Working Paper Series
Department of Economics
University of Verona

On the gravitation and convergence of industry profit rates in Denmark, Finland, Italy and the US

Andrea Vaona

WP Number: 2 January 2010

ISSN: 2036-2919 (paper), 2036-4679 (online)

On the gravitation and convergence of industry profit rates in Denmark, Finland, Italy and the US

Andrea Vaona[†]

Department of Economics Sciences, University of Verona
Palazzina 32 Scienze Economiche
Ex Caserma Passalacqua
Viale dell'Università 4
37128 Verona
E-mail: andrea.vaona@univr.it

Kiel Institute for the World Economy

[†] The author would like to thank Giampaolo Mariutti and Andrea Roventini for helpful conversations. The usual disclaimer applies.

On the gravitation and convergence of industry profit rates in Denmark, Finland, Italy and the US

Abstract

The hypotheses of profit rates gravitating around or converging towards a common value is tested using Danish, Finnish, Italian and US data. Both hypotheses are rejected for all the countries considered. This is interpreted as the result of limitations to capital mobility and of persistent differentials in the innovative performance of industries.

Keywords: capital mobility, gravitation of profit rates, convergence, SURE estimation, exactly median unbiased estimator
JEL Codes: L16, L19, L60, L70, L80, L90, B51, B52

Introduction

The present work is devoted to the empirical study of the tendency of industry profit rates to either converge towards or gravitate around a common value, due to the *mobility of capital*, namely its migration from low profit sectors to high profit ones. We show a new econometric method to test these hypotheses, as well as we consider economies with different degrees of product marker regulations and exposure to international trade as Denmark, Finland and Italy (Høj et al. 2007). Moreover, these are the countries with the most complete data in the STAN OECD database, which contains information based on a specific effort to allow cross-industry and cross-country comparability. However, we do not stop here. We apply sound econometric testing to US data too in order to see whether our results can be replicated for a large economy with a better definition of profits and to check the conclusions achieved by the previous literature on the basis of descriptive evidence.

In order to introduce our topic, a terminological distinction is warranted after D'Orlando (2007). On one side we define "*convergence* towards long-period positions" as "the movement of actual magnitudes towards their long-period counterparts" driven by the mobility of capital. In other words, we make reference to a situation where industry profit rates initially differ, but they tend to collapse towards a common value. On the other, we term *gravitation* as "the random oscillation of actual magnitudes around their long-period counterparts". Convergence is therefore a prerequisite for gravitation.

A number of studies has been devoted to this issue. Glick and Ehrbar (1988) consider the profit rates of 13 manufacturing sectors between 1970 and 1979 for France, Germany, Italy, United Kingdom, and the United States allowing for sector and time specific effects and using a maximum likelihood approach to the modelling of serial correlation in the disturbances. They found scant support for the theory of profit rate equalization across sectors when defining the profit rate as the ratio of gross value added minus employee compensation over the gross stock of capital at replacement cost. Once deducting from profit indirect taxes, net interest, and an estimate of the noncorporate wage equivalent and adding inventories to the stock of capital, their econometric evidence is still against the hypothesis of profit equalization, though to a lesser extent. Relying on a weighted least squares estimator, Glick and Ehrbar (1990) produce similar results to Glick and Ehrbar (1988) and they find a significant correlation between profit standard deviation and a measure of industry long-run profit rates in US manufacturing. This could entail that investors require higher remunerations in riskier industries, if one is ready to accept profit standard deviation as a measure of risk.

Duménil and Lévy (2002) present evidence, based on descriptive statistic, that the gravitation of profit rates take place only in five industries: Manufacturing Durable Goods, Manufacturing Nondurable Goods, Wholesale trade, Retail trade and Capitalist Services. In other sectors, gravitation could not be observed because individual businesses, which might not maximize profits[1], dominate or because there might exist some measurement error in the capital stock and a distorting effect of economic regulation[2]. Similarly, Duménil and Lévy (2004) find descriptive evidence of gravitation of profit rates of a restricted financial sector and a restricted non-financial sector, once taking into account their large fluctuations and the effect of economic policies.

Zacharias (2001), in an interesting unpublished work, finds that profit rates of most US manufacturing industries between 1947 and 1998 are nonstationary, but not all of them are cointegrated. So it is not possible to find evidence of long-run equalization of profit rates in all the sectors considered.

Lianos and Droucopoulos (1993a) examine the behaviour of profit rate differentials of Greek manufacturing sectors between 1963 and 1986, finding a mild tendency for convergence and a slowly changing hierarchy of profit rates. Tsoulfidis and Tsaliki (2005) criticize the usage of profit margins on sales as a measure of profitability instead of the profit-capital ratio, on the ground that if the profit-capital ratios are equalized in presence of unequal capital output ratios, it will imply different profit margins. They also discuss the notion of competition as rivalry between firms, as advanced by classical economists and Schumpeter. Building on the concept of "regulating capital", namely "capital that embodies the best generally available method of production", they find evidence of profit equalization in Greek manufacturing industries. Maldonado-Filho (1998) does not find empirical support for the hypothesis that long run profit rates are positively correlated with market power and entry barriers in the Brazilian economy from 1973 to 1985. Finally, Tsaliki and Tsoulfidis (1998) show that a classical and post-keynesian hybrid model is particularly successful when applied to large-scale Greek manufacturing industries, whereas the neoclassical model is not supported by the data.

A parallel stream of literature is the one on the persistence of profit (POP) rates which originates from the work of Brozen (1971a, b), who criticizes previous studies finding a positive relationship between industry concentration and profit rates on the basis that a cross-sectional approach far from being able to capture long-run nexuses might just detect temporary occurrences. Mueller (1986) moves beyond the conclusion that the correlation between concentration and profit rates is unstable, finding support for the hypothesis that profit rates tend to converge in the long-run, though the convergence process is not

[1] This is the case of Agriculture, Construction and Individual Business Services.
[2] This is the case of industries with high capital intensity.

complete. Mueller (1990) presents a series of studies on profit dynamics concerning the US, Canada, Japan, the UK, the Federal Republic of Germany and France sharing a common methodology, concluding that the persistence of company profits is much higher than what it would be possible to expect in a competitive environment.

Analyzing data on 42 Indian industries over the period 1970-1985, Kambahampati (1995) finds that profit rate differentials tend to persist more in fast growing industries or industries with high barriers to entry and that government intervention can reduce profit persistence. Lianos and Droucopoulos (1993b) detect high profit rate persistence in Greek manufacturing industries, a high permanent component of the profit rates with substantial variations among sectors; and that the concentration ratio, advertising intensity, export intensity and capital intensity of different industries do affect the speed of adjustment of profit rates. Bourlakis (1997) analyses a dataset of Greek manufacturing industries from 1958 to 1984 and he finds that the persistence of profit rate differentials is not continuous in time and there is a general tendency towards more competitiveness.

Glen, Lee and Singh (2001, 2003) compare estimates of the persistence of profit at the company level for developing and developed countries, finding that it is greater in the latter than in the former ones and discussing possible economic causes and implications of this pattern. Yurtoglu (2004) finds that the profit persistence of major Turkish firms between 1985 and 1998 was not greater than that of firms in developed countries. A considerable degree of persistence is found by Murayama and Odagiri (2002) analysing Japanese data in the period 1964-1997. Crespo Cuaresma and Gschwandtner (2008) produce econometric evidence in favour of changes in profit persistence through time. Gschwandtner and Hauser (2008) apply fractional integration techniques to the dynamic structure of profit rates of 156 US manufacturing firms confirming the finding of high profit persistence, which is at odd with the assumption of a competitive environment. Gschwandtner (2005) focuses on 85 US companies surviving from 1950 to 1999 and finds that profits were not eroded by competitive forces even after a period of 50 years.

Cable and Jackson (2003) use structural time series analysis finding that profit, though having a cyclical component, displayed non-eroding long run persistence in 60% of the companies included in their sample.

Goddard and Wilson (1999) and Gschwandtner (2003) find non-stationarity in the 76–81% of 335 time-series of UK firms and in the 37% of 187 US companies respectively. Crespo Cuaresma and Gschwandtner (2006) propose to explain the high persistence of profit rates on the basis of nonlinearities in their adjustment process, which could be the result of fixed costs in firms' entry-exit decisions in a market, whereby only if profits exceed a given level entry is attractive.

Goddard, McMillan and Wilson (2006) use time-series/cross-section techniques to assess the persistence of the profit rates of 96 large UK firms over a 31-years period finding that for many sectors the unit root hypothesis can be rejected though for not all of them.

Though most of the studies of the POP literature use firm level data, the specific importance of industry level analyses should not be overlooked as Duménil and Levy (1993, p.154) show that industry profit rates equalization can take place even in presence of firms with heterogeneous technology and, therefore, profit rates.

The rest of this paper is structured as follows. The next section illustrates our data and mothods. Section 3 presents our results, while the last section concludes.

Data and Methods

We analyse data produced by the OECD and national statistical offices for Denmark, Finland and Italy. While for the US we rely on data published by the US Bureau of Economic Analysis. From the OECD STAN database we consider the following variables: Labour compensation of employees (LABR), Total employment – Persons (EMPN), Employees – Persons (EMPE), Net operating surplus and mixed income (NOPS). From the national statistical offices, we obtained data on value of net capital stock at current prices (CPNK)[3]. Similarly to Duménil and Lévy (2002), we proxy the wage equivalent of the self-employed by labour costs over total employment times the number of the self-employed. In the end, we compute the profit rate for industry *i* at time *t* (π_{it}) as follows[4]

[3] The OECD STAN database contains data on real fixed capital and not on nominal fixed capital. It would be possible to deflate the numerator of (1) by the production deflator, but this would eliminate the effect on profit rates of the relative prices of production and capital goods. So a ratio between nominal variables is preferable.

[4] After Wolff (2003), note 1, we also used a Marxian definition of profit rate as

$$\frac{NOPS_{it}-\left[\frac{LABR_{it}}{EMPE_{it}}\cdot\left(EMPN_{it}-EMPE_{it}\right)\right]}{CPNK_{it}+\left[\frac{LABR_{it}}{EMPE_{it}}\cdot\left(EMPN_{it}-EMPE_{it}\right)\right]+LABR_{it}+INTI_{it}}$$

where $INTI_{it}$ is intermediate inputs. Our results did not substantially change.

$$\pi_{it} = \frac{NOPS_{it} - \left[\frac{LABR_{it}}{EMPE_{it}} \cdot \left(EMPN_{it} - EMPE_{it} \right) \right]}{CPNK_{it}} \tag{1}$$

Our analysis concerns the following sectors: Agriculture, hunting, forestry and fishing; Mining and quarrying; Food products, beverages and tobacco; Textiles, textile products, leather and footwear; Wood and products of wood and cork; Pulp, paper, paper products, printing and publishing; Chemical, rubber, plastics and fuel products; Other non-metallic mineral products; Basic metals, metal products, machinery and equipment; Basic metals and fabricated metal products; Machinery and equipment; Transport equipment; Manufacturing nec; Electricity, gas and water supply; Construction; Wholesale and retail trade, Restaurants and hotels; Transport and storage and communication; Financial intermediation. In the end, for each of the 17 industries considered, we have 35 observations for Denmark, 32 for Finland and 26 for Italy.

In equation (1), profits are net of taxes and of payments for interest, as measured by financial intermediation services indirectly measured (FISIM). However, the capital stock does not include inventories, given that no data about them is provided neither in the STAN database nor by national statistical offices. We share this shortcoming with other studies on European countries, such as Glick and Ehrbar (1988). (1) is robust to the critique by Tsoulfidis and Tsaliki (2005) as it is a profit-capital ratio and not profit margin on sales.

In order to verify whether our results are robust to this lack of data, we also analyse US data, after Duménil and Lévy (2002). Here, we consider the following variables, taken from the Gross Product Originating and the NIPA tables: Corporate Profit Before Taxes (PI)[5], Proprietors' income (PROINC), Compensation of Employees (COMP), Full-time and Part-time Employees (FTPT), Persons engaged in Production (PEP), Full-time equivalent employees (FTE)[6], Current-Cost Net Stock of Nonresidential and Residential Fixed Private Capital by Industry (K)[7], Inventories and Domestic Final Sales of Business by Industry (INV)[8]. In this case we compute the profit rate of industry *i* at time *t* in the following way:

$$\pi_{it} = \frac{PI_{it} + PROINC_{it} - \frac{COMP_{it}}{FTPT_{it}} \left(PEP_{it} - FTE_{it} \right)}{K_{it} + INV_{it}} \tag{2}$$

[5] Nipa table 6.17.
[6] Gross Product Originating.
[7] Table 3.1ES of the Fixed Assets Tables.
[8] NIPA table 5.7.5.

Unfortunately, relying on publicly available data, it is not possible to completely rebuild the dataset by Duménil and Lévy (2002) as data on K and INV are not available any more with the SIC classification but only with the NAICS one. However, it is possible to consider 4 out of the 5 sectors that Duménil and Lévy (2002) argue whose profits are gravitating around a declining trend, namely Manufacturing Durable Goods, Manufacturing Nondurable Goods, Wholesale Trade and Retail Trade. For similar reasons, it is not possible to extend our dataset beyond 1997, so we have 50 observations for 4 sectors.

It is worth noting that though, in principle, given the lack of data discussed above, (2) is preferable to (1), both of them are just proxies of the profit rate as their measures of the capital stock are incomplete, not including financial debts and assets and trade credits.

Figures 1 to 4 show the time series of industry profit rates for Denmark, Finland, Italy and the US respectively. While for the US, profit rates generally trend downward, at a first sight no general pattern emerges for the other countries. Some industry specificities are, though, interesting. After 1998 the profitability of the Mining and Quarrying sector took off in Denmark, probably due to the increase in the price of oil in the same period, given the presence of oil reserves in the Danish portion of the North sea. It is possible to observe a similar trend in the Machinery and Equipment industry in Finland after 1993, capturing the rise of Nokia as a worldwide leader in the sector. On the other hand, the high profit rates in the Construction and in the Mining and Quarrying sectors in Italy might be the result of a lack of competition.

Figures 5 to 8, instead, show how two measures of dispersion of the profit rates, standard deviation and the variation coefficient, evolved through time. Considering both of them is interesting as the latter normalizes the standard deviation of the profit rates of a given year to their mean.

It is interesting to notice that the variation coefficient tends to increase towards the end of the sample in all countries. A similar trend can be observed for the standard deviation of profit rates in Denmark and Finland, but not for Italy and the US. Therefore, it is possible to state that the dispersion of profit rates actually increased from 1948 to 1997, once taking into account the behaviour of their mean.

In the end descriptive statistics would not support neither the gravitation nor the convergence hypotheses. However, the pattern emerged above might be the result of temporary, but persistent shocks to profitability. In order to shed more light on this issue, we resort to econometric testing.

After Mueller (1986), we consider a model for profit rates with a nonlinear time trend, allowing, however, shocks to be serially correlated:

$$\tilde{\pi}_{it} = \alpha_i + \frac{\beta_i}{t} + \frac{\gamma_i}{t^2} + \frac{\varphi_i}{t^3} + \varepsilon_{it} \quad (3)$$

$$\varepsilon_{it} = \rho_i \varepsilon_{it-1} + \xi_{it} \qquad (4)$$

where $\tilde{\pi}_{it}$ is the deviation of the profit rate in sector *i* from the cross-sectional mean, ξ_{it} is a stochastic error with a normal distribution with zero mean and variance σ_ξ^2, *t* is time, α_i, β_i, γ_i, φ_i, and ρ_i are parameters to be estimated.

Equation (3) was originally proposed by Mueller (1986, p. 12) in the study of long-run profit rates[9]. It has a number of advantages against other time trend specifications. In the first place, a linear time trend is unrealistic as it would predict a continuous decline in profit rates, even after the attainment of their competitive level. In the second place, a third order polynomial in the inverse of time does not imply that the peak or the trough in profitability occurs in the first time period, allowing two changes in direction for the time-path of profitability. Higher order polynomials might incur into collinearity problems. Mueller (1986) assumed ε_{it} to be white noise, so our specification of (4) has a greater degree of generality.

In order to account for both serial correlation in the disturbance and possible cross-sector correlation we adopt a similar procedure to that proposed by Meliciani and Peracchi (2006). We first estimate (3) separately for each sector. Then we use the exactly median unbiased (EMU) estimator devised by Andrews (1993) to estimate ρ_i and its confidence interval from the residuals of (3). Building on our point estimates of ρ_i, we apply a feasible GLS transformation on our data to account for serial correlation after Greene (2003)[10] and, finally we implement a SURE estimator on the transformed data to obtain new estimates of α_i, β_i, γ_i and φ_i. At this stage, we check for the poolability of these parameters across sectors, namely we test the null hypothesis that

$$\alpha_i=\alpha,\ \beta_i=\beta,\ \gamma_i=\gamma,\ \varphi_i=\varphi$$

which would imply that profits were gravitating around a common trend.

[9] In the POP literature it is customary to demean the data of each cross-section of the panel before estimation. We stick to this practice. Not demeaning would not substantially alter our results.

[10] See p. 272. Given a generic estimate of ρ_i, $\hat{\rho}_i$, the feasible GLS transformation for a model with an AR(1) disturbance consists in pre-multiplying the vector of observations of the dependent variable and the matrix of observations of independent variables of sector *i* by the matrix below:

$$\begin{bmatrix} \sqrt{1-\hat{\rho}_i} & 0 & \cdots & 0 \\ -\hat{\rho}_i & 1 & \cdots & 0 \\ \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & -\hat{\rho}_i & 1 \end{bmatrix}$$

Resorting to the estimator by Andrews (1993) is useful because the OLS estimator is well known to be downward biased in small samples (Quenouille, 1956 and Orcutt and Winokur, 1969). Given the OLS estimator of ρ_i, $\hat{\rho}_i$, whose median function is $m(\cdot)$, the EMU estimator of ρ_i is:

$$\tilde{\rho}_i = \begin{cases} 1, & \text{if } \hat{\rho}_i > m(1) \\ m^{-1}(\hat{\rho}_i), & \text{if } m(-1) < \hat{\rho}_i \leq m(1) \\ -1, & \text{otherwise} \end{cases} \tag{5}$$

where $m^{-1}(\cdot)$ is the inverse of $m(\cdot)$ and $m(-1) = \lim_{\rho_i \to -1} m(\rho_i)$. The median of $\hat{\rho}_i$ usually is numerically evaluated on a fine grid of ρ_i values and interpolation is used to obtain $m^{-1}(\cdot)$. In a similar fashion it is possible to obtain the 5th and the 95th quantiles of $\hat{\rho}_i$ and to build a 95% confidence interval of $\tilde{\rho}_i$[11].

Finally, we try to understand whether profit rates eventually converged to levels that were not statistically different from one another. In order to do so we test the hypothesis

$$\begin{aligned}(1-\tilde{\rho}_i)\alpha_i + \beta_i\left(\frac{1}{T} - \tilde{\rho}_i \frac{1}{T-1}\right) + \gamma_i\left[\frac{1}{T^2} - \tilde{\rho}_i \frac{1}{(T-1)^2}\right] + \varphi_i\left(\frac{1}{T^3} - \tilde{\rho}_i \frac{1}{(T-1)^3}\right) = \\ = (1-\tilde{\rho}_i)\alpha + \beta\left(\frac{1}{T} - \tilde{\rho}_i \frac{1}{T-1}\right) + \gamma\left[\frac{1}{T^2} - \tilde{\rho}_i \frac{1}{(T-1)^2}\right] + \varphi\left(\frac{1}{T^3} - \tilde{\rho}_i \frac{1}{(T-1)^3}\right)\end{aligned} \tag{6}$$

where T is the time span of our dataset and the terms multiplying $\tilde{\rho}_i$ are introduced by the feasible GLS transformation.

Results

Our results for Denmark, Finland, Italy and the US are set out in Tables 1 to 4. For most of the sectors considered, but Agriculture, hunting, forestry and fishing in Denmark, Food products, beverages and tobacco in Finland and Wood and products of wood and cork and Manufacturing n.e.c. in Italy, we find that serial correlation in the disturbances is statistically significant at a 5% level. However, we do not find evidence supporting the presence of unit roots in the residuals with the exception of Finance, Insurance, Real Estate and Business Services in Finland. As a matter of consequence, this sector was

[11] An extension of this estimator to the AR(p) case, with p being the number of lags, is provided in Andrews and Chen (1994). The EMU estimator requires prior knowledge on the distribution of ξ_{it}, however Andrews (1993) showed that assuming it to be normal produces results robust to various non-normal distributions. One further assumption is $m(\cdot)$ to be continuous and strictly increasing. It is worth noting that in the empirical application by Meliciani and Peracchi (2006) not resorting to the EMU estimator increases the frequency of rejection of the null hypothesis of poolability.

excluded from the SURE estimation. Parameter estimates differ considerably across sectors and not surprisingly poolability tests strongly reject the null hypothesis in all the countries considered returning a value of 2256.87 in Denmark, 984.86 in Finland, 4839.80 in Italy, and 58.1 in the US, which for χ^2 distributions with 64, 60, 64 and 12 degrees of freedom always entail a p-value of 0.00. The null hypothesis of eventual convergence of profit rates, (6), was rejected too, as the test statistics, distributed like a χ^2 with 16 degrees of freedom for Denmark and Italy, with 15 degrees of freedom for Finland, and 3 degrees of freedom for the US returned values of 947.57 (Denmark), 396.04 (Finland), 1155.95 (Italy), and 46.68 (the US), always implying a p-value of 0.00.

In principle, it would be possible to think that restricting the analysis to manufacturing industries might provide more favourable results to the gravitation hypothesis, or at least to the convergence one. This is because after Duménil and Lévy (2002) one might argue that the capital stocks of the Financial intermediation and Wholesale trade sectors are not accurately measured due to the lack of data on financial debts and assets and on inventories respectively. Further, Agricultural and Construction activities might have a too large share of individual businesses, which might not respond to profit rate differentials due to either lack of information or absence of a profit maximizing behaviour. Finally, the capital stock in Mining, Transport and Electricity activities might not be properly measured due to its long duration. However, even the null hypothesis of a gravitation field restricted to the manufacturing sector could not be accepted as the poolability test returned a statistic of 347.22 in Denmark, 261.83 in Finland, 1695.04 in Italy, which for χ^2 distributions with 36 degrees of freedom always entail a p-value of 0.00. Convergence did not find empirical support either, as the null hypothesis (6) was strongly rejected too[12,13,14].

We conclude that industry profit rates were not gravitating around a common value during the period of observation, instead they were each converging towards an idiosyncratic path. With the exception of the financial sector in Finland, whose profit rate would appear to contain a stochastic trend.

Conclusions and Interpretation

This work has investigated by means of descriptive statistics and econometric testing whether industry profit rates displayed either gravitation around or convergence towards a common value in Denmark

[12] The tests returned statistics of 127.92 for Denmark, 145.24 for Finland and 318.81 for Italy with p-values of 0.00.

[13] The SURE estimates obtained restricting the analysis to manufacturing activities are similar to those set out in Tables 1 to 4.

[14] Excluding from the sample the Machinery and Equipment sector in Finland would not alter our results to a significant extent.

from 1970 to 2005, in Finland from 1975 to 2007, in Italy from 1980 to 2006 and in the US from 1948 to 1997. We found that industry profit rates did not tend to gravitate around a common value. Rather their time evolution can in general be described as gravitation around industry specific trends. Furthermore, convergence in profit rates was never achieved in the countries considered during the period under scrutiny.

We interpret this behaviour as the result of limitations to capital mobility across sectors, which might have different sources. Duménil and Lévy (1993, pp 69-73), presenting classical economists' thought, write that capital mobility among economic sectors can take two forms, either firms' entry-exit decisions - Marx and Smith's view - or credit flows - Ricardo's view. We know that both these processes are not as smooth as one in principle could expect. On the one hand, sunk costs and uncertainty are known to curb firms' movements in and out a given market (Dixit, 1989; Cabral, 1995; Lambson, 1991 and 1992). In this context the persistent ability of firms in a given industry to undertake strategic investment leading to innovation or to an increase in their market share might boost their relative profit rate for a long period of time[15] (Lee and Mahmood, 2009, Pianta and Tancioni, 2007, Geroski et al. 1993, Dosi, 2007). On the other, capital market imperfections are a pervasive phenomenon, whereby, for instance, the structure of a given industry in terms of firm size might curb capital mobility given that small firms tend to have less collateral and, therefore, less creditworthiness (Schiantarelli, 1995).

Duménil and Lévy (1993)[16] showed by means of numerical simulations that limitations to capital mobility can produce highly persistent deviations in industry profit rates. Inspecting their results it is possible to infer that, observing industry profit rates for periods of 20-50 years, one might find a pattern very similar to the one emerged in the present work, namely that profit rates do not gravitate and they tend to follow trends which might or might not converge. Under this perspective, the results contained in the present work might not be considered per se as an empirical challenge to the theory of the equalization of profit rates and, as a consequence, of the relevance of the prices of production, as it would be necessary to have data for a much longer time span than that usually considered in the literature to observe the gravitation of profit rates, which, in its own, could be considered as only one of the forces that affect the dynamics of industry profit rates. Sunk costs, uncertainty, capital market imperfections and innovation trajectories are very likely to have a role as well.

[15] As testified by the dynamics of the profit rate of the Machinery and Equipment industry in Finland.
[16] See p. 155.

Bibliography

[1] Andrews, D. W. K. (1993), "Exactly median unbiased estimation of first order autoregressive unit root models", Econometrica 61: 139-165.

[2] Andrews, D. and H. Y. Chen (1994). Approximately Median Unbiased Estimation of Autoregressive Models", *Journal of Business and Economic Statistics*, Vol. 12, pp. 187-204.

[3] Bourlakis (1997), "Testing the Competitive Environment and the Persistence of Profits Hypotheses", Review of Industrial Organization 12: 203–218.

[4] Brozen, Y. (1971a), "The Persistence of "High Rates of Return" in High-Stable Concentration Industries", Journal of Law and Economics, 14, 501-512.

[5] Brozen, Y. (1971b), "Bain's Concentration and Rates of Return Revisited", Journal of Law and Economics, 14, 351-369.

[6] Cable, J. and Jackson R. H. G. (2003) The persistence of profits in the long run: a new approach, mimeo, School of Management and Business, University of Wales, Aberystwyth, UK.

[7] Cabral, L. (1995), Sunk costs, firm size and firm growth. Journal of Industrial Economics 43 (2), 161–172.

[8] Crespo Cuaresma, J. and A. Gschwandtner, (2006), "The competitive environment hypothesis revisited: non-linearity, nonstationarity and profit persistence", Applied Economics, 38, 465–472.

[9] Crespo Cuaresma, J. and A. Gschwandtner (2008), "Tracing the dynamics of competition: evidence from company profits", Economic Inquiry, 46, 208-213.

[10] D'Orlando, F. (2007), "A methodological note on long-period positions", Contributions to Political Economy 26: 17-26.

[11] Dixit, A., 1989. Entry and exit decisions under uncertainty. Journal of Political Economy 97 (3), 620–638.

[12] Dosi, G. (2007), "Statistical Regularities in the Evolution of Industries. A Guide through some Evidence and Challenges for the Theory", in Malerba, F. and S. Brusoni, eds., *Perspectives on Innovation*, Cambridge University Press, Cambridge, UK, 153-186.

[13] Duménil, G., and D. Lévy (1993), *The economics of the profit rate: Competition, crises, and historical tendencies in capitalism*, Edward Elgar, Aldershot, England.

[14] Duménil, G. and D. Lévy (2002), "The field of capital mobility and the gravitation of profit rates (USA 1948–2000)", Review of Radical Political Economics 34, 417–436.

[15] Duménil, G. and D. Lévy (2004), "The Real and Financial Components of Profitability (United States, 1952–2000) Review of Radical Political Economics 36, 82-110.

[16] Geroski P.A., Machin S., and J. Van Reenen (1993), "The Profitability of Innovating Firms", RAND Journal of Economics, 24(2), pp. 198-211.

[17] Glen, J., K. Lee and A. Singh (2001), "Persistence of profitability and competition in emerging markets", Economics Letters, 72, pp. 247–53.

[18] Glen, J., K. Lee and A. Singh (2003), "Corporate profitability and the dynamics of competition in emerging markets: a time-series analysis", The Economic Journal, 113, F465–F484.

[19] Glick, M. and H. Ehrbar (1988), "Profit Rate Equalization in the U.S. and Europe: An Econometric Investigation", European Journal of Political Economy, 4, 179-201

[20] Glick, M. and H. Ehrbar (1990), "Long-run Equilibrium in the Empirical Study of Monopoly and Competition", Economic Inquiry, 28, 151-162.

[21] Goddard, J. A. and J. O. S. Wilson (1999) The persistence of profit: a new empirical interpretation, International Journal of Industrial Organization, 17, 663–87.

[22] Goddard, J., McMillan D. and J. O. S. Wilson (2006), "Do firