

**ECONOMIC DEVELOPMENT AND
BUSINESS OWNERSHIP: AN ANALYSIS
USING DATA OF 23 OECD COUNTRIES IN
THE PERIOD 1976-1996**

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Abstract: In the present paper we address the relationship between the extent of business ownership and economic development. We will focus upon three issues. First, how is the equilibrium rate of business ownership related to the stage of economic development? Second, what is the speed of convergence towards the equilibrium rate when the rate of business ownership is out-of-equilibrium? Third, to what extent does deviating from the equilibrium rate of business ownership lead to a penalty of less economic growth? Hypotheses concerning all three issues are formulated setting up a new two-equation model. A basic aspect of the model is a U-shaped relation between the equilibrium rate of business ownership and the stage of economic development. The existence of this relation as well as that of a penalty for out-of-equilibrium situations is confirmed using a data panel of 23 OECD countries. An important policy implication of our exercises is that low barriers to entry and exit of businesses are necessary conditions for the equilibrium seeking mechanisms that are vital for a sound economic development.

Keywords: business ownership, economic growth, entrepreneurship

JEL-classification: L16, O12

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1. Introduction

Joseph Schumpeter's contribution to our understanding of the basic mechanisms of technological progress and economic development is widely recognized. In *The Theory of Economic Development* he emphasizes the role of the entrepreneur as prime cause of economic development. He describes how the innovating entrepreneur challenges incumbent firms by introducing new inventions that make current technologies and products obsolete. This process of *creative destruction* is the main characteristic of, what has been called, the Schumpeter Mark I regime. In *Capitalism, Socialism and Democracy*, Schumpeter focuses on innovative activities by large and established firms. He describes how large firms outperform their smaller counterparts in the innovation and appropriation process through a strong positive feedback loop from innovation to increased R&D activities. This process of *creative accumulation* is the main characteristic of, what has been called, the Schumpeter Mark II regime¹.

The extent to which either of the two Schumpeterian technological regimes prevails in a certain period and industry varies. It may depend upon the nature of knowledge required to innovate, the opportunities of appropriability, the degree of scale (dis)economies, the institutional environment, the importance of absorptive capacity, demand variety, etc. Industries in a Schumpeter Mark II regime are likely to develop a more concentrated market structure in contrast to industries in a Schumpeter Mark I regime where small firms will continue to proliferate.

Most of the 20th century can be described as a period of accumulation. From the Second Industrial Revolution through to the 1970s the large firm share was on the rise in most industries and the economy as a whole. It was the period of 'scale and scope' (Chandler (1990)). It was the era of the hierarchical industrial firm growing progressively larger through exploiting economies of scale and scope in areas like production, distribution, marketing and R&D. The conglomerate merger wave of the late 1960s seemed to have set the case. The period seems to be aptly described by the Schumpeter Mark II regime. However, from the 1970s onwards times have changed. There is ample evidence that the share of small businesses in manufacturing in Western economies has started to rise (Acs and Audretsch, 1993 and Thurik, 1999). Large firms have been downsizing and restructuring in order to concentrate on 'core business' again. In the meantime the entrepreneur has risen from the dead. High-technology innovative small firms have come at the forefront of technological development in many (new) industries. Piore and Sabel (1984) claim that an 'industrial divide' has taken place. Jensen (1993, p.835) considers it the period of the Third Industrial Revolution. The last quarter of the 20th century may therefore be described as a period of creative destruction in the sense of the Schumpeter Mark I regime.

¹ For a summary of the Schumpeter Mark I and Mark II regimes also see Soete and ter Weel (1999).

In the present paper we investigate why this change happened and what its consequences have been for economic progress. We develop a model relating the regime switch to economic development and present empirical evidence. In Section 2 we present a variety of theoretical considerations. It is followed by Section 3 in which we present our two-equation model. The first equation explains the change in the business ownership rate while the second equation explains economic growth. The notion of an equilibrium business ownership rate, being a function of economic development, will be crucial in the analysis. In Section 4 we present the data of 23 OECD countries and in Section 5 we present the estimation results. The final section is used for discussion.

2. Theory

In this section we will discuss the Schumpeterian regime switch. We discuss the pre-1970s era of declining self-employment rates and the period thereafter in which the rates appear to rise again in most Western economies. Next we discuss how the business ownership rate at the economy-wide level can be used to determine the extent of structural transformation. The interrelationship between the extent of business ownership and economic growth is dealt with.

The first three quarters of the 20th century can be characterized as a period of declining small firm presence in most industries. In many Western countries and industries this decline has stopped and even reversed. Many old and large firms have been losing ground to their small and new counterparts since. We label this as a regime switch from Schumpeter Mark II to Schumpeter Mark I. We note that the regime labels are rough approximations as the industrial landscape shows a far too great variety to claim that in each and every industry one of the Schumpeter regimes is prevailing. A further complication is that business ownership and entrepreneurship are not synonymous for at least two reasons (see also Amit et al. 1993).

First, business owners serve many roles and functions. Many researchers distinguish between Schumpeterian (or real) entrepreneurs and managerial business owners (Wennekers and Thurik 1999). Entrepreneurs are a small fraction of the business owners. They own and direct independent firms that are innovative and "creatively destroy" existing market structures. After realizing their goals Schumpeterian entrepreneurs often develop into managerial business owners, but some may again start new ventures. Managerial business owners dominate in the large majority of small firms. They include many franchisees, shopkeepers and people in professional occupations. They belong to what Kirchhoff (1996) calls "the economic core". Occasionally, entrepreneurial ventures grow out of them. In an empirical context it is difficult to discriminate between managerial business owners and entrepreneurs. For that profiles of individual business owners would be required. Moreover, the discrimination is a theoretical one since most business owners are neither pure "Schumpeterians" nor pure "shopkeepers" but share the attitudes associated with these extremes in a varying degree. Second, entrepreneurial energy is not limited to self-employed individuals. Large companies promote 'intrapreneurship' within business units to achieve more flexibility and innovativeness (Stopford and Baden-Fuller 1994).

Despite these conceptual problems we argue that the secular trend of the business ownership rate declining and afterwards starting to rise again for many countries presents a fair indication of the general development of the level of entrepreneurship, at least in modern economies. It shows how the extent of (real) entrepreneurship which tended to decline during the accumulation era was followed by a rise in the creative destruction period from the 1970s onwards.

The impact of economic development on business ownership

The proportion of the labor force that is self-employed has decreased in most Western countries until the mid-1970s. Since then the self-employment rate has started to rise again in several of these economies. Blau (1987) observes that the proportions of both male and female self-employed in the nonagricultural U.S. labor force declined during most of this century. He also observes that this decline bottomed out in the early 1970s and started to rise until at least 1982. The data used in the present paper show that the business ownership rate in the U.S. has continued to rise in the 1980s while stabilizing in the 1990s. More recently business ownership increased in several other countries as well. We will first discuss the period of decline of business ownership (Mark II regime) followed by a discussion of the period of reversal of this trend (Mark I regime).

Decline of business ownership

Several authors (Kuznets, 1971; Schultz, 1990; Yamada, 1996) have reported a negative relationship between economic development and the business ownership (self-employment) rate. Their studies use a large cross-section of countries with a wide variety in the stage of economic development.

There are a series of reasons for the decline of self-employment, and of small business presence in general. Lucas (1978) shows how rising real wages may raise the opportunity cost of self-employment relative to the return. Given an underlying “managerial” talent distribution this induces marginal entrepreneurs (in this context Lucas refers to managers) to become employees. This pushes up the average size of firms. Schaffner (1993) takes a different approach. She points out that “over the course of economic development the advantages firm owners derive from being less risk averse (better diversified) than self-employed producers are likely to rise relative to the disadvantages caused by the costliness of circumventing asymmetric information problems.”(p.435). Iyigun and Owen (1998) develop a model implying that economic development is associated with a decline in the number of entrepreneurs relative to the total number of employees. They argue that fewer individuals are willing to risk becoming an entrepreneur as the “safe” professional earnings rise with economic development.

Chandler (1990) stresses the importance of investment in production, distribution, and management needed to exploit economies of scale and scope during the period after the second industrial revolution of the second half of the 19th century. It was a period of relatively well-defined technological trajectories, of stable demand and of seemingly clear advantages of diversification.²

Reversal of the trend

Several authors have provided evidence of a reversal of the trend towards less self-employment. Acs et al. (1994) report that of 23 OECD-countries, 15 experienced an increase in the self-employment rate during the 1970s and 1980s. They show that the weighted average of the self-employment rate in OECD-countries rose slightly from 8.4% in 1978 to 8.9% in 1987. Closely related to the development of the self-employment rate is the development of small business presence in general. Some of the other sources showing that the growing importance of large business has come to a halt in Western countries include Carlsson (1989), Loveman and Sengenberger (1991), Acs and Audretsch (1993), Acs (1996) and Thurik (1999).³

There are several reasons for the revival of small business and self-employment in Western economies. First, the last 25 years of the 20th century may be seen as a period of creative destruction. Piore and Sabel (1984) use the term Industrial Divide, Jensen (1993) prefers the term Third Industrial Revolution, while Freeman and Perez (1988) talk about the transition from the fourth to the fifth Kondratiev wave. Audretsch and Thurik (1997 and 2000) stress the effects of globalization and the information revolution leading to the demise of the comparative advantage of Europe in many of the traditional industries, such as machine tools, metalworking, textiles and automobile production. The most obvious evidence is the emergence of new industries like the software and biotechnology industries. Small firms play an important role in these new industries. Acs and Audretsch (1987) provide empirical evidence that small firms have a relative innovative advantage over their larger counterparts in such highly innovative industries. Evidence for the comparative advantage of small firms in inventing radically new products is also given in Prusa and Schmitz (1991), and Rothwell (1983, 1984).

Second, new technologies have reduced the importance of scale economies in many sectors. Small technology-based firms started to challenge large companies that still had every confidence in mass production techniques (Carlsson 1989). Meredith (1987) argues that small firms are just as well, or better, equipped to implement technological advances and predicts the factory of the future to be a small factory. Jensen argues that "It is far less valuable for people to be in the same geographical location to work together effectively, and this is encouraging smaller, more efficient, entrepreneurial organizing units that cooperate through technology" (Jensen 1993, p. 842). This is supported by Jovanovic claiming that: "recent advances in information technology have

² Audretsch and Thurik (1997) characterize this period as one where stability, continuity and homogeneity were the cornerstones and label it the managed economy.

³ See also the various editions of *The European Observatory for SMEs* that provide an account of state of small business in Europe, for instance EIM (1997).

made market-based coordination cheaper relative to internal coordination and have partially caused the recent decline in firm size and diversification” (Jovanovic 1993, p. 221). Others, like Rothwell (1983, 1984), stress that large and small firms complement and succeed each other in the innovation and diffusion process. See also Nooteboom (1994) for an account of the concept of ‘dynamic complementarity’

Third, deregulation and privatization movements have swept the world. In countries like Australia, Finland, Italy and Sweden there have been strong tendencies to deregulate and privatise (OECD 1995, p. 39-49). Phillips (1985) reports that small firms have dominated in both the creation of new businesses and new jobs in deregulated industry sectors in the U.S. in the early 1980s. This confirms some preliminary empirical evidence as provided by Shepherd (1982). Governments have also begun to acknowledge and promote the vital role of small (start-up) firms in achieving economic growth and development. See Storey and Tether (1998), OECD (1998) and EIM (1994 and 1996).

Fourth, there has been a tendency of large firms to concentrate on ‘core competences’ (Carlsson 1989). Jovanovic (1993) reports that the 1980s were characterized by corporate spin-offs and divestment. Aiginger and Tichy (1991) blame much of the ‘back-to-basics’ and downsizing (or rightsizing) tendencies on the opportunistic conglomerate merger wave of the late 1960s.

Fifth, the increasing incomes and wealth have enabled individuals to strive for ‘higher’ needs. As a result the demand for variety increases (Jackson 1984). Cross-cultural influences have also enlarged the demand for variety. Small firms are often the most obvious suppliers of new and specialized products. The decrease in diversification as reported by Jovanovic (1993) suggests that large firms have not been capable of entering into such market niches.

Sixth, self-employment is more highly valued as an occupational choice than before. Roughly one out of four young U.S. workers pursue self-employment according to Schiller and Crewson (1997). Kirchoff (1996) argues that self-employment is not anymore characterized as under-employment or being mom-and-pop establishments, but as a way to achieve a variety of personal goals. Also, as hypothesized in social psychology there is a Maslowian hierarchy of human motivations, with physical needs at the bottom and self-realization at the top (Maslow 1970). A higher level of prosperity will induce a higher need for self-realization and thereby may stimulate entrepreneurship.⁴

Finally, the employment share of the services sector has been well documented (Inman, 1985) to increase with per capita income. Given the relatively small average firm size of most services (barring airlines, shipping and some business services) this creates more opportunities for business ownership.

