** (1.8)	**391.2** (1.9)	**321.9** (2.5)	**302.3** (2.7)	**305.0** (5.8)	**313.8** (2.8)
Male Total Work - Female Total Work		**39.6**	**-2.5**	**-92.2**	**-123.9**	**10.3**	**0.3**	**-0.2**	**11.9**
Tertiary time	Men	**624.1** (2.1)	**655.9** (1.7)	**685.2** (1.3)	**611.3** (1.4)	**623.7** (2.3)	**633.6** (2.5)	**645.3** (4.3)	**609.3** (2.0)
	Women	**652.4** (1.8)	**680.9** (1.5)	**663.0** (1.0)	**592.3** (1.1)	**642.8** (1.8)	**660.2** (1.9)	**653.3** (3.8)	**635.5** (1.8)
Leisure	Men	**300.9** (2.9)	**339.1** (2.1)	**287.0** (2.2)	**466.8** (2.2)	**397.1** (3.8)	**392.8** (3.8)	**329.9** (6.4)	**322.5** (3.2)
	Women	**312.4** (2.4)	**311.7** (1.8)	**216.9** (1.5)	**360.9** (1.6)	**388.4** (2.7)	**366.5** (2.8)	**322.6** (5.2)	**308.1** (2.7)

gender groups to choose the same amount of total work. What could this mechanism be?

A. Specialization and fairness within the household. A first possibility is that the equality of male and female total work results from the interaction between optimal specialization and a desire for fairness within the household, as suggested by Table . M.

Imagine, for instance, that John might has a comparative advantage in home production over his lawyer wife Helen. As a result, they have decided that he would be a househusband while she would practice law in a firm. The implicit contract between them stipulates that while John spends his days taking care of the kids and cleaning up the house, Helen should really work, and not spend her afternoon playing golf with her partners. In return, John has promised Helen, who comes back exhausted from a full day at the o ce, that the kids will be clean, the house tidy and dinner ready when she returns home from the o ce in the evening. John starts his day of home work when Helen leaves the house, and is done by the time she comes back in the evening. As a result, total work is identical for both spouses in the Helen and John household, but its is allocated di erently for each across market and secondary activities. If Helen and John both worked in the market and split housework, they would arrange their working days so that, in the end, they enjoy the same total amount tertiary and leisure activities, i.e., the same amount of total work in the market and at home.

B. Unmarried agents. However seductive and intuitive this explanation might sound, it however does not account for another feature of the

Table 2.1U. Time Allocations (minutes), Unmarried People, Means and Their Standard Errors, Men and Women Separately

		Germany		Italy		The Netherlands		U.S.	
		1991/92	2001/02	1988/89	2002/03	1990	2000	1985	2003
Market work	Men	226.6 (5.7)	241.1 (5.5)	324.9 (5.5)	348.3 (3.1)	222.6 (9.2)	243.6 (8.0)	294.80 (12.5)	283.8 (5.5)
	Women	182.9 (4.8)	175.0 (3.8)	182.4 (4.2)	171.1 (2.5)	105.2 (5.1)	152.2 (5.2)	217.4 (19.3)	223.5 (4.1)
Secondary time	Men	241.1 (4.3)	170.4 (3.5)	58.5 (1.9)	97.6 (1.4)	113.0 (4.1)	120.5 (3.7)	113.7 (4.1)	135.6 (3.0)
	Women	281.9 (3.5)	263.9 (2.9)	237.3 (3.0)	302.0 (2.1)	226.3 (4.1)	196.9 (3.5	202.1 (6.0)	218.5 (2.8)
Male Total Work - Female Total Work		2.9	-27.4	-36.3	-27.3	-4.1	15.0	-11.0	-22.6
Tertiary time	Men	633.1 (2.8)	649.3 (3.2)	678.2 (2.2)	580.0 (1.4)	625.7 (4.7)	635.6 (4.2)	636.4 (6.9)	627.8 (3.1)
	Women	649.5 (2.4)	665.4 (2.3)	694.6 (1.8)	593.7 (1.3)	653.9 (3.2)	657.8 (3.1)	654.1 (5.3)	646.9 (2.4)
Leisure	Men	339.2 (4.2)	379.3 (4.0)	378.9 (4.5)	414.1 (2.3)	478.7 (7.8)	440.3 (6.7)	395.0 (10.1)	392.6 (4.7)
	Women	325.7 (3.9)	335.6 (1.6)	326.0 (3.2)	373.2 (2.0)	454.7 (4.9)	433.2 (4.7)	366.5 (7.8)	351.0 (2.5)

data, exhibited in Table . U: total work is also invariant across gender for the *unmarried*.

Thus, while the unmarried specialize less than the married, the amount of total work that unmarried men perform is very close to that of unmarried women in a given country and in a given year. This implies that we cannot invoke the interaction of specialization and fairness within the household to explain the equal work fact. There must be a mechanism that coordinates the total time spent on market work and secondary activities across males and females, whether they are married or unmarried.

The simplest coordination device that equalizes total work across agents is a *social norm for leisure* that serves as focal point for the determination of total work. Peer pressure or a strong desire to conform to social norm for time allocation mute market incentives and weaken the impact of individual tastes. As a result, time use becomes more similar across individuals. If the social norm is strong enough to drive the agent to fully conform, we obtain the equal work result we have observed in the data. Alternative explanations of the iso-work fact are of course possible: all must involve, in one way or another, the interplay between social interactions and individual tastes. The social norm story we tell here is just one instance of social interaction.

For a survey of social norms and economic theory, see Elster ( ). Social norms have been studied, among others, by Akerlof ( ), Jones ( ), Cole, Mailath, and Postlewaite ( ), Kandori ( ), Young ( ), Lindbeck ( ), and Lindbeck, Nyberg, and Weibull ( ).

In this simple story, total conformity only occurs if the desire to conform is infinitely strong. The literature (Bernheim,) has sought ways to obtain full conformity without assuming an infinite cost of deviance.

II. Social norms for leisure

Imagine that, *in the absence of a social norm*, the demand for leisure of an agent depends negatively (and linearly) on the wage rate:

$$L = 1 - \epsilon w.$$

The amount of time available (say, in a week) is normalized to 1, and $\epsilon > 0$ measures the sensitivity of leisure to the wage rate w. We call this outcome the agent's *intrinsic optimum*.

Now suppose that there is a social norm that influences, but does not mandate, individual leisure. We mean by this that agents have the choice of the extent to which they stick to the norm, and optimally balance the marginal costs and benefits of deviating from the norm. The cost of deviating may stem from guilt (an internal psychological process) or shame (an external peer pressure mechanism or reputational mechanism). The benefit of deviating results from the joy of following one's own unbridled inclinations that in general di er from the norm.

Formally, let us measure the strength of the social norm by a coe cient $\phi \geq 0$. When $\phi = 0$, there is no social norm, and agents choose $L = 1 - \epsilon w$. When $\phi = +\infty$, the hold of norm on the agent's behavior is infinitely powerful so that, if we call L^* the social norm for leisure, agents pick $L = L^*$ regardless of their w and ϵ. For ϕ between zero and infinity, the social norm pulls optimal leisure choice away from $1 - \epsilon w$ and towards L^*: Hence

$$L = \alpha(1 - \epsilon w) + (1 - \alpha)L^* \equiv L(w),$$

with the weight α, between 0 and 1, given by

$$\alpha = \frac{1}{1 + \phi\epsilon.}$$

This would result from the case in which consumers maximize in each period the utility function $C - (1/2\epsilon)(1 - L)^2$ subject to the budget constraint $C = \Omega + w(1 - L)$, where Ω is non-labor income.

By assuming $\epsilon > 0$, we rule out for simplicity cases in which the labor supply curve is backward-bending. Leisure demand, and labor supply, become wage-inelastic when $\epsilon \to 0$. In that case, our specification implies, somewhat unpleasantly, that $L = 1$ so that agents do not work. This could be fixed by writing instead $L = L_0 - \epsilon w$ with $L_0 \in (0, 1)$. We keep the formulation $L_0 = 1$ in order to lighten the notational burden.

The strength of the norm for an individual may depend on the number of people who have adopted it. We examine this possibility below.

This linear formulation follows from assuming that a deviation from the norm entails a quadratic utility loss, i.e., from maximizing $C - (1/2\epsilon)(1 - L)^2 - (\phi/2)(L - L^*)^2$ with respect to L.

The coe cient α is large, and optimal leisure is far from the norm, if the social norm is weak (ϕ small) or leisure is not very elastic (ϵ small). Higher wages, keeping α constant, increase the distance between L and L^*.

Now assume that male (M) and female (F) wages di er, but that the wage sensitivity of leisure (α) is identical across sexes. The resulting *leisure gap* between man and women is

$$\begin{aligned} L^m - L^f &= L(w^m) - L(w^f) \\ &= -\alpha\epsilon(w^m - w^f). \end{aligned}$$

A. Iso-work. Explaining the iso-work fact requires examining under which circumstances the leisure gap $L^m - L^f$ may be zero (or indeed very small). Since α collapses to zero as ϕ goes to infinity, this requires that the strength of the norm be infinitely (or very) strong, for

$$\lim_{\phi\to\infty}(L^m - L^f) = 0.$$

In words, a very strong norm mutes the e ect of wages on leisure, and equalizes male and female leisure.

While this result may appear trivial, its derivation reveals what is perhaps the most crucial ingredient of a norm-based explanation of the total work fact: the assumption that men and women share a *gender-neutral norm*. It is because the leisure norm of males and females is gender-neutral that a larger ϕ wipes out the di erences between male and female leisure. Were the norm correlated with gender, we would in general observe, ceteris paribus, di erent male and female leisure even when $\phi = +\infty$. Hence the fact that total work is relatively invariant to gender in high-income countries (but less so in poorer economies) suggests, if the social norm story is correct, that a fundamental change of norms takes place in the process of economic development: gender-neutral, or gender-blind norms replace gender-specific references for leisure (and more generally for consumption).

B. Accounting for variations in total work. The data presented in Chapter make it abundantly clear that although total work is strikingly equal across men and women, it does vary, sometimes substantially, across countries and over time. Since we are arguing that social norms may serve as a coordination device between the total work of males and females, we must

This last assumption, which is of course at odds with estimates of labor supply elasticities for males and females, can easily be relaxed.

Note that no causal statement is being made here. One can easily write models in which gender-specific norms cause economic backwardness, and models in which competition and development causes gender-equality.

now undertake the task of explaining why norms may vary across countries and dates.

So far, we have treated social norms as *exogenous*. One could argue that this is appropriate because norms reflect moral or religious imperatives that have little or nothing to do with economics. We could then conclude that total work is not the same in all places and at all times because norms vary as a function of culture or circumstances. This would be akin to the account given by Solow ( ) of the secular improvement of GDP per capita: standards of living keep improving, and capital remains productive enough at the margin to justify investment, because technical progress exogenously shifts up the production function over time. This explanation, like Solow's, would not be trivial: it would focus our attention on norms as the engine of change of total work (changing norms) in very the same way that Solow made us realize that ideas could be the engine of long-run growth.

However, in the same way that bringing back the determination of technological progress within the fold of economics has been a significant milestone for endogenous growth theory, we believe that endogenizing the norms that explain the iso-work fact is the right tack to take.

To that e ect, let us return to our simple model of social norms. Remember that male and female leisure are given by

$$L^m = \alpha(1 - \epsilon w^m) + (1 - \alpha)L^*,$$
$$L^f = \alpha(1 - \epsilon w^f) + (1 - \alpha)L^*.$$

Now if we view the gender-neutral norm L^* as reflecting *average leisure* across males and females in society, and there are equal proportions of men and women in the economy, it must be the case that, in equilibrium,

$$\frac{1}{2}(L^m + L^f) = L^*$$

Combining the last three equations and solving for L^*, we conclude that the *equilibrium social norm for leisure* is simply

$$L^* = 1 - \epsilon w^*,$$

where

$$w^* = \frac{w^m + w^f}{2}$$

is the average wage in the whole (male *and* female) population.

The story we are telling is very simple:

This endogenization of norms is at the heart of the recent literature on conformity. See Bernheim ( ).

- The equilibrium social norm for leisure is independent of its impact on the agent's tastes (ϕ), but it depends on the sensitivity of individual leisure to the wage (ϵ) and on the average wage rate in the economy ($\bar{w}$). Whenever these magnitudes change, across countries or over time, the social norm for leisure varies.
- The extent to which individual leisure ends up in equilibrium close to the social norm depends on the parameter ϕ. In the limit, when $\phi \to +\infty$, the iso-work fact hold exactly (the leisure gap between men and women is zero).

C. Summary. We have shown that a simple social interaction story—a social norm for leisure—may rationalize the equality of iso-work across genders. The norm itself can be endogenized, which may explain why total work varies so much across countries and over time. Thus, the current European "culture" that favors leisure can be viewed as an equilibrium outcome rather than as a taste di erence.

III. US vs. Europe: A model of coordinated leisure

Chapter has documented that Americans work more than Europeans, and that, in addition, the hebdomadal pattern of work di ers substantially between the two continents: in contrast with Europe, weekends look a lot like weekdays in the US.

One could of course argue that this is due to di ering tastes, but as usual explanations based on unobservable variables are not very persuasive—especially since Europeans actually worked more than Americans as recently as the s, as noted by Alesina, Glaeser, and Sacerdote ( ). Instead, we wish to show that wide divergence in leisure is possible across two otherwise identical economies if one is willing to entertain the possibility that there are leisure externalities across agents.

Imagine that consumers prefer, at the margin, spending their free time in the company of others rather than alone, i.e., that individuals have a preference for *coordinated leisure*. This preference for social leisure introduces an additional dimension of *strategic complementarity* between agents. If a consumer expects others to be working a lot, she prefers to also work (and

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In this section, we abandon for simplicity considerations related to social norms.

Weiss ( ) has studied related issues in the context of production externalities. Implications of the desire for coordinated leisure for the regulation of working hours is explored in Burda and Weil ( ). Alesina, Glaeser, and Sacerdote ( ) analyze the macroeconomic implications of "social multiplier," á la Glaeser, Scheinkman, and Sacerdote ( ), that stems from leisure externalities. Hamermesh ( ) has shown the role of leisure externalities within the household, and Jenkins and Osberg ( ) demonstrate their existence within regions.

consume) a lot, as most of the leisure she so foregoes so is solitary and not very valuable. Conversely, a consumer who expects others to rest a lot finds leisure more attractive, as it is more likely that it will be taken in its most valuable, i.e., common, form.

This strategic complementarity leads, under conditions that we will outline below, to *multiple Pareto-ranked competitive equilibria*. In the presence of a preference for social activities, the economy might end up either in a low-leisure, high-consumption equilibrium, or in high leisure, low-consumption equilibrium. Crucially, welfare is lower in the former equilibrium than in the latter outcome.

To make these points formally, we first examine optimal labor supply and consumption choice of households in the presence of a preference for common over solitary leisure. Second, we determine under which conditions multiple competitive equilibria arise in our economy, and we show how they can be Pareto-ranked. Finally, we characterize the economic rationale and e ects of blue laws.

A. Household preferences and the structure of time. The economy consists of a continuum of identical agents distributed over the interval $[0, 1]$. The utility function of a typical consumer is

$$u(C) + v(\ell), \qquad (\ .\ )$$

where C denotes consumption and ℓ is an *index* of total leisure to be defined below. We assume that

$$u(C) = \begin{cases} -\infty, & c = 0; \\ C, & c > 0, \end{cases}$$

and that $v(.)$ is increasing and concave, with $v(0)$ finite. This specification would yield, in a traditional model of consumption and leisure choices, an upward-sloping labor supply curve. It rules out uninteresting corner solutions with zero consumption, as no finite amount of leisure can compensate the consumer for the infinite negative utility felt when $C = 0$. Since $v(0)$ is finite, our model does not exclude, however, solutions with zero leisure. This means that we are only discussing here non-essential leisure, and that time that must be devoted to vital activities (say, sleep) is left outside of the model for simplicity.

The total leisure index ℓ depends linearly on solitary leisure ℓ_s (idle time spent alone) and common leisure ℓ_c (idle time spent with others):

$$\ell = \ell_s + \sigma\ell_c. \qquad (\ .\ )$$

The model could be generalized, without significantly a ecting the results, to more general utility functions.

The assumption of linearity is only made for analytical convenience. All that matters for our results is that neither form of leisure be essential in utility.

We assume that the parameter σ is greater than 1, i.e., that agents find a unit of common leisure more pleasurable than one unit of solitary leisure. Thus, σ measures the desire for *conviviality*. Without the assumption that $\sigma > 1$, it would be impossible to plausibly explain why we observe that consumers voluntarily coordinate their leisure activities (husband with wife, parents with children, friends, etc.). The case where $\sigma = 1$, in which agents do not distinguish between solitary and common leisure, is the one studied in standard models of consumption-leisure choice.

Assume that the day (or the week) is divided into two shifts: day and night (or weekdays and weekend). The length of each day is normalized to 2, and we assume the two shifts are of equal unit length. Individuals can choose to work in either or both of the shifts. Furthermore, assume that shifts are indivisible: an individual either works, or not, during a shift. Labor supply in shift $t = 1, 2$ is thus an indicator variable x_t that takes value 1 if the individual works in shift t, 0 otherwise. Hence, total labor supply is $x_1 + x_2$, and the consumer's budget constraint is accordingly

$$C = w(x_1 + x_2), \qquad (\ .\ )$$

where we have assumed, for simplicity, the wage rate w to be the same in both shifts. In words, consumption is w or $2w$ depending on whether the consumer works one or two shifts.

Let X_t denote the average labor supply of *other* agents during shift t. In a pure-strategy Nash equilibrium, $X_t = 1$ if other agents work is thus

$$\ell_s = (1 - x_1)X_1 + (1 - x_2)X_2, \qquad (\ .\ )$$

while common leisure equals

$$\ell_s = (1 - x_1)(1 - X_1) + (1 - x_2)(1 - X_2). \qquad (\ .\ )$$

Obviously, the sum of solitary and coordinated leisure equals $2 - (x_1 + x_2)$, the di erence between the time endowment and labor supply.

B. Multiple equilibria. We now show that there is a range of wage rates w and of conviviality parameters σ for which there are two possible equilibrium outcomes. In one equilibrium, consumers work both shifts and consume a lot. In the other, they work only one shift, consume less and but enjoy coordinated leisure.

An alternative, but implausible explanation, would be that there are large economies of scale in leisure.

We assume for simplicity that sleep is not necessary.

We do not discuss mixed strategy equilibria here.

Remember that, because of the way we specified the utility function, it is always optimal to work at least one shift.

If a consumer expects *other* consumers to work two shifts (i.e., she anticipates $X_1 = X_2 = 1$), she gets utility $2w + v(0)$ if she also decides to also work two shifts, since this results in high consumption but no leisure. Under the same expectation that other will be working non-stop, she gets utility $w + v(1)$ if she decides to only work one shift, as she receives a low labor income and has no choice but to enjoy her one unit of leisure alone (the others being at work all the time). As a result, working two shifts if others work two shifts is an equilibrium if $2w + v(0) > w + v(1)$, that is, when the wage rate is high enough:

$$w > v(1) - v(0). \qquad (\ .\ )$$

If a consumer expects others to work one shift, say the first shift, and rest during the second, she gets utility $2w + v(0)$ if she breaks ranks with the rest of the population, works both shifts, and accordingly enjoys high consumption at the cost of no leisure whatsoever. If she chooses instead work for only one shift, like the others, she will always pick the same shift as the others because the desire for conviviality ($\sigma > 1$) makes common leisure more pleasurable than solitary leisure. She will thus end up with low consumption but with one unit of common leisure, which yields utility $w + v(\sigma)$. As a result, working only one shift (and synchronizing leisure with the others) when others are only working one shift is an equilibrium if $w + v(\sigma) > 2w + v(0)$, that is, when the wage rate is low enough:

$$w < v(\sigma) - v(0). \qquad (\ .\ )$$

We conclude from inequalities (.) and (.) that both high consumption with no leisure, and low consumption with common leisure are equilibria if and only if

$$v(1) - v(0) < w < v(\sigma) - v(0). \qquad (\ .\ )$$

This is a "Goldilocks inequality:" multiple equilibria are possible if and only if the wage rate is neither so low that it leads consumers to work one period regardless of what the others are doing, nor so high that it encourages them to work both shifts independently of the actions of their fellow citizens.

What is at work here is again a *strategic complementarity*. Were solitary leisure less pleasurable than, or as pleasurable as, common leisure ($\sigma \leq 1$),

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In that case, $\ell_s = 1$ regardless of whether x_1 *or* x_2 equals 1.

When multiplicity condition (.) is satisfied, there is also a third equilibrium in which a fraction of the population works two shifts, a fraction works the first shift only, and the remainder works the second shift only. Given these proportions, consumers are indi erent between working full-time, or in one of the two shifts only. We do not study this equilibrium here, since it is unstable: the deviation of a single individual makes the equilibrium collapse to one of the two fully-coordinated equilibria studied in the text.

multiplicity would never arise, as inequality (.) could never be satisfied. But as soon as the desire for conviviality makes common leisure more pleasurable than solitary leisure ($\sigma > 1$; i.e., as soon as the common leisure externality is strong enough), and provided the wage is not to extreme, consumers wish to follow each other's actions. As a result, society might end up coordinating on either an equilibrium with high consumption with no leisure, or on one with low consumption with common leisure.

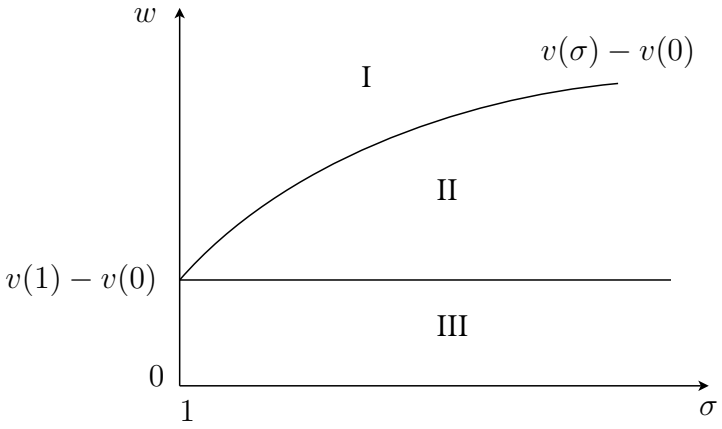

Figure 2.1. Multiple equilibria

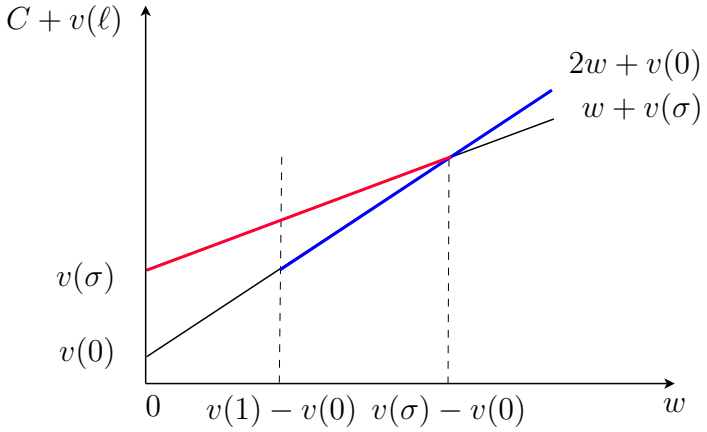

Figure 2.2. Welfare

Figure . illustrates these results in the space (σ, w). In region I, a region with high wages in the sense of inequality (.), the only equilibrium

is one in which everyone works two shifts and consumes a lot, while low consumption with one period of common leisure is the only equilibrium in the low-wage region III. Multiplicity arises in the "intermediate" region II.

C. Coordination failure. We can Pareto-rank the two equilibria that can arise when the multiplicity condition (.) is satisfied. Welfare in the equilibrium with high consumption and no leisure is

$$2w + v(0),$$

while utility in the low consumption, common leisure, equilibrium is

$$w + v(\sigma).$$

But, when inequality (.) is satisfied, the latter is larger than the former. Accordingly, the low consumption, common leisure, equilibrium Pareto-dominates the high consumption, no leisure, equilibrium when both are equilibria. We therefore conclude that, when the desire for conviviality is strong ($\sigma > 1$) and the wage is intermediate (condition .), consumers just might end up working and consuming too much for their own good—simply because of the high valuation they place on communal leisure activities! Paraphrasing Schor ( ), we can say that people might truly be "overworked" in equilibrium. Unlike Schor, however, this results from their own preferences and the nature of the externalities. As such, it is more like Akerlof's ( ) rat-race equilibrium.

Figure . shows, for a given $\sigma > 1$, how welfare changes as a function of the wage rate.

D. Summary. We have shown that preference for coordinated leisure gives rise to multiple, Pareto-ranked equilibria. In the "US" equilibrium, individuals work a lot, consume a lot, and have little time for communal activities. In the "European" equilibrium, consumers work less and consume less, but enjoy more common leisure. The European equilibrium Pareto-dominates the US outcome.

Hence, the reason why Americans today work more than Europeans may not be that Europeans are lazier than Americans. History (e.g., the first oil shock) and institutions (labor-market regulations) might have simply led otherwise identical Americans and Europeans to coordinate on different equilibria—as emphasized by Alesina, Glaeser, and Sacerdote ( ). Americans might nevertheless be crazy, as the low-activity equilibrium with coordinated leisure Pareto-dominates the high-activity outcome in which individuals "bowl alone," as deplored by Putnam ( ).

CHAPTER

Home production, setup costs and welfare

I. The link between market and secondary work

A number of salient facts emerge from our empirical analysis of time use. First, we confirm the stereotype of the "overworked American." Despite inherent problems with international comparisons of time-use data, Americans do appear to work more, especially in the market. Second, Americans tend to concentrate their work less than Europeans, preferring instead to work all the time, including weekends and at odd hours of the day and night. (They also do this in a more gender-neutral fashion than Europeans). Third, Europeans work relatively more at home than in the market when compared with Americans. Finally, we are intrigued by the fact that, despite all this, both Americans and Europeans tend to spread the volume of total work "fairly", on average, across gender.

These facts have wide-reaching implications. First and foremost, they imply a central role for secondary work, or home production, in the economic existence of the household. They imply that market and home work are relatively substitutable, at least at the relevant active margin. Furthermore, while di ering degrees of marketization of home production is a defining feature of the US-Europe comparison, it is not true that total work is constant across time and space.

It is also true that EU-US di erences are significantly smaller for total work than for market hours. German men averaged minutes of All Work in / , a slump period, compared with minutes in the US in , a period of strong economic growth. Yet German males actually worked more minutes per day in that year in secondary activities ( ) than their US counterparts ( ). Generally, European time-use data reveal a much larger share of secondary work in total work than in the United States. Explicit consideration of incentives which determine the division of labor within household is necessary to account for this variation. Comparative statics analysis suggests that labor taxation should play an important role in explaining cross country di erences in this division. In this section we confirm this suspicion. Just as theory predicts, secondary labor responds to taxation and can account for cross country di erences, at least for the G- countries considered by Prescott ( ).

In this final chapter, we examine how home production is chosen in the household context and explore the welfare implications of secondary work for households in the EU and US. We begin by reviewing and extending the theory of home production. Since the seminal contribution of Gronau ( ), home production has been recognized as a potential source of valuable, if not always well-appreciated, non-marketed output. The empirical evidence presented in Chapter showed not only that secondary work is a significant component of All Work, but also that it varies widely across households and across persons within households. By gender, average time spent in home production as a fraction of All Work in a given country and year ranges in our data from percent (US men in) to percent (Dutch women in). Moreover, the iso-work hypothesis implies that at a point in time within a country, market and secondary work will tend to be negatively correlated across individuals and especially across individuals within families. The iso-work fact induces these two types of work to o set each other. Because secondary work is productive, it can be used as a bu er for labor not immediately employable. Evidently, an assessment of cross-country di erences in market work is incomplete without considering the substitution margin between market and secondary work.

The existence of secondary work has important implications for welfare assessments of the costs of business cycles and unemployment. After considering the economics of secondary work in the household, we evaluate welfare implications of secondary work and the role of non-convexities in the market versus work decision. There are good theoretical reasons to suspect that the decision to move from no market work (and thus all secondary work) to some market work involves the expenditure of time and material resources. This suggests a natural econometric test, namely to see whether the decision to work changes the allocation of time in a smooth fashion or in fact "disrupts" the allocation of time and material resources to other activities. We then conclude with some speculation as to what we can say about these EU-US di erences in work and time use.

II. Household labor supply with home production

A. A simple toy model. In this section, we present a simple version of the theory of home production and its implications for total labor supply

For example, the correlation coe cient between daily market and secondary work across all individuals in the German / time use survey was - . , and - . in the / survey. In a sample pooling the two years, the correlation was - . for unmarried women, - . for unmarried men, - . for married women, and - . for married men.

("All Work"). The objective is to understand how expanding the range of choices taken by the household a ects the labor supply to the market and at home. We begin by thinking about a household as a single decision-making unit; it is straightforward to extend the theory to include specialization among members, possibly such that each is specialized in one type of labor.

To capture the most important aspects of the household's decision when home production is available, we study a simple extension of the linear-quadratic "toy model" introduced in the previous chapter to give a flavor of the principal economic e ects under consideration. We abstract from all discussion of norms. The utility of the household is given by the following separable function of consumption C and leisure L:

$$C - \frac{1}{2\epsilon}(1-L)^2, \qquad (\ .\ )$$

Consumption C is the sum of the consumption of market goods C_M and home production C_H. The assumption of perfect substitutability of home production with market goods is an important one which allows us to convey the most important aspects of the model in a simple diagram. If the household works M hours in the market at a real, gross-of-tax hourly wage w , and τ is the rate of labor taxation including social contributions, then goods purchased in the market must obey the budget constraint

$$C_M = (1-\tau)wM + \Omega \qquad (\ .\ )$$

where Ω stands for non-labor income or wealth. To avoid corner solutions, we will assume that $(1-\tau)w < \frac{1}{\epsilon}$. Home production requires input of secondary labor according to

$$C_H = \theta \ln(H+1) \qquad (\ .\ )$$

where θ is a productivity shift term. Again, to simplify matters, we assume $(1-\tau)w < \theta < 2(1-\tau)w$. Note that $H = 0$ implies that $C_H = 0$.

The classic references are Becker Becker ( ) and Gronau (,). Benhabib, Rogerson, and Wright ( ) show conditions under which the model with home production can be replicated by the standard neoclassical growth model.

Separability is an important assumption, and is not innocuous in models of home production. Greenwood and Hercowitz ( ) replace leisure with "home produced" goods and services which enter utility non-separably with market-purchased commodities. In contrast, we will treat secondary time as an input to a production function for home consumption goods. Separability of utility over goods and leisure is necessary (but not su cient) for stationary steady states in environments with economic growth (King, Plosser, and Rebelo,).

This assumption will guarantee that the worker always works some positive number of minutes at home ($H > 0$) but not the entire day ($H < 1$). Later we shall consider the case of $H = 1$ in more detail. Upon substitution of (.), the utility function (.)

The central aspect to be captured is declining marginal utility or declining e ciency of home production. While most of us would find too much home production unpleasant, most are willing to do some of it, so the first few units of consumption obtained from home production are usually much cheaper than those purchased in the market. The assumptions made here guarantee that the household always works some hours at home $(H > 0)$, yet always supplies some labor to the market $(M > 0)$. Imposing $\epsilon(1 - \tau)w < 1$ guarantees that the household takes some leisure as well $(L > 0)$.

Maximization of utility (.) subject to the budget constraint (.) and the home production function (.) yields the optimal secondary work input by the household:

$$H = \frac{\theta}{(1-\tau)w} - 1. \qquad (\ .\ )$$

The home production decision turns out to be separable from the total and market work decisions; this follows from the fact that market and household goods are perfect substitutes. The household's optimal use of time in secondary work depends negatively on the net of tax return to work $(1 - \tau)w$ and positively on productivity at home θ . At the margin, the household equates the output of an additional hour of home production to the opportunity cost of that time in the market, the net-of-tax wage. High-wage households will tend to cut back on household production and purchase substitutes in the market, so that the higher income is "eaten up" to some extent by a higher e ective cost of living. Households with lower opportunity costs of time in the market will engage in more home production for market goods and services, such as meal preparation, laundry, child-care, and house-cleaning.

All work is given by:

$$H + M = \epsilon(1 - \tau)w \qquad (\ .\ )$$

and market hours by

$$M = 1 + \epsilon(1 - \tau)w - \frac{\theta}{(1-\tau)w}. \qquad (\ .\ )$$

Labor supply to market is positively influenced by the net wage, positively by the insensitivity of utility to work ϵ , and negatively by productivity in

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is indistinguishable from $C_M + \ln C_H$, with the home production function for given by $C_H \equiv (H + 1)^{\theta}$.

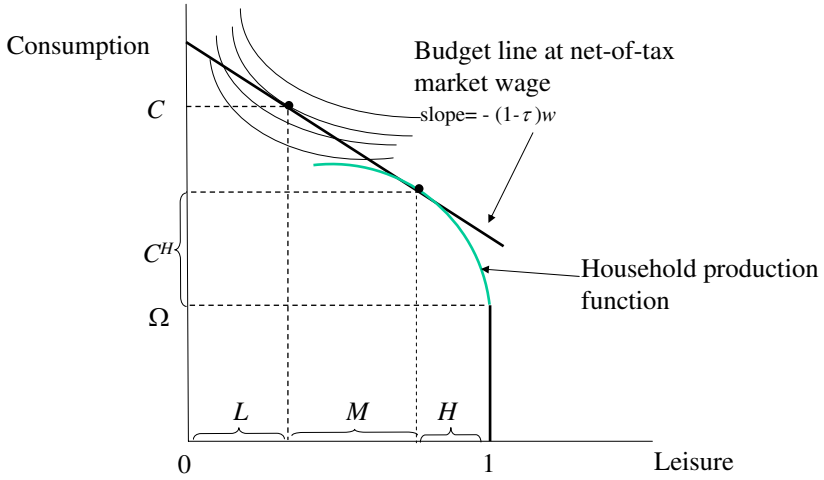
The separability property generalizes to those problems in which the substitution elasticity between home and market goods is very high, and when workers do not choose a "corner" solution. See the Appendix for more details. For a thorough discussion of other implications of imperfect substitutability of market and home production, see Gronau ( ).

home production. The elasticity of labor supply is higher, possibly significantly higher than it would be without home production. Labor supply to the market is positive, even if $\epsilon = 0$. The toy model also excludes the possibility of a backward bending supply curve. There is no income e ect of a wage change - total supply supply always reacts nonnegatively to a net wage increase.

In this model, the household always works strictly positive minutes both at home and the market. Figure . depicts this special case in terms of the standard analysis of a household's labor supply decision. The assumption of perfect substitutability of the two consumption goods allows us to aggregate them conveniently in the diagram (alternatively, consumption C denotes an aggregator of market goods and home production). The household, with preferences summarized by the familiar indi erence curves in the figure, has three alternative uses of time: it can supply secondary work to home production H shifting out the budget set commensurately as long as the marginal productivity exceeds the net wage for the first minutes worked. Given the availability of market work at the after-tax wage rate, the household should allocate time to market and secondary work so as to equate the net returns from both activities. This results in a "pasting" of the market budget line with the home production function at the point where the slope of the latter is equal to $-(1-\tau)w$. Home production, insofar as it is more productive than the market wage, leads to an expansion of the budget set for the household and an increase in its welfare. The extent of this expansion is smaller, and the size of the household production sector larger, the greater the rate of taxation faced by labor, or the lower the gross wage, ceteris paribus. Thus we would expect large home production sectors not only in developing countries, but also in OECD economies with high labor tax burdens (including social security contributions and value-added taxes).

B. Some general comparative statics propositions for the Gronau model. The home production model is generally more complex than the impression conveyed by Figure . . Comparative static analysis of market, secondary and total work to changes in market prices, productivity, wealth and other determinants does not always yield unambiguous results. This is especially true if market and home consumption are not highly substitutable. Nevertheless, the case of perfect substitutability—which is the assumption behind Gronau ( )—is a good starting point for analysis and finds some support in one sparse set of data (Benhabib, Rogerson, and Wright,). In this section, we summarize the

Figure 3.1. The Gronau Model of Home Production with Taxes



most important features of that model in terms of the elasticities of the allocation of time in the household with respect to the e ects of wages, labor taxes, wealth and home productivity.

a. *Household production.* For the more general version of the Gronau model, the following results can be shown for the household which is supplying time both to the market and to household production activities:

S . *The supply elasticity of secondary work (home production) with respect to the gross-of-tax market wage is unambiguously negative.*

S . *The (uncompensated) supply elasticity of secondary work with respect to labor taxation is unambiguously positive.*

S . *The elasticity of secondary work with respect to an improvment in home sector productivity is positive if that productivity is labor augmenting.*

S . *Wealth, or non-labor income more generally, has no effect on secondary employment.*

The economic mechanisms behind these propositions are straightforward, and some have already been discussed in the context of the simple

See the Appendix. The elasticities are derived from log-linearized versions of the first-order conditions of the formal problem. For simplicity, we consider only interior solutions in which positive amounts of market, household and leisure time are observed. This is entirely consistent when the model is viewed as a stand-in for the representative or average household in the economy. Later we will consider corner solutions explicitly.

model. As the opportunity cost of working at home (the net market wage) rises, less of it is performed. Thus, an increase in the net wage - caused by either a decrease in the tax rate or, holding taxes constant, an increase in the gross wage - decreases incentives to engage in household production. Conversely, an increase in taxes (or a decrease in the gross market wage, given taxes) decreases incentives to work in the market at the expense of secondary work. In Figure . , we depict the e ect of an increase in the rate of labor taxation (which is equivalent to a decrease in the gross wage, ceteris paribus).

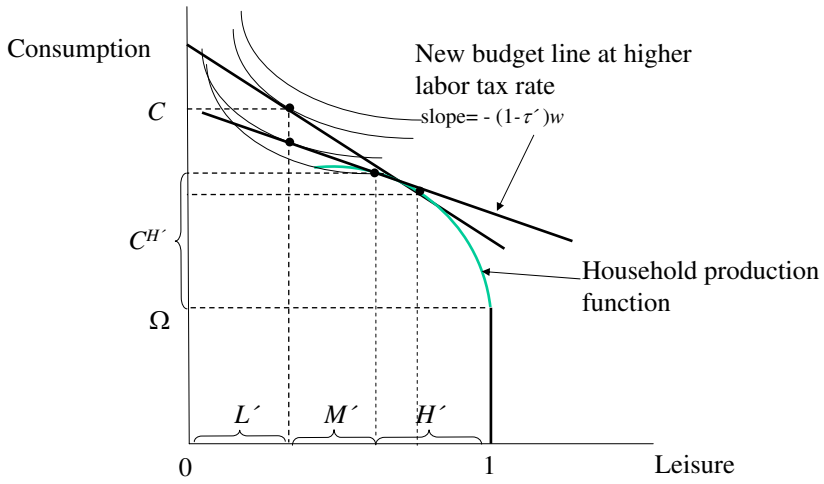
While it is true that a higher marginal product of household work will lead to more time devoted to home production, it is important also to remember that technical progress in home production can involve increases in average productivity while simultaneously *decreasing* marginal productivity of labor at given input, i.e. labor-saving technical progress. Productivity in secondary work will a ect the allocation of time across uses in the market and at home. Increases in productivity which are *labor-augmenting* (think of a better set of kitchen knives, a high-quality convection oven or a home cinema system) will increase the attractiveness of home production at previous inputs, and thus increase labor input at the chosen optimum. In contrast, *labor-saving* technical progress (a microwave oven, a vacuum cleaner or an electric hair blow dryer) will reduce the time supplied to that activity.

Finally, as long as some work is performed both in the market and at home (i.e. an interior solution), the margin of market and secondary work is determined by pure e ency considerations: non-labor income does not a ect the household's optimal choice of home production. While it is easy to criticize this assumption, the correct sign is by no means clear, and will depend on whether home production is a normal or inferior good. Good arguments can be adduced in favor of both hypotheses.

b. *Market work.* The determinants of household production also a ect the household's decision to work in the market. As in the standard theory of labor supply, substitution and income e ects of wage changes act in opposite directions. The di erence here is that they are augmented by a possible reallocation of time between market and home work. The e ects of various exogenous variables on market hours M can be summarized as follows:

M . *The sign of the uncompensated elasticity of market work with respect to the gross-of-tax wage is ambiguous, but larger than in the absence of secondary work.*

Figure 3.2. E ect of a Labor Tax Increase in the Gronau Model



M . *The sign of the uncompensated elasticity of market work with respect to labor taxation is ambiguous, but smaller than when secondary work is absent.*

M . *The elasticity of market work with respect to non-labor income or wealth is unambiguously negative.*

M . *The elasticity of market work with respect to all forms of secondary work productivity is negative.*

c. *All work.* We now turn to the reaction of All Work and leisure to changes in market wages, in labor taxation, in the productivity of home production, and of wealth. It is worth noting that the elasticity of total work with respect to some variable is a weighted average of the respective elasticities of market and secondary work, with the weights corresponding to the shares of the two types of work in total work time. Given the ambiguity for market work and the unambiguous results for household production, it would be surprising if the reaction of total work to the wage and to taxation yielded unambiguous answers. In fact, the results of the previous sections developed in the Appendix to this Chapter show that total work elasticities are values for the market work elasticities "shrunk" by the factor M/L. Thus, an increase in non-labor wealth and in home productivity unambiguously increase leisure and decrease total labor supply (total

It should be stressed that we have restricted our attention to interior solutions.

work). As expected, total work is an ambiguous function of the net wage—depending on whether the income or substitution e ect dominates. Indeed, the predicted negative elasticity of total work with respect to wealth is consistent with evidence over longer periods presented by Aguiar and Hurst ( ), who document a secular increase in leisure, measured as the complement of total work, since the s. They associate this with a dramatic drop in household work in the US, due both to increases in after-tax, real wages as well as to labor-saving technical progress in home production (see Greenwood, Seshadri, and Yorukoglu,).

d. *Summary.* The central results can be summarized as follows:

- Secondary work (home production) is an unambiguously positive function of the tax rate and labor augmenting productivity in home production. It is an unambiguously negative function of the real before-tax wage. For interior solutions, secondary work is independent of both non-earned income/wealth.
- Market work depends negatively on non-labor income/wealth, and on productivity in household production, but depends ambiguously on the after-tax wage.
- For interior solutions, the e ect of the gross market wage and of labor taxation on market work is ambiguous, as would be expected; an increase in the wage induces incentives to work more (the substitution e ect) but also to work less (the income e ect). The presence of household production, however, unambiguously increases the (algabraic) magnitude of the supply elasticity of market hours.

C. Empirical evidence: Labor taxation and household production. Both the toy model as well as a more general version studied in the Appendix contain a simple, empirical prediction shown in Figure . : the reaction of household production to market incentives—here, wages and labor taxes—should be much stronger and unambiguous than that of All Work or market work. This is because, plausibly, while o setting income and substitution e ects are operative for total work (and thus for leisure), only the e ciency-driven substitution e ect is relevant for the household production decision. The literature has generally confirmed predictions of this type using micro data (see Gronau, , for examples), but to our knowledge this test has not been confronted with cross-country data.

This line of thinking is suggestive of the following empirical specification for observations in country i for gender grouping $j \in \{m, f, all\}$

In the model we consider, tax revenue is not rebated to the household. With a rebate (or purchase of substituable public goods), the elasticity of market labor supply should rise, as in Prescott ( ).

Table 3.1. Labor Taxation, Manufacturing wages, and average market and secondary work, G-7 countries

Country	*Labor tax rate*	*Avg. gross mfg. earnings ($/hr), 2000*	*Avg. minutes of market work (M)*	*Avg. minutes of secondary work (M)*	*Avg. minutes of market work (F)*	*Avg. minutes of secondary work (F)*
Canada	0.52	16.5	270	162	168	264
France	0.59	15.5	227	136	145	253
Germany	0.59	23.7	263	174	133	312
Italy	0.64	13.8	327	80	131	365
Japan	0.37	22.0	404	33	204	248
UK	0.44	16.7	245	123	156	221
US	0.40	19.7	313	163	201	271

Note: Labor tax rate is taken from Prescott (2004, Table 2). Wage is total compensation per hour in 2000 in manufacturing industry, in US dollars, published by the US BLS ftp://ftp.bls.gov/pub/special.requests/ForeignLabor/ichccsuppt02.txt. Minutes of market and secondary work are taken from the constituent country studies taken used in the paper. Data and dates of relevant survey are described in the appendix to Chapter 1.

(male, female, all pooled):

$$\ln(H/M)_{ij} = a + b \ln w_i + c \ln \tau_i + u_{ij}.$$

This relation can be derived from a more general version of the model in which market and home-produced goods are *not* perfect substitutes. The prediction of the model is that b and c have indeterminate signs, but that c is more likely to be negative due to the existence of home production.

For a number of reasons, especially given by the recent discussion about "lazy Europeans" initiated by Prescott ( ), it seems reasonable to consider the same G countries, which have similar economic sizes, wealth levels, etc., so that other determinants can be relegated to the constant term a . Table . displays the data. Estimates of the model presented for each $j \in \{m, f, all\}$ are presented in Table . . The elasticity with respect to the tax rate is positive and ranges between . and . ; moreover, it is highly significant for women and insignificant for men. This follows the prediction of the Gronau model both in the aggregate and individual level, since women in these countries tend to supply less labor to the market and more to secondary activities than men do. At the same time, an indicator of the hourly wage was never significant. Thus, using the Prescott ( ) data and a model extended to account for an obvious and elastic margin, we are able

Suppose households maximize utility given by $\ln[\alpha \left(C^M\right)^\rho + (1-\alpha) \left(C^H\right)^\rho] - v(M+H)$, where $v()$ is some convex function of All Work, subject to a budget restriction (.) and with linear household production $C^H = \theta H$, and let $\Omega = 0$. Then it is straightforward to show that optimal choice implies

$$\ln(H/M) = \frac{1}{1-\rho}\left[\ln\left(\frac{\alpha\theta^\rho}{1-\alpha}\right)\right] + \frac{\rho}{1-\rho}\ln w + \frac{\rho}{1-\rho}\ln(1-\tau).$$

Table 3.2. Secondary-Market Work Ratios and Labor Taxation in the G-7
(standard errors in parentheses)

Dep.variable:	*Const.*	ln(w)	ln($\tau_{Prescott}$)	$\bar{R}^2$
$\ln(H/M)_m$	0.1465 (1.03)		1.579 (1.43)	0.037
$\ln(H/M)_m$	-0.5412 (5.23)	0.2661 (1.97)	1.695 (1.81)	-0.199
$\ln(H/M)_f$	1.430 (0.196)		1.284 (0.270)	0.782
$\ln(H/M)_f$	0.8289 (0.946)	0.2324 (0.357)	1.386 (0.328)	0.754
$\ln(H/M)_{all}$	0.6809 (0.284)		1.159 (0.391)	0.565
$\ln(H/M)_{all}$	0.1220 (1.410)	0.2162 (0.532)	1.254 (0.487)	0.478

Note: OLS cross-sectional regressions, n=7. For details on data, see Table 3.1.

to suggest a role for taxation beyond that suggested by the conventional neoclassical growth model.

III. Household labor supply with setup costs of work

A. Motivation. The analysis of the last two sections examined the intensive margin and the response of market, secondary and total work to changes in incentives. Yet it is well-known that the *extensive* margin comprises up to three-quarters of variation of labor input over the business cycle. Our analysis can be fruitfully extended to include the extensive margin - the participation decision - in the presence of fixed costs, especially when the utility gain from additional employment in secondary activities is non-negligible. In Chapter , we saw that European households tend to work more at home than in the market on average. Could it not also be the case that they concentrate their nonemployment on a smaller number of individuals or households, as a rational response to relative prices and institutions in their respective countries?

In the previous section, we showed that labor taxation, which is only imposed on market hours, is more likely to a ect the *distribution* than the overall level of hours worked ("All Work"). This is because standard theory predicts that given that one is already working positive hours, the home production decision is likely to be governed by e ciency considerations,

This result is meant to be illustrative. Data limitations - poor comparability of larger cross-sections of country data and restricted availability of essential household covariates (e.g. taxes) within countries - precluded a more detailed analysis of labor supply at this stage, which we leave for future work.

so the elasticity of substituting secondary for market work should be high. Evidence from the G- countries supports this conclusion.

In this section we explore a related aspect of the home production decision. In general, the decision to work in the market entails discrete, one-time setup costs or costs of "reorganizing one's life" which must be expended regardless of whether that work is part-time or full-time (see Cogan, , for a seminal analysis of monetary costs of this type). These costs lead to non-convexities in the budget constraint, which have received considerable attention in the macro literature (Hansen, ; Rogerson, ; Cho and Rogerson,). Most obviously, going to work entails an increase in tertiary time dedicated to taking better care of one's appearance and health, getting more (or less) sleep, and possibly changing eating habits.

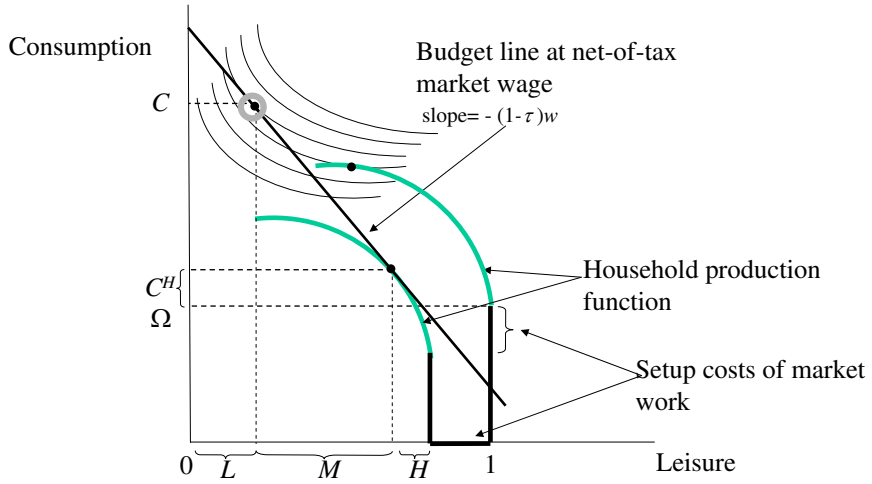
Less obvious but equally relevant, taking up market work can lead to abrupt shifts in the time devoted to household production. Going to work often means skipping or economizing on cooking, house-cleaning, gardening and child-care that would have occurred in constant amounts in any event. As a result of fixed costs, taking up market work could also mean *more* household production, however, necessitating certain types of shopping or the production of certain personal services which, for any number of reasons, might be unavailable or too expensive to purchase in the market. Going to an o ce job usually requires wearing well-pressed shirts and blouses; in many continental European countries with high minimum wages, product market regulations and binding environmental restrictions, these services are expensive and border on being a luxury.

In what follows, we sketch a model with a rich structure of such setup costs, first graphically, then formally, using an extension of the toy model of previous sections. We then use this model to motivate an econometric analysis of the impact of going to work in the four data sets we have examined. In the concluding section we summarize the implication of home production, fixed costs of going to work and more generally external e ects for welfare.

B. A model of household labor supply with fixed setup costs: A graphical representation. Typically, setup costs that households incur when they work positive market hours introduce non-convexities in the budget constraint relevant for the labor supply decision Cogan, . These costs can take the form of material resources or time. This means shifting the market budget line in Figure . down or to the left, respectively, while consumption

A non-convex budget set is one which does not contain all linear combinations of its elements. For example, working overtime only pays extra for the last hours worked, or going to work requires the expenditure of time and money from the first minute on.

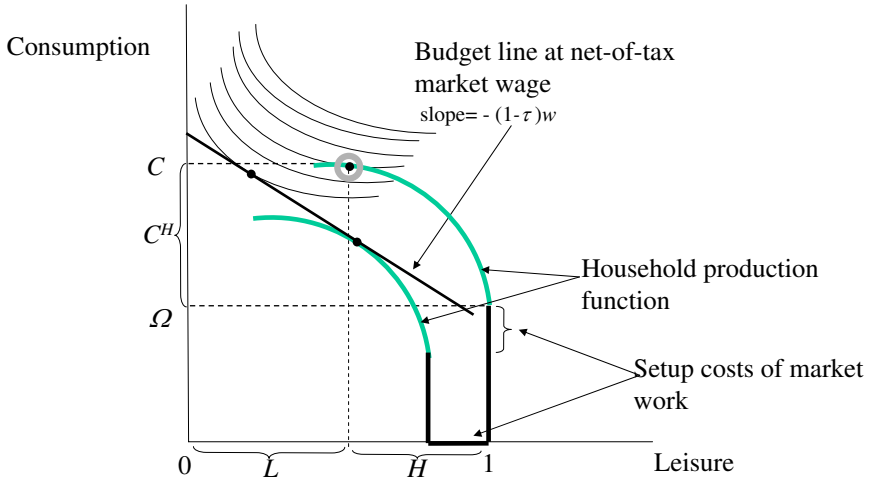
Figure 3.3. Fixed costs and budget set non-convexity: positive market hours



possibilities at zero market labor supply $(M = 0)$ remain at their previous level. When home production is possible, the attractiveness of not working in the market is further enhanced, especially for households with two or more workers, with the potential for specialization Cho and Rogerson, . In general, the first hours spent in home production are the most productive ones, so this option is likely to encourage some agents to achieve high levels of utility without working in the market at all.

The e ect of fixed costs on the labor supply decision is summarized in Figures . and . . The figures are drawn such that preferences are identical in both cases—the di erence arises entirely from the opportunity costs of time, summarized by the net real wage available from working in the market, which in turn depends positively on the nominal real wage (w) and the tax rate (τ), but also on shifts in the budget set induced by "setup costs." In the first case depicted in Figure . , the net returns to market work time are high, and the household chooses to work more in tha market than at home, using market income to purchase goods and services. The circled tangency point of consumption-leisure indi erence curves with the linear segment of the budget set yields higher utility to that household, despite the shift downward and inward of the budget set implied for any positive value of market work M.

Figure 3.4. The decision to work under: zero market hours



In Figure . , the net returns from market work are low. The household opts for no market work at all, working exclusively at home $M = 0,\ H > 0$. Even though an hour of work—as household production—is relatively unproductive at the margin, the household achieves a level welfare higher than that attainable from using the labor market, as seen by the higher level of utility at the encircled tangency point.

Under which conditions are agents likely to exclude market work entirely? In the next section we formalize, in a fashion analogous to the norm model elaborated in Chapter , the household's decision as a choice between maximizing utility working positive market hours ($M > 0$, $H > 0$) versus not working at all ($M = 0, H > 0$).

C. A formal model of fixed setup costs. As before, the household is the decision-making unit, but now it faces a richer structure of costs. Utility is given by (.), with $C = C_M + C_H$, and home production is determined by (.). Now consider the following modifications: First, any positive amount of market work implies a series of one-o shifts in the e ective time delivered to all activities. For any choice of leisure L, only $(L - \Psi_L)$ is actually

It is important to stress that the net real return from market work is not only determined by the gross wage and taxes, also by the relative price of market goods to home production.

This could be extended to a multiple-person household with specialization Cho and Rogerson, , with some members working exclusively in the market and others specializing in home production.

enjoyed. In the language of the first chapter, this might be thought of as a fixed loss of planned leisure or tertiary time necessary for work ($\Psi_L > 0$), or the time actually freed up by working ($\Psi_L < 0$). Consider personal maintenence time. In principle, going to work could require more time (getting more restful sleep each night, shaving every morning), or less (shorter showers, less sleep on weekdays). Where this time comes from in the end is left up to the household.

Similarly, working in the market may imply a one-o shift in the amount Ψ_H of the e ectiveness of secondary time H. For a given home production technology, this is equivalent to a fixed expenditure of home production (think of the very first shirt that needs to be ironed). There is no reason to assume that Ψ_H is always positive - the first cup of co ee might have to be taken away from home. Finally, for any positive market work, only $M - \Psi_H$ is actually delivered and is compensated at the net-of-tax market wage.

Under these assumptions, the home production function reads

$$C_H = \theta \ln(H + 1 - \Psi_H),$$

with the restriction $\frac{\theta}{(1-\tau)w} > 1 - \Psi_H$ imposed to preclude negative C_H. The time restriction $M + H + L = 1$ continues to hold. Under these conditions, it can be shown that optimal choice for households which choose positive market work is given by

$$M = \epsilon (1 - \tau) w - \frac{\theta}{(1 - \tau) w} - \Psi_L - \Psi_H + 1$$

$$H = \frac{\theta}{(1 - \tau) w} - 1 + \Psi_H$$

$$L = 1 - \epsilon (1 - \tau) w + \Psi_L.$$

A positive value of Ψ_L reduces minutes of market work and increases leisure. Analogously, Ψ_H depresses market work and increases household production, ceteris paribus. The fixed loss of work time Ψ_M does not appear in these expressions, but it a ects at the extensive margin, as do Ψ_L and Ψ_H. Note that all Ψs are measured in terms of time (i.e. minutes).

For those who do not work in the market, we have (for small θ and ϵ) :

$$H = \sqrt{\frac{1}{4} + \theta\epsilon} - \frac{1}{2} \approx \theta\epsilon$$

Here, we continue to consider leisure as the sum of tertiary time and leisure in the narrow sense. The model is easily extended to capture the distinction made in Chapter .

For simplicty, we have grouped leisure and tertiary time together. Allowing Ψ to take negative or positive values may be interpreted as deviations from a fixed "base" requirement of tertiary time.

$$L = 1 - H = \frac{3}{2} - \sqrt{\frac{1}{4} + \theta\epsilon} \approx 1 - \theta\epsilon,$$

so secondary labor supply is independent of the market wage, but positively related to both home productivity and the disutility of work.

To understand the extensive margin decision, consider that indirect utility for an interior solution with positive market work $(M > 0)$ is

$$\Omega + \frac{\epsilon}{2}(1-\tau)^2 w^2 + \theta\left[\ln\left(\frac{\theta}{(1-\tau)\,w}\right) - 1\right] \qquad (\ .\ )$$

$$+ (1 - \Psi_L - \Psi_H - \Psi_M)\,(1-\tau)w, \qquad (\ .\ )$$

while utility when not working $(M = 0\ )$ is given approximately by

$$\Omega + \frac{\theta^2\epsilon}{2}. \qquad (\ .\ )$$

Hence, an approximate threshold for the household to work in the market can be computed as

$$1 + \frac{\frac{\epsilon}{2}\left[(1-\tau)^2 w^2 - \theta^2\right] + \theta\left[\ln\left(\frac{\theta}{(1-\tau)w}\right) - 1\right]}{(1-\tau)w} > \Psi_L + \Psi_H + \Psi_M \quad (\ .\ \ )$$

By inspection, all three shift parameters Ψ_i , when positive, reduce market participation, i.e. to less use of the extensive margin. Higher gross wages, lower tax rates and lower productivity at home will increase participation in market work.

Since the Ψ_i are unobservable, we can only examine their implications indirectly by inferring changes in minutes of alternative uses of time implied by market work $(M > 0)$. In particular, the model predicts that the di erence between secondary and leisure time between labor market participants and non-participants will obey:

$$H_{M>0} - H_{M=0} = \frac{\theta}{(1-\tau)\,w} - 0.5 + \Psi_H - 0.5\sqrt{1 + 4\theta\epsilon}$$

and

$$L_{M>0} - L_{M=0} = 0.5 - \epsilon\,(1-\tau)\,w + \Psi_L + 0.5\sqrt{1 + 4\theta\epsilon}$$

In an econometric specification explaining minutes of secondary, tertiary or leisure time, these di erences might correspond to estimated coe cients of a dummy variable which takes the value of if any market work was

A first-order Taylor expansion of the function $\sqrt{\frac{1}{4} + \theta\epsilon} - \frac{1}{2}$ around $\theta\epsilon = 0$ yields the approximation $H \approx \theta\epsilon$. Now insert this into utility when working at home to obtain $\Omega + \theta\ln(1+\theta\epsilon) - \frac{1}{2\epsilon}(\theta\epsilon)^2 \approx\ \Omega + \frac{\theta^2\epsilon}{2}$.

recorded. These coe cients will depend on Ψ_i, but also on home productivity, the net wage, and the wage sensitivity of utility to work. In addition, the unobservable Ψ_i may be correlated with the disturbance term as well as with individual explanatory variables leading to potential biases. Thus, the next section will focus on presenting some first estimates of such shift terms and establishing the importance of these costs.

D. Empirical evidence: Estimating costs of market work. In this section, the four principal countries' time-use data sets—Germany, Italy, the Netherlands and the US—are employed to study setup costs arising from market work as well as "where working time comes from," that is, which alternative uses bear the burden of adjustment of market time at the intensive margin. This is potentially important for welfare analysis. It could be argued, for example, that Europeans rationally concentrate their unemployment by restricting labor force participation, and economize on fixed costs associated with working. If these costs are significant, welfare gains might be realized by concentrating unemployment on the young and less skilled, who are likely to have a comparative advantage at home production anyway. In addition, the estimated coe cients could also allow us to draw conclusions about welfare, since the Ψ_i directly reduce indirect utility for those who continue to work and move households at the margin out of market employment.

We will work with a specification suggested by Hamermesh (a), who examines issues related to fixed costs of work in a similar framework for the e ect of ageing on the labor supply decision. The model in the last section considered three di erent uses of time, while the data sets deliver a fourth—tertiary time—which might be considered "partially unavoidable" leisure (eating, personal hygiene, sex, and sleep fall into this category). In the empirical work that follows, we allow for separate consideration of both conceptualizations of leisure. As might be expected, there are di erences, and these are sometimes significant and merit additional analysis and interpretation.

The econometric model is a system of three equations relating the minutes allocated by an individual to each of secondary, tertiary and leisure activities, as defined in Chapter , to (i) minutes spent in market work, (ii) an indicator variable indicating whether *any* time was worked in the market, as well as a number of controls that are as similar as possible across the data sets. By construction—and by nature of the survey, which leaves none

Controls for the US regression: age, age squared, race, children - , children - , children - , children - , gender, marital status, spouse's work hours. Controls for Germany: age, age squared, spouse's age squared, marital status, gender, marital status x gender, children in the household younger than , children in household between and .

Table 3.3. Estimates of the Effect of Working and the Amount of Market Work Time on Time Aggregates

		Germany		Italy		The Netherlands		U.S.	
		1991	2001	1988/89	2002/03	1990	2000	1985	2003
Dep. var.	**Ind. Var.**								
Secondary	Whether worked	16.10 (4.43)	22.60 (4.14)	-28.98 (3.71)	-34.44 (3.53)	11.58 (7.74)	26.99 (7.22)	-14.82 (10.09)	2.74 (5.13)
	Minutes worked	-0.396 (0.0079)	-0.337 (0.0083)	-0.222 (0.007)	-0.251 (0.007)	-0.299 (0.014)	-0.312 (0.013)	-0.288 (0.016)	-0.324 (0.0081)
Tertiary	Whether worked	-0.401 (3.30)	-18.44 (3.38)	17.26 (2.75)	-24.34 (2.78)	-3.68 (6.30)	-5.33 (5.64)	37.27 (9.65)	14.48 (4.58)
	Minutes worked	-0.259 (0.0059)	-0.277 (0.0068)	-0.219 (0.005)	-0.160 (0.005)	-0.211 (0.011)	-0.233 (0.010)	-0.264 (0.017)	-0.228 (0.0078)
Leisure	Whether worked	-15.70 (4.47)	-4.16 (4.12)	11.81 (3.75)	59.45 (3.57)	-7.89 (8.84)	-21.66 (7.86)	-22.44 (10.70)	-17.29 (5.37)
	Minutes worked	-0.344 (0.0079)	-0.386 (0.0083)	-0.559 (0.007)	-0.590 (0.007)	-0.490 (0.016)	-0.455 (0.014)	-0.448 (0.018)	-0.448 (0.0085)
Test $\chi^2(2)$ $\beta^{Sec}_{worl} = \beta^{Ter}_{worl} = \beta^{Lei}_{worl} = 0$ (p-value in parentheses)		14.84 0.001	42.00 <0.001	75.16 <0.001	275.61 <0.001	2.31 0.316	13.97 <0.001	14.94 <0.001	46.97 <0.001

or very little time unaccounted for—the estimated coe cients on (i) across the three equations sum to - , while the market work coe cients associated with (ii) will sum to zero. Because the equations are based on weighted observations, the estimates reflect the relevant e ects on a representative day of the week. The results are presented in Table . .

Turning first to the question "where does the working time come from?" we find that all coe cients on minutes of market time are negative, just as in Hamermesh (a) analysis of US data, and are all highly significant and significantly di erent from each other, strongly suggesting qualitative di erences in taking time from leisure than from secondary or tertiary activities. Remarkably, the rank ordering of the coe cients is the same for all data sets except Germany : the burden of an extra minute of market work falls most heavily on narrowly-defined leisure, followed by secondary time, with the smallest sacrifice coming in terms of tertiary time. It is interesting to note that the absolute value of the leisure-cost coe cient is the largest in Italy (- . to - .), followed by the Netherlands (- . to - .), then the US (- .), and Germany (- . to - .).

Now we turn to the time shift coe cients, which are not identical to Ψ_M ,Ψ_H and Ψ_L in the setup cost model, but can be mapped into these fixed time cost parameters . The model predicts that positive values of these fixed costs would generate shifts in the time allocated to the major categories of activity whenever a person begins market work. In contrast to the coefficients on the volume of market work described above, the estimates of the

Controls for Italy: age, age squared, marital status, sex, marital status x gender, children in household younger than , children in household between and , and spuworkm. Controls for Netherlands: age, age squared, spouse's work hours, age of spouse, age of spouse squared, marital status, gender, marital status x gender, children in household younger than , children in household between and .

discrete shifts due to market work do not exhibit simple common patterns. In continental Europe, working in the market is associated with lost tertiary time (most probably sleep, but possibly also bathing and eating). For example, in Italy on an average day, working in / meant a sacrifice of minutes tertiary time, as well as a reduction of one half-hour of household production. On the other hand, taking up market work in Italy is associated with an increase in leisure of almost one hour! Among other things, this could reflect the increased propensity of working Italian women to reduce or defer cleaning and other chores, to delegate them to other household members, or to purchase these services in the market.

In the US, market work comes primarily at the expense of leisure (between and minutes and statistically significant) while tertiary time use *increases* and secondary time falls or remains constant. In the Netherlands and Germany, in contrast, working in the market is associated with a significant increase in secondary time at the expense of tertiary and leisure time. In practice this might take the form of ironing one's clothes more often and forsaking the daily shower and shave or makeup session. Interestingly, in the later data set for the Netherlands, this country appears more like the United States in terms of fixed leisure loss of work, and more like Germany in terms of the increase in secondary time. Again, these estimates should be seen in the context of country-specific institutions such as market regulations, public provision of work-related services, subsidies (including mass transit).

There are a number of issues that arise in the econometrics of estimating such an system, which we are glossing over. In the first instance, wages, taxes, household productivity and measures of preferences are important theoretical determinants of the allocation of time in its various uses and are not included directly. Treating the decision to work in the market, and given that, the number of hours to work as predetermined seems like a heroic simplification. Yet, re-estimating our specification on various sub-samples of the data, especially those individuals with positive but low hours in the market, does not result in significantly di erent estimates. As Hamermesh (b) finds for the US, very modest involvement with the labor market implies significant reallocations of time for individuals. These reallocations are likely to be associated with welfare costs. Without knowing much more about preferences, however, it is di cult to quantify those costs.

IV. Summary

This chapter has examined the distinction between home production and leisure in still more detail. In Chapter , we saw that unremunerated work takes up a significant fraction of an average individual's day, both in

Europe and the US. While women tend to perform more household work than men, this asymmetry is shrinking in most countries—with the possible exception of Germany—as more women enter the labor market. By definition, household production does not involve a formal market, and therefore represents a degree of freedom facilitating the All Work/leisure norm studied in Chapter .

Can the existence of the household production option explain why Americans work more in total than Europeans? Not really. As long as market goods and secondary output are readily substitutable at the margin, theory does not yield such a prediction for All Work. Overall labor supply is determined by the net market price of labor, non-labor income and wealth, plus norms which can condition labor supply at any given set of incentives. The theory can however, tell us why Europeans tend to spend more a greater fraction of their time in household production as a fraction of All Work. In the first instance, all factors a ecting the real, take-home wage for market work will a ect the choice of household production versus market work. These include labor taxes and the relative prices of commodities most easily substituted using home production: child care, gardening, home cleaning, food preparation and cooking. Our simple cross country analysis of the G- countries does suggest a strong association of the fraction of household work in All Work with the rate of labor taxation used by Prescott ( ) to study the determinants of market hours in the context of a calibrated growth model. A more thorough investigation would need to examine international di erences in product market regulation and governmental subsidies of services.

A skeptic might argue that this is not remarkable, given that Europeans are more likely to be unemployed and have lower overall employment and labor force participation rates. While unemployment is likely to be one determinant of household production in the short run, it cannot explain certain patterns in the countries we examine. It cannot explain, for example, why German men in / worked a mere minutes less in the market than US-American men in , both periods when real growth in both economies was virtually identical (. - percent per annum), while German men worked *one full hour more than American men in home production*.

Labor taxation is one plausible explanation that has been invoked elsewhere to explain the low absolute level of market time in OECD economies (Daveri and Tabellini,). Yet the high taxation is only one possible distortion against market work that might distinguish Europe from the US. It

For example, Benhabib, Rogerson, and Wright ( ) show that home production is countercyclical.

is well-known that growth of the European service sector has been lacklustre compared with the US, and many have cited labor and especially product market regulations as a cause. It is interesting to note that the Scandinavian countries do not fit the pattern of the G- , and this is likely due to the high level of subsidy of child care for working parents and public services, despite high income taxation, which e ectively raise the real net return from working in the market relative to the European continent.

The data from Chapter suggest not only that Americans work more hours and have higher levels of labor force participation than most EU citizens, but they also work more odd hours and more on weekends. If so, is that necessarily e cient? It could be, if fixed costs associated with market work are significantly lower in the US than in Europe. Estimated fixed costs of starting market work suggest that these costs are high in Europe, especially the additional burden of household production in Germany and the Netherlands, as compared with the US (Italy is, as usual, *sui generis*). Moreover, lower gasoline and automobile taxation in the US mean lower transportation costs and probably also tilt the decision at the extensive margin to work in the market there. Tax and social insurance systems in EU countries often introduce significant fiscal costs of secondary worker's market participation.

The real issue is whether Europeans bear significant welfare costs for working so much at home as opposed to in the market. Answering this question requires us to revisit issues raised in Chapter as well as in this chapter. We will return to this in our concluding remarks and resume of the report. Indeed, both serious and not-so-serious research has valued home production at a significant fraction of total national income. If these estimates are valid, home production certainly mitigates the lost value of the European slump, as well as the business cycle in general. Home production

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Schneider and Enste ( ) have argued that the underground economy can explain a large component of the EU-US labor and product market divide. Davis and Henrekson ( ) link the size of the underground economy in rich countries to the overall level of taxation. To the extent that survey respondents declare time in their diaries as secondary when in fact it is primary could also account for the secondary-heavy European orientation. In fact, the especially large underground economy in Italy (estimated at - percent) o ers yet another explanation for their lone violation of the iso-work fact: Italian men are reluctant to admit to this activity for fear of detection by the fiscal authorities.

In an early NBER study, King ( ) assessed the value of services performed by in the United States at the beginning of the th century at one-quarter to one-third of national income. In a frequently cited estimate, Gronau ( ) estimates that the value of home production represents roughly two-thirds of total household income. More recently, the internet website salary.com estimates that the market value of services provided by "stay at home moms" was $, annually, an increase from $, in . "Working moms" would earn $, for the home production component of their work.

may not be as e cient in Europe as it could be if delivered by the market, yet the problem may indeed be, to quote Tobin, more an issue of Harberger triangles than Okun's rectangles.

Appendix: More general formulation of the Gronau model

In this appendix we consider a household with more general preferences than the toy model in the main text, but maintaining perfect substitutability between market goods and home production. The household maximizes utility, deriving from separable consumption C goods and leisure L:

$$u(C) + v(L, L^*).$$

Consumption is the sum of market and household production: $C = C_M + C_H$. The utility function has the standard properties. In particular, we require that $u(.)$ and $v(.)$ are increasing and concave in their arguments: $u' > 0, u'' < 0, v_L > 0$, and $v_{LL} < 0$; v_{L^*} is left unrestricted, although generally assumed that $sign(v_{L^*}) = sign(L - L^*)$. The parametric "leisure norm" argument L^* is anchor for the utility of leisure. If the household works M hours at real, gross-of-tax hourly market wage w, and τ is the rate of labor taxation including social contributions, then market goods obey the budget constraint

$$C_M = (1 - \tau)wM + \Omega$$

where Ω stands for non-labor income or wealth. Household production C_H requires labor input H according to

$$C_H = \theta f(H),$$

where $\theta > 0$ is a productivity shifter and $f'(H) > 0, f''(H) < 0$. Finally, the overall time restriction implies $1 = M + H + L$. Focusing on interior solutions, the problem reduces to:

$$\max_{M,H} \; u\left[(1 - \tau)wM + \theta f(H) + \Omega\right] + v(1 - M - H, L^*).$$

First-order conditions are given by:

$$(1 - \tau)wu'(C) = v_L(L, L^*) \qquad (\ .\ )$$

Separability is an important assumption, and is not innocuous for its treatment of time in home production. Rather than considering secondary time as leisure, we treat it as an input to a production function for home consumption goods, and assume perfect substitutability of market goods and home production. Benhabib, Rogerson and Wright ( ) adduce arguments for perfect substitutability of market and home-produced consumption goods. Moreover, separability of utility over goods and leisure is necessary (but not su cient) for stationary steady state property in environments with economic growth. See King, Plosser, and Rebelo ( ).

As noted in the text, productivity can also be labor saving, for example in the form $C_H = f(\theta H)$. See Gronau ( ) for more details.

$$u'(C)\,\theta f'(H) = v_L(L, L^*) \qquad (\ .\ )$$

It follows immediately that

$$(1-\tau)w = \theta f'(H) \qquad (\ .\ )$$

Let $\widehat{x} \equiv dx/x$ denote percentage deviations from equilibrium values. Log-linearizing and the first-order conditions (.) and (.) around the optimum yields the following system of equations expressing $\widehat{H}$ and $\widehat{M}$ as a function of exogenous influences $\widehat{w}, \widehat{\tau}, \widehat{\Omega}, \widehat{\theta}$, and $\widehat{L^*}$:

$$\begin{bmatrix} \eta & 0 \\ \gamma\frac{C^H}{C} + \frac{\nu H}{\rho L} & \frac{(1-\tau)wM}{C} + \frac{\nu M}{\rho L} \end{bmatrix} \begin{bmatrix} \widehat{H} \\ \widehat{M} \end{bmatrix} = \begin{bmatrix} \widehat{\theta} - \widehat{w} + \frac{\tau}{1-\tau}\widehat{\tau} \\ \left(\rho^{-1} - \frac{(1-\tau)wM}{C}\right)\left(\widehat{w} - \frac{\tau}{1-\tau}\widehat{\tau}\right) - \frac{\Omega}{C}\widehat{\Omega} + \frac{C^H}{C}\widehat{\theta} - \frac{\zeta}{\rho}\widehat{L^*} \end{bmatrix}$$

where:

$\eta \equiv \frac{-Hf''(H)}{f'(H)}$, the curvature of the home production function

$\gamma \equiv \frac{Hf'(H)}{f(H)}$ is the elasticity of home production to employment;

$\rho \equiv \frac{-u''(C)C}{u'(C)}$ is the curvature of utility derived from consumption;

$\nu \equiv \frac{-v_{LL}L}{v_L}$ is the curvature of utility derived from leisure;

$\zeta \equiv \frac{v_{LL^*}L^*}{v_L}$ is the elasticity of the marginal utility of leisure with respect to the leisure norm. The solution is

$$\widehat{H} = \eta^{-1}\left(\widehat{\theta} - \widehat{w} + \frac{\tau}{1-\tau}\widehat{\tau}\right)$$

$$\widehat{M} = \Delta^{-1}\eta\left[\left(\rho^{-1} - \frac{(1-\tau)wM}{C}\right)\left(\widehat{w} - \frac{\tau}{1-\tau}\widehat{\tau}\right) - \frac{\Omega}{C}\widehat{\Omega} + \frac{C^H}{C}\widehat{\theta} - \frac{\zeta}{\rho}\widehat{L^*}\right] - \Delta^{-1}\left(\widehat{\theta} - \widehat{w} + \frac{\tau}{1-\tau}\widehat{\tau}\right)\left(\gamma\frac{C^H}{C} + \frac{\nu H}{\rho L}\right)$$

where $\Delta \equiv \eta\left(\frac{(1-\tau)wM}{C} + \frac{\nu M}{\rho L}\right) > 0$.

The propositions in the main text concerning home production and market work follow directly from the last two equations. We then use the fact that the elasticity of total work with respect to any variable x

is a weighted average of the elasticities of market and secondary work: $\widehat{\frac{1-L}{\widehat{x}}} = \frac{M}{M+H}\frac{\widehat{M}}{\widehat{x}} + \frac{H}{M+H}\frac{\widehat{H}}{\widehat{x}}$, and the elasticity of leisure (L) is a rescaling of $\widehat{\frac{1-L}{\widehat{x}}} : \frac{\widehat{L}}{\widehat{x}} = -\frac{1-L}{L}\widehat{\frac{1-L}{\widehat{x}}}$,to summarize the influences on total work and leisure as follows:

$$\widehat{1-L} = -\frac{L}{1-L}\left[\alpha_1\left(\widehat{w} - \frac{\tau}{1-\tau}\widehat{\tau}\right) + \alpha_2\widehat{\Omega} + \alpha_3\,\widehat{\theta} + \alpha_4\widehat{L^*}\right]$$

and

$$\widehat{L} = \alpha_1\left(\widehat{w} - \frac{\tau}{1-\tau}\widehat{\tau}\right) + \alpha_2\widehat{\Omega} + \alpha_3\,\widehat{\theta} + \alpha_4\widehat{L^*}$$

where

$$\alpha_1 = -\frac{\rho^{-1} - \frac{(1-\tau)wM}{C}}{\frac{\nu}{\rho} + \frac{(1-\tau)wL}{C}} \lesseqgtr 0$$

$$\alpha_2 = \frac{\Omega/C}{\frac{\nu}{\rho} + \frac{(1-\tau)wL}{C}} > 0$$

$$\alpha_3 = \frac{C^H/C}{\frac{\nu}{\rho} + \frac{(1-\tau)wL}{C}} > 0$$

$$\alpha_4 = \frac{\zeta/\rho}{\frac{\nu}{\rho} + \frac{(1-\tau)wL}{C}} > 0.$$

General conclusion

The rise in unemployment in Europe has attracted the attention of continuing generations of economists since the s. Even as a number of European countries—Ireland, Denmark, the Netherlands, and the United Kingdom in particular—have brought unemployment rates back to levels of the s and early s, the major continental European economies, including France, Germany, Italy and Spain, seem to have accepted high unemployment as inevitable. In response to this development, some economists argued that Europeans have di erent tastes for leisure than Americans. Others blamed high, almost punitive rates of labor taxation and the welfare state. Still others have pointed to equilibria which, while unambiguously inferior, are the outcome of political processes in which a majority of political actors or voters can block any e ort to reform.

The emphasis on unemployment as an indicator of well-being may be misplaced, since it represents only an absence from the labor market, which is a modest time commitment in most modern economies. In , the average man in the US spent about percent of the average day in market work, compared with percent in sleep, percent in leisure and percent in secondary labor activities; for women, these proportions were percent in paid work, percent in sleep, percent in leisure and percent in secondary (home production) activities.

It thus seemed useful to gather systematically more general stylized facts about time use in a number of countries. In one respect, the data confirm what we already knew: Americans do work more than Europeans, and they tend to work at odd hours of the day and on weekends more often than Europeans do. Our detective work turned up an even more interesting aggregate regularity in high-income countries which had gone generally unnoticed and, by economists, uninvestigated: the iso-work fact. The sum of market and home work for men and women tends to be equal at a point in time, even while this may change over time and di er across countries. In the US example above, both men and women in spent a third of their

For recent contributions to this debate, see for instance Blanchard ( ) and Nickell, Nunziata, and Ochel ( ).

time on All Work. In Germany, men and women spent about percent of their average day in All Work.

The iso-work fact is challenging for economic theory for a number of reasons. First, economic theory should be able to explain why total work di ers so little at the aggregate level between genders, when there is so much variation within-gender. Since the market o ers little hint at the rationale for such a coordination mechanism, we propose social norms in Chapter and investigate the power of this theory to explain the facts. Second, All Work is the sum of two di erent types of labor with sharply di erent productivities—why should their *sum* be equal across gender, without regard to the mix? In Chapter , we examine the theory of home production, especially to allow for both norms as well as fixed costs of market work. These fixed costs have a significant impact on the labor supply of households. Indeed, the most commonly invoked models of home production imply a high elasticity of substitution between market and home work for those households in which both market and home work are performed. We are able to validate this sensitivity in our finding of a high elasticity of response of female home work to labor taxation in the G- countries.

This fact makes home work a useful "sink" that enables members of society to meet the norm. Yet under certain conditions, the norm may be di cult to adhere to. If market work is not very productive or market wages are low relative to home production, or if fixed costs are high, households may choose to perform only home work. In this case, only very costly norms will lead to iso-work, especially across genders.

We hope that the data that we have assembled and analyzed, the stylized facts on time use we have established, and the theoretical vistas we have opened will prove valuable to labor economists and macroeconomists alike. Our claim that social influences are a crucial and heretofore little noticed determinant of labor supply and time use, for both single and married agents, is likely to awaken the interest of labor economists. The theory and empirics of home production have already attracted the attention of macroeconomic theorists, who have recognized their potential role in the propagation and the cost of business cycles. The reason is that non-convexities in household budget sets increase the relative importance of the extensive margin for labor supply in cyclical fluctuations, which accounts for three-fourths of total fluctuations in hours in the US (Cho and Rogerson,).

Note that we have said nothing about the thorny issue of the "double burden" of market and home production by working women. Even though

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Norms in labor supply represent a logical solution to one of the most uncomfortable challenges to labor economics: explaining why the standard workweek appears to enforce itself, even in European countries without explicitly legislated standard workweeks.

men and women perform the same total work in the aggregate, the types of market and secondary activities that they perform do di er, sometimes considerably. It would seem unwarranted, then, to draw welfare inferences from the iso-work fact at this stage. We have no choice, however, to reiterate the central importance of household production for an economy and the role of labor taxation in shaping that importance. Such work—be it child care, garden work or house-cleaning—probably represents the largest labor tax loophole granted to households. Furthermore, it is largest in precisely those countries which tax labor most heavily. It is noteworthy that in economies in which both males and females are heavily involved in the labor market—Denmark and Sweden for example—the government has actively intervened to o set the negative incentives created by high labor taxation by providing day care and related services for working mothers.

Overall, the issue of whether Europeans are lazy or Americans are crazy seems of second-order importance relative to understanding the determinants of individual behavior. A more useful, scientific approach is to assume that underlying tastes are common to both continents, while technologies, institutions, or interpersonal influences like norms or externalities may differ and evolve di erently. The fact that Americans work on weekends or more often at odd hours of the day may simply represent a bad equilibrium that no individual agent can improve upon—and would certainly not wish to deviate from, given what all others are doing. Especially if norms and other externalities are important (recall the model of common leisure in Chapter), one should recognize that the invisible hand may lead agents to places like this. If our claim that social e ects play a central role in the determination of economic activity is confirmed by new data and/or further work, policy makers and economists alike will have to remember that multiple equilibria, and social multipliers, are more likely to determine the impact of labor market policies and taxes rather than the implications of more traditional models.

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