⁴ Entrepreneurial energy as such may not suffice for economic progress. Baumol (1990) stressed the importance of entrepreneurship being led into productive channels.

Obviously, some of these factors may have had a temporary effect only. For example, it is not unlikely for the outsourcing and deregulation waves to dry up. On the other hand, there are more permanent effects like the impact of new technologies. We refer again to Freeman and Perez (1988). They claim that in the new techno-economic paradigm (fifth Kondratiev wave) the organization of firms will be 'networks' of large and small firms. See also Oughton and Whittam (1997) who emphasize the role of external economies of scale when explaining the viability of small firms. Moreover, the introduction of these new technologies is also positively related to the stage of economic development through necessary skills and other investments. This structural influence of economic development is reinforced through the increasing variety of demand for specialized goods and services and the enhanced valuation of self-realization which are also dependent on the attained level of prosperity.

An equilibrium rate of business ownership

In the present paper the economy-wide rates of business ownership in relation to the level of economic development (per capita income) are used to discriminate between Schumpeterian regimes. We also investigate whether countries that deviate strongly from the "average" business ownership rate for comparable levels of economic development suffer in terms of economic growth. For this we develop an error-correction model to determine the "equilibrium" rate of business ownership as a function of GDP per capita. The notion of "equilibrium" appears more akin to neo-classical economic theory than to a Schumpeterian framework. In the next paragraph we discuss some neo-classical approaches to this issue. However, in our empirical application the "equilibrium" rate of business ownership reflects no more than a rate to which the respective rates in the countries have tended to adjust to. It lacks precision. This is in accordance with Simon (1991, p. 41-42): "organization size and degree of integration, and the boundaries between organizations and markets, are determined by rather subtle forces. The wide range of organizational arrangements observable in the world suggests that the equilibrium between these two alternatives may often be almost neutral, with the level highly contingent on a system's history".

Equilibrium rates of self-employment in the neo-classical framework can be derived by making assumptions about (1) the aggregate production function combining the efforts of business owners and wage-employed individuals and (2) their rational occupational choice between self- and wage-employment. Differences in the assumptions about which factors influence the choice for self-employment lead to different equilibrium models. Two early contributions are Lucas (1978) and Kihlstrom and Laffont (1979). Lucas assumes individuals to have different managerial abilities while Kihlstrom and Laffont assume individuals to differ with respect to their risk attitudes. Calvo and Wellisz (1980) extend Lucas' model by introducing a learning process through which managers acquire the necessary knowledge. These and related models suggest that the stage of economic development is the driving force of "equilibrium".

We hypothesize an “equilibrium” relationship between the rate of business ownership and per capita income that is U-shaped.⁵ The U-shaped pattern has the property that there is a level of economic development with a "minimum" business ownership rate. Many forces may cause the actual number of business owners to deviate from the long-term equilibrium rate. Such a “disequilibrium” may result from cultural forces, institutional settings (regulation of entry, incentive structures, functioning of the capital market) and economic forces (unemployment, profitability of private enterprise). See Kirzner (1997), Davis and Henrekson (1999) and Henrekson and Johansson (1999).

There are several forces in market economies that contribute to adapting towards the equilibrium. An example may illustrate this point. A high labor income share and a structurally low number of enterprises such as many Western economies experienced in the late 1970s and early 1980s, have undoubtedly contributed to structural unemployment. This unemployment has had two consequences. First, unemployment has a direct effect on self-employment, as unemployed are more likely to become self-employed than employees, see for instance Storey (1991) and Evans and Leighton (1989).⁶ Second, structural unemployment gradually results in wage moderation helping to restore profitability of private enterprise (lower labor income share). In addition, a perceived shortage of business ownership will induce policies fostering entrepreneurship, ranging from better access to financing to competition policies. See OECD (1998). These equilibrating processes are hard to observe directly and may therefore be modeled best using an error correction mechanism.

The effect of business ownership on economic growth

There is some evidence on the relation between size class distributions and economic performance. For instance, see Nickell (1996), Nickell et al. (1997) and Lever and Nieuwenhuijsen (1999) who present evidence that competition, as measured by increased number of competitors, has a positive effect on the rate of total factor productivity growth.⁷ Carree and Thurik (1998, 1999) show that the share of small firms in manufacturing industries in European countries has a positive effect on the industry

⁵ Schultz (1990) reports having found statistical evidence for a quadratic relationship between the share of wage earners and the stage of economic development. In Carree et al. (2000) we also investigate an L-shaped pattern in which the equilibrium business ownership rate continues to decline with the stage of economic development. There we present some evidence that a U-shape gives a better statistical fit than an L-shape.

⁶ Alba-Ramirez (1994) shows that for both Spain and the U.S. the duration of unemployment increases the probability of becoming self-employed. His analysis suggests that the effect of unemployment duration on the probability of becoming self-employed is not very different for the two countries, albeit stronger for the U.S. The results are interesting especially since the Spanish economy has a higher degree of unemployment and self-employment when compared to the American economy. The results suggest that the influence of unemployment on business ownership is a common feature across economies. Alba-Ramirez also notes that legislation aimed to help the jobless starting up their own businesses has been implemented across developed countries and provides the example of the Spanish 1985 law giving lump-sum unemployment insurance to workers becoming self-employed.

⁷ Acs et al. (1999) point at differences in competition and entrepreneurship when comparing the more successful U.S. economy to that of Europe and Japan.

output growth. Thurik (1996) reports that the excess growth of small firms⁸ has had a positive influence on percentage change in gross national product for a sample of 16 European countries in the period 1988 through 1993.⁹

A theoretical endogenous growth model was developed by Schmitz (1989). His model predicts that an increase of the proportion of entrepreneurs in the working force leads to an increase in long-run economic growth. See also Holmes and Schmitz (1990) who develop a model of entrepreneurship in the spirit of T.W. Schultz. They show how specialization in managerial tasks and entrepreneurship – responding to opportunities for creating new products and production processes – may affect economic development. Finally, some evidence of a well-established historical (long-term) relationship between fluctuations in entrepreneurship and the rise and fall of nations has been assembled by Wennekers and Thurik (1999). In this respect also the work of Eliasson (1995) on economic growth through competitive selection is of relevance. He shows (for the Swedish economy) how a lack of industry dynamics affects economic progress not so much on the short term but very strongly so on the long term (from about two decades on).

Another source of evidence on the relation between self-employment and progress is the economic history of the formerly centralized planned economies. A characteristic of these economies was the almost complete absence of small firms (and private ownership of the means of production), and this extreme monopolization constituted one of the major factors leading to the collapse of state socialism (Acs 1996). The development of small enterprises is considered a vital part of the current transition process in Eastern Europe.¹⁰

In the present paper we assume that deviations between the actual and the equilibrium rate of business ownership will diminish the growth potential of an economy in the medium term. A shortage of business owners will diminish competition with detrimental effects for static efficiency and competitiveness of the national economy. It will also

⁸ The excess growth of small firms in that study is defined as the percentage change in the value-of-shipments accounted for by small firms minus that accounted for by large firms.

⁹ A subset of small firms which are assumed to improve economic performance are the so-called New Technology-Based Firms (NTBFs). Many of the businesses can be found on Science Parks of which the number in many countries has increased strongly during the 1980s and 1990s. Storey and Tether (1998) show that most of the NTBFs are, in fact, small firms. They report the average number of employees to be around 20 both in France and the U.K. The two countries were the first in Europe (in 1969) to establish science parks (Cambridge Science Park in the U.K. and Sophia Antipolis in France). They claim that Italy serves as an example of lagging behind in the establishment of 'advanced' science parks and relate this to the relatively low proportion of university research that is financed by the Italian private sector.

¹⁰ See for example Russia's Shatalin Plan, which "is built on the assumption that society needs small enterprises to orient production to the needs of every person, to fight the dictatorship of monopolies in consumer and production markets, and to create a favourable environment for quick introduction of new scientific and technological ideas" (Nolan (1995), p. 82).

diminish variety, learning and selection and thereby harm dynamic efficiency (innovation). On the other hand, a glut of self-employment will cause the average scale of operations to remain below optimum. Moreover, it will result in large numbers of marginal entrepreneurs, absorbing capital and human energy that could have been allocated more productively elsewhere.

Lyigun and Owen (1998) show in a dynamic model with two types of human capital (professional and entrepreneurial) that a misallocation of the existing human capital stock between professional and entrepreneurial activities may occur. The nature of the inefficiency, however, is not clear-cut. There may be too much entrepreneurship or too little, depending on how entrepreneurial and professional skills contribute to the level of technology. They find that “a more efficient ratio of professional and entrepreneurial skills will raise the steady state of technology, the wages paid to human capital providers, and therefore, the economy’s human capital stock” (p. 457). Therefore, their model supports our notion that deviations from the level of “optimal” relative entrepreneurial activity come at a cost of lower economic performance.

3. Model

The object of this section is to develop a model of the interrelationship between business ownership and economic development at the macro level. The model consists of two main equations. The first equation deals with the causes of changes in the rate of business ownership whereas the second deals with its consequences. From the first equation we derive the equilibrium rate of business ownership as a function of the stage of economic development. In the second equation we estimate the effect on economic growth of deviating from this equilibrium rate.

The first equation of the model relates the change in the rate of business ownership E_{it} in country i in year t to the extent to which this rate deviated from the equilibrium rate E_{it}^* , to the unemployment rate U_{it} and the labor income share LIQ_{it} . The second equation of the model relates the extent of economic growth to the (absolute) deviation of the actual business ownership rate from the equilibrium rate. Economic growth is measured as the relative change in the variable $YCAP_{it}$, the per capita gross domestic product in purchasing power parities per U.S. dollar in 1990 prices in country i and period t . We correct for catching-up effects by including the level of economic development. The equations use the notation $\Delta_4 X_t = X_t - X_{t-4}$. The third equation presents the equation relating the equilibrium business ownership rate to the level of economic development. It is assumed to be a quadratic function of $\ln(YCAP_{it} + 1)$.¹¹ The model reads as follows:

¹¹ In Carree et al. (2000) we compare four different specifications of the relationship between the equilibrium business ownership rate and GDP per capita. The log-quadratic specification adopted in the present paper was found to outperform the other specifications in terms of goodness of fit.

$$(1) \Delta_4 E_{it} = b_1 (E_{i,t-4}^* - E_{i,t-4}) + b_2 (U_{i,t-6} - \bar{U}) + b_3 (LIQ_{i,t-6} - \overline{LIQ}) + \varepsilon_{1it}$$

$$(2) \frac{\Delta_4 YCAP_{it}}{YCAP_{i,t-4}} = c_0 + c_1 |E_{i,t-4}^* - E_{i,t-4}| + c_2 YCAP_{i,t-4} + \varepsilon_{2it}$$

$$(3) E_{it}^* = \alpha + \beta \ln(YCAP_{it} + 1) + \gamma \ln^2(YCAP_{it} + 1),$$

The symbols stand for the following variables:

E:	number of business owners per labor force,
E*:	equilibrium number of business owners per labor force,
YCAP:	per capita GDP in purchasing power parities per U.S. \$ in 1990 prices,
U:	unemployment rate,
\bar{U} :	sample average of unemployment rate,
LIQ:	labor income share,
\overline{LIQ} :	sample average of labor income share,
$\varepsilon_1, \varepsilon_2$:	disturbance terms in equations (1) and (2), respectively,

Business ownership equation (1)

In equation (1), the variable to be explained is the growth in the number of business owners per labor force in a period of four years. The first explanatory variable in the equation, which has the parameter b_1 assigned to it, is an error correction variable describing the difference between the equilibrium and the actual rate of business ownership at the start of the period. The parameter b_1 is expected to have a positive sign. In this version of our model the equilibrium function is U-shaped with respect to per capita income (equation (3) has a quadratic form). Because the parabola should first drop and then rise (instead of the other way around) we expect the parameter γ to be positive and the parameter β to be negative. Furthermore, since the relative number of business owners cannot be negative or in excess of one, the parameter α should lie between zero and one.

As a second explanatory variable we use lagged unemployment acting as a push factor for business ownership¹². The expected sign of the parameter b_2 is positive. We choose a lag of six years instead of four for this variable because mental preparation, practical procedures and legal requirements are involved in starting a new enterprise.

As a third explanatory variable we have the labor income share. This variable is a pragmatic proxy for the earning differentials between expected profits of business owners and wage earnings. We assume that a relatively high business profitability (as compared to wage earnings) acts as a pull factor for business ownership. The labor income share is defined as the share of labor income (including the "calculated"

¹² Audretsch and Thurik (1998), in an earlier empirical investigation for 23 OECD countries find a positive effect of the (lagged) change of unemployment on the change of the self-employment rate.

compensation of the self-employed for their labor contribution) in the net national income. The expected sign of the parameter b_3 is negative. As with the unemployment variable, an additional lag has been included.

Economic growth equation (2)

In equation (2), the variable to be explained is economic growth in a four-year period, measured as the relative change in gross domestic product per capita. The first determinant of growth is the (absolute) deviation of the actual number of self-employed (business owners) from the equilibrium rate of business ownership at the start of the period. As explained in a previous section, the deviation variable is expected to have a negative impact on growth.¹³

Next to this deviation variable, we take as a control variable into account the level of per capita income at the start of the period. It allows us to correct for the convergence hypothesis of countries: countries which are lagging behind in economic development can grow more easily than other countries because they can profit from modern technologies developed in other countries. The expected sign of the parameter c_2 is negative.

4. Data and estimation technique

We use data material of 23 OECD countries including the fifteen countries of the EU-15, Australia, Canada, Iceland, Japan, New Zealand, Norway, Switzerland and the U.S. and for the period 1976 through 1996¹⁴. Data are made available for the even years only. The main data sources are the OECD Labor Force Statistics and the OECD National Accounts. In Table 1 some summary statistics values are given for the first and last year of the sample and the mid year 1988 (due to lags only the period 1980-1996 will be used as the sample period).

From Table 1 we see that Greece, Italy and Spain have the highest levels of self-employment (business ownership) in 1988: more than 15% of the labor force. The unweighted sample average level of self-employment in that year is 10%. The countries with the lowest levels of self-employment in 1988 are Austria, Denmark and Sweden: six percent of the labor force. Looking at the GDP per capita in 1988, we see that the United States, Switzerland and Luxembourg are the most affluent countries while Greece, Ireland, Portugal and Spain are the least affluent countries in the sample. The unemployment rates are not given in the table but they were highest in the 1980s in Ireland and Spain. Low unemployment rates were found in Japan, Norway, Sweden, Switzerland, Iceland and Luxembourg in that period.

¹³ In Carree et al. (2000) we consider an alternative penalty function based on the squared instead of the absolute deviation. For each of the shapes of the equilibrium function the absolute deviation penalty structure outperformed the squared deviation variant.

¹⁴ For the unemployment rate and the labor income share we also use data of 1974.

Table 1 Summary statistics for the 23 OECD countries

Country	E ₁₉₇₆	E ₁₉₈₈	E ₁₉₉₆	YCAP ₁₉₈₈	E* ₁₉₈₈
Austria	0.063	0.056	0.062	15,651	0.106
Belgium	0.098	0.109	0.116	15,326	0.107
Denmark	0.090	0.062	0.071	16,263	0.106
Finland	0.061	0.071	0.075	15,456	0.107
France	0.103	0.098	0.078	16,421	0.106
Germany (West)	0.067	0.067	0.075	17,245	0.106
Greece	0.177	0.186	0.196	7,274	0.235
Ireland	0.090	0.111	0.123	9,735	0.160
Italy	0.142	0.169	0.183	15,289	0.107
Luxembourg	0.085	0.068	0.057	21,103	0.119
The Netherlands	0.092	0.082	0.102	14,867	0.108
Portugal	0.121	0.145	0.182	8,424	0.193
Spain	0.140	0.156	0.173	10,886	0.140
Sweden	0.064	0.064	0.081	16,632	0.106
United Kingdom	0.076	0.100	0.106	15,590	0.106
Iceland	0.099	0.101	0.132	17,368	0.107
Norway	0.093	0.088	0.074	17,301	0.106
Switzerland	0.073	0.082	0.099	20,133	0.115
United States	0.088	0.116	0.114	21,543	0.122
Japan	0.117	0.112	0.089	16,328	0.106
Canada	0.065	0.079	0.092	18,573	0.109
Australia	0.110	0.123	0.119	16,154	0.106
New Zealand	0.115	0.136	0.157	13,532	0.113
Average	0.097	0.104	0.111	15,526	0.122

Note: The business ownership rates E are per labor force. The unit of GDP per capita (YCAP) is purchasing power parities per U.S. \$ at 1990 prices. In the last column the estimated equilibrium business ownership rates for 1988 are given, using the estimates of α , β and γ from the 'Two yearly' case from Table 2.

Variables and sources

The variable definitions and their main sources are given below.

E : Self-employment or business ownership. This variable is defined as the number of business owners (in all sectors excluding the agricultural sector), expressed as a fraction of the labor force. Business owners in the present report are defined to include owners of enterprises that are not legally incorporated as well as owner/managers of incorporated businesses. We use the terms self-employed and business owners

interchangeably.¹⁵ Data on the number of self-employed (business owners) are from the OECD Labor Force Statistics 1974-1994 and 1976-1996. Some data were missing however. EIM completed the data by using ratios derived from other variables, which sometimes came from other sources. In some countries self-employed are strictly defined as individuals owning a business that is not legally incorporated. In other countries, owner/managers of an incorporated business who gain profits as well as a salary are also considered self-employed. Australia, Canada, Denmark, France, Ireland, the Netherlands, New Zealand, Norway, Portugal, Spain and U.S. use the narrow definition, while the other countries apply the broader characterization. For the countries not following the broader definition, EIM made an estimation of the number of owner/managers by using information derived from statistical bureaus in these countries. Another difference in definition is that in some countries unpaid family workers are included in the data of self-employed as well. The unpaid family workers were eliminated from the data by using ratios derived from other variables, recent years, sometimes using data coming from other domestic sources. Data on the labor force are also from the OECD Labor Force Statistics 1974-1994 and 1976-1996. Again, some missing data have been filled up from other sources.

YCAP: gross domestic product per capita. The underlying variables gross domestic product and total population are from OECD, National Accounts 1960-1996, Detailed Tables, and from the OECD Labor Force Statistics 1974-1994 and 1976-1996, respectively. The GDP is measured in constant prices. Furthermore, purchasing power parities are used to make the monetary units comparable between countries.

U : (standardized) unemployment rate. This variable measures the number of unemployed as a fraction of the total labor force. The labor force consists of employees, self-employed persons, unpaid family workers, people who work in the army and unemployed persons. The main source for this variable is OECD Main Economic Indicators. Some missing data on the number of unemployed have been filled up with help of data from the OECD Labor Force Statistics and the Yearbook of Labor Statistics from the International Labor Office.

LIQ : labor income share. The following definition is used. Total compensation of employees is multiplied by (total employment/number of employees) to correct for the imputed wage income for the self-employed persons. Next, the number obtained is divided by total income (compensation of employees plus other income). The data on the separate variables are from the OECD, National Accounts 1960-1996, Detailed Tables. Some missing data have been filled up with help of data from the OECD Labor Force Statistics.

When estimating the model, we weight the observations with population. We think that larger countries such as the U.S. and Japan are more important in establishing the relationship between business ownership and economic growth than small countries.

¹⁵ For more information on various measures of self-employment, see *The State of Small Business; a report of the president 1996*, Washington: US Government Printing Office, chapter 3.

When the data of, for example, Luxembourg or Iceland would call for a different relation, we would not want this to have a big impact on the model. We refer to Carree et al. (1999, 2000) for a technical description of the weighting of observations.

Special position of Italy

The main problem with estimating the basic model is that there may be (large) countries with specific economic circumstances not covered by our model. This could influence the estimates towards implausible results. The country we suspect may deviate most from the other countries is Italy. Looking at Table 1, we see that Italy combines a high level of self-employment with a near average level of per capita income. This is unusual: the countries with a high rate of self-employment (business ownership) are generally in a less advanced stage of economic development (for example Greece and Spain). Italy can be divided in two quite different types of economies: a well-developed economy (Northern Italy) and a less developed economy (Southern Italy or the Mezzogiorno). Italy might not fit well in our model because it basically consists of two different economies. A closer inspection of the data for Northern and Southern Italy¹⁶ shows that Northern Italy in particular deviates from the expected pattern, i.e., the U-shaped trend of the relative number of business owners set out against per capita income. Here, a high self-employment rate is combined with a relatively high value of the GDP per capita. Small and medium-sized firms play a bigger role in (Northern) Italian manufacturing than in other industrialized countries. A notable feature of the organization of Italian small and medium-sized firm production is its high geographical concentration in small areas or industrial districts (Piore and Sabel 1984). The geographical distribution also shows that the majority of small and medium-sized manufacturing firms is located in Northern and Central Italy (Acs en Audretsch 1993). They often have a strong family component.

The Italian model of extensive small and medium-sized firm production differs from that in other countries in similar stages of development. It may have positive and/or negative effects on economic growth. Many of the Italian firms are highly specialized and are organized on a flexible basis, so as to meet specific customer needs, and produce well designed and fashionable goods, aimed at the richest segments of the market. Another characteristic of the Italian model, however, is that Italian R&D expenditures as a percentage of GNP are by far the lowest among the largest OECD-countries. They amount to only half of that in Germany, the U.S. and Japan over a long period (Klomp and Pronk 1998, p. 167). Hence, the number of business owners in Northern Italy is higher than one would expect on the basis of the advanced stage of economic development. The data for Southern Italy seem to be in conformity with the general pattern: there is also a high level of self-employment but combined with a low value of the GDP per capita.

¹⁶ Separate data for North- and South-Italy are obtained from the Eurostat Regions Statistical Yearbook.

We introduce a dummy variable D_{ITA} that is 1 for the Italian observations and 0 elsewhere. There are several ways to apply this dummy in the model. Specifically, it could be placed inside or outside the parabola describing the equilibrium rate of business ownership (or both inside and outside the parabola). Clearly, the interpretations differ. In Carree et al. (1999) we fail to find evidence that Italy has a different equilibrium relation between self-employment and the stage of economic development. It appears that Italy has developed an autonomous (additional) rise in the number of business owners when compared to other countries. We therefore have the error term in equation (1) equal to $\varepsilon_{lit} = a_{0,ITA}D_{ITA} + \eta_{it}$.

5. Estimation results

In order to estimate the model (1)-(3) we incorporate equation (3) into equation (1) to find:

$$(4) \Delta_4 E_{it} = a_0 - b_1 E_{i,t-4} + b_2 U_{i,t-6} + b_3 LIQ_{i,t-6} + a_4 \ln(YCAP_{i,t-4} + 1) + a_5 \ln^2(YCAP_{i,t-4} + 1) + \varepsilon_{lit}$$

We apply (weighted) least squares to this equation and then find estimates for the equilibrium relation parameters through:

$$(5) \hat{\alpha} = (a_0 + b_2 \bar{U} + b_3 \overline{LIQ}) / b_1 \quad \hat{\beta} = a_4 / b_1 \quad \hat{\gamma} = a_5 / b_1.$$

These coefficients are inserted into equation (3) so that we can calculate the E^* -variable. This variable is incorporated into equation (2). This equation is then also estimated using (weighted) least squares.

We consider two samples. The first is the 'Two yearly' case in which data for all the even years are used (1980, 1982, 1984, 1986, 1988, 1990, 1992, 1994 and 1996). The total number of observations then equals 207. As an alternative we use the 'Four yearly' case in which data for the years 1980, 1984, 1988, 1992 and 1996 are used. The total number of observations then equals 115. The reason for removing observations from the sample is that the observation periods for two consecutive even years overlap. This may lead to a downward bias in the estimated standard errors of the coefficients.

Weighting with population (in the year $t-4$) implies that all variables (including constants and dummies) are multiplied with the square root of population before the least squares procedure is run. In this way, larger countries, in terms of population, are given a larger influence in determining the parameter estimates than smaller countries. See Carree et al. (1999, 2000) for details of the weighting procedure used.

The estimation results of model (1)-(5) are in Table 2.

Table 2: Estimation results

Parameter	Two yearly	Four yearly	Parameter	Two yearly	Four yearly
a_0	0.200 (4.1)	0.187 (2.7)	α	2.012 (4.4)	1.815 (3.0)
b_1	0.096 (4.0)	0.099 (2.9)	β	-1.336 (4.0)	-1.179 (2.7)
b_2	0.088 (6.3)	0.084 (4.2)	γ	0.234 (3.9)	0.203 (2.5)
b_3	-0.015 (1.1)	-0.015 (0.8)	c_0	0.189 (9.7)	0.190 (7.8)
a_4	-0.128 (3.6)	-0.117 (2.3)	c_1	-0.646 (3.6)	-0.577 (2.7)
a_5	0.022 (3.4)	0.020 (2.2)	c_2	-0.006 (5.7)	-0.006 (4.7)
$a_{0,ITA}$	0.010 (4.4)	0.010 (3.0)			
R_1^2	0.325	0.283	R_2^2	0.537	0.599
N	207	115	N	207	115

Note: Absolute t-values between brackets.

As can be seen from Table 2, all parameter estimates, except for that of b_3 , are significant. Notably, we indeed find evidence for the hypothesized U-shape of the equilibrium rate of business ownership. The estimated parameters α , β and γ are significantly different from zero. Also, β and γ have the predicted signs. We find that α is in excess of unity, in contrast to our expectations. This is likely to be a consequence of concentrating on relatively rich countries instead of including data from less developed countries as well. Further investigation of the parabola shows that for the 'Two yearly' case the minimum value is reached for a level of per capita income of 16,373 U.S. dollar (in purchasing power parities) at 1990 prices. The minimum level of equilibrium business ownership is 10.6% of the labor force. In Figure 1 we show the equilibrium curve and the actual data for the G7-countries. For the 'Four yearly' case the value of the minimum is 0.105 and it is attained at a level of 17,175 U.S. dollar. We will concentrate on the results of the 'Two yearly' case as they are quite similar to the 'Four yearly' one.

The last column of Table 1 presents the equilibrium business ownership rates in the year 1988. Greece has the highest equilibrium rate, 0.235, in that year. Most of the countries are very close to the minimum of the curve, though. The two richest countries, Luxembourg and the United States, have an equilibrium rate of 0.12, only about 1.5 percent points higher than the minimum. For the interpretation of this parabola

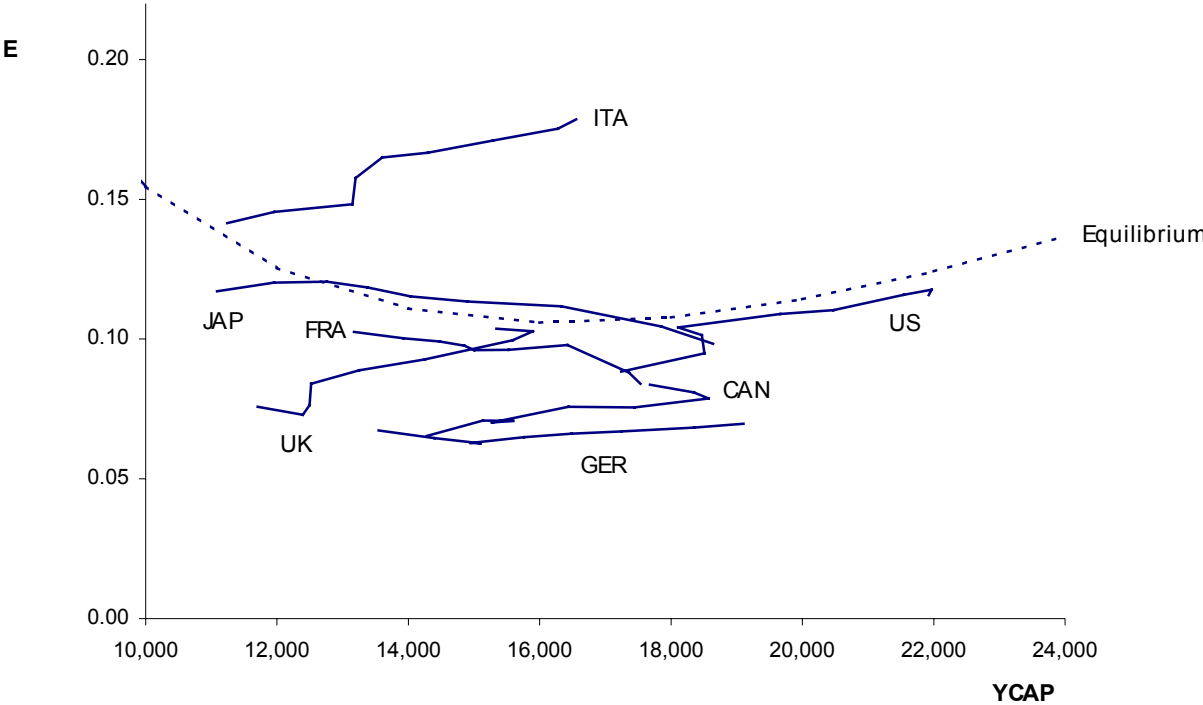
describing the equilibrium rate of business ownership given a certain stage of economic development, it should be noted that the relation is based upon a limited range of values of GDP per capita. For values of per capita income far outside our sample range, for example less developed countries or GDP per capita levels twice as high as attained in the richest countries in our sample, the equilibrium rate of business ownership is not properly described by the quadratic function. The high value of α that we found has to be viewed in this context (note that α corresponds to the value of E^* at $YCAP=0$, see (3)).

We find that the hypothesized error-correction process of the number of business owners towards the equilibrium rate is supported: parameter b_1 is significantly positive. The speed of adjustment is not high: the deviation from equilibrium at a certain point in time decreases with 10 percent in a period of four years. The low value of the speed of adjustment is not surprising. The convergence process of the actual business ownership rate towards the equilibrium rate is intrinsically slow because it involves structural changes of the supply side (setting up enterprises, investments in physical and human capital, divestments, etc.).

The parameter b_2 points to a positive impact of unemployment on self-employment: every percent point rise in the unemployment rate leads to a rise of 0.09 percent point in the self-employment rate in the succeeding six years. This is in accordance with earlier studies: unemployment is a push factor for self-employment (Evans and Leighton 1989 and Storey 1991). The other variable explaining the change in self-employment, the labor income share, has the expected effect: the parameter b_3 is negative. The effect is insignificant, though. This means that we fail to find evidence for higher business profitability to act as a pull factor for business ownership. The remaining variable in the business ownership equation, the Italy-dummy, shows a significant positive parameter: in Italy the rate of business ownership rises faster *ceteris paribus* than in other countries. Another important characteristic of the estimation results is the deviation of the actual number of business owners from the equilibrium rate having a negative impact on economic growth: the parameter c_1 is significantly negative. This implies that economies with a business ownership rate below the equilibrium may benefit from stimulating new start-ups. In case this rate exceeds the equilibrium, it suggests that there are important impediments to growth for small and medium-sized enterprises. In the growth equation, the per capita income parameter is significantly negative. This might reflect the convergence of countries hypothesis. However, it may also be a within (regression-to-the-mean) effect: a higher value of GDP per capita in a certain year leads to a smaller economic growth in the subsequent period. Finally, the constant term c_0 is positive.

A comparison of the third and sixth column of Table 1 shows that in 1988 most countries had too few self-employed relative to the equilibrium value. The most obvious exception is Italy.¹⁷ It indicates that the high level of self-employment in Italy is not efficient: it has a relatively large negative impact on economic growth.¹⁸ Countries which had very low business ownership rates compared to the equilibrium include the Scandinavian countries. These economies are characterized by a very large public sector, relatively low entry and exit rates and high taxes. Eliasson (1995) and Braunerhjelm and Carlsson (1999) blame part of Sweden's relatively bad economic performance in the 1980s on limited private initiative and a lack of structural adjustment.

Figure 1: The actual and equilibrium rate of business ownership for G7-countries in sample period



¹⁷ New-Zealand is also an exception. It may be a result of the economic reforms in this country, through which business ownership experienced a big boost in the early eighties. See Evans et al. (1996).

¹⁸ In Italy, research and development expenditures are by far the lowest among the largest OECD countries as a percentage of gross national product. This is in line with the idea that when there are too many business owners, the scale advantages in research and development are not utilized. See Cohen and Klepper (1996).

6. Discussion

Business ownership has received considerable attention from policy makers in European countries. The high unemployment rate coupled with limited economic growth in Europe has triggered a plea by policy makers for rethinking the policy approach that fostered prosperity during the post-war era. In two ways globalization has reduced the ability of the European countries to generate economic growth and create jobs. On the one hand the advent of new competition from low-cost countries in Central and Eastern Europe as well as Asia has flooded European markets. On the other hand, the telecommunications and computer revolutions have drastically reduced the cost of shifting capital and information out of the high-cost locations of Europe and into lower-cost locations around the globe.

In their efforts to create jobs, politicians turned to promoting labor-intensive and small-scaled organizations. Furthermore, entrepreneurship, in the form of new firms, and intrapreneurship, in the form of new ideas and responsibilities implemented in existing organizations, are assumed to be essential to creating new economic activity. In modern economies a great variety of organizations is involved in making innovative products. This is the case particularly in niche markets like in the ICT sector. The more organizations are active in such markets, the greater the chance that an innovation takes place. Variety and selection play a dominant role in this mechanism.

It is deeply embedded in the current European policy approach that the creativity, autonomy and independence of the self-employed contribute to higher levels of economic activity. Therefore, major funds of governmental institutions and independent donor organizations are being channeled towards young and small firms. The present paper aims at judging whether such policies are justified in different phases of economic development.

We adopt a Schumpeterian framework to explain the interrelationship between economic progress and the size class structure of firms. We claim that there has been a regime switch which caused the hitherto negative "equilibrium" relation between the business ownership rate and economic development to become U-shaped. There are many other links between entrepreneurship and the macroeconomy. See Acs, Carlsson and Karlsson (1999) for a recent and Brock and Evans (1986) for an early survey. The present paper zooms in on one specific linkage: that between the number of business owners and economic development. Three aspects of this linkage are investigated. First, we investigate whether there is a long-term equilibrium relation between the number of business owners and the stage of economic development. This conjecture arises from analysing empirical and theoretical work in this area. The relation is hypothesized to be a decreasing function of economic development in that the self-employment rate is high in low-developed economies whereas there is a later phase where mass production and scale economies thrive. A vast literature points at a still later phase of economic development where the business ownership rate is increasing again. This phase is characterized by "the reversal of the trend" towards increasing economies of scale and scope. Therefore we formulate the equilibrium business ownership to have a U-shaped

relation with respect to economic development. Second, we investigate whether there is a correction mechanism when the rate of business ownership is out of equilibrium and what the speed of convergence is. Deviations from equilibrium can occur due to exogenous shocks and institutional divergences, for instance, because “government regulation of market activity is likely to obstruct and frustrate the spontaneous, corrective forces of entrepreneurial adjustments” (Kirzner 1997, p. 81). Third, we investigate whether deviating from the equilibrium rate of business ownership leads to lower economic growth. The three aspects are tested using a two-equation model. The first equation explains the growth of the number of business owners using the deviation between the actual and the equilibrium rate of business ownership, unemployment as a push factor and the labor income share as a measure of business profitability. The second equation explains economic growth using the deviation between the actual and the equilibrium rate of business ownership, and the per capita income level. The model is tested using a data panel of 23 OECD countries.

The rate of business ownership is shown to influence economic growth through deviations from the equilibrium rate. This result supports the view that size distribution differences across countries matter when explaining economic performance (Davis and Henrekson 1999). As a consequence, economies can have both too few or too many business owners and that both situations lead to lower growth rates. By and large, a five percent point deviation implies a growth loss of three percent over a period of four years. In particular, the fact that economic development may be hampered by a number of business owners being too high considering an economy's stage of development may come as a surprise for European politicians. They see self-employment as a forceful weapon when fighting unemployment and stagnating growth. Different stages of economic development thus call for different development and stimulation programs.

We find evidence for an error correction mechanism between the actual rate of business ownership and the equilibrium rate. Lagged unemployment appears to be a significant push factor of business ownership. Italy plays an exceptional role in that there appears to be an additional autonomous increase of the rate of self-employment which may have frustrated economic growth.

An important policy implication of our exercises is not only that “To induce dynamic entrepreneurial competition we require the fulfillment of only one condition: guaranteeing free entrepreneurial entry into any market where profit opportunities may be perceived to exist” (Kirzner 1997, p.74), but also that exit free of stigma and financial burdens has to be safeguarded. See also Acs, Carlsson and Karlsson (1999). Low barriers to entry and exit of business owners are a necessary condition for the equilibrium seeking mechanisms which are vital in our model of the relation between business ownership and economic development.

Future research should investigate whether different countries have different equilibrium relations depending upon institutional, industrial and other dimensions and how and to what extent policy measures are able to influence this equilibrium. Furthermore, while the present research is fully based upon country-wide composites, sectoral diversity between countries probably plays a role when explaining differences in equilibrium situation and differences in the equilibrium restoring mechanism. For that many data problems have to be resolved.

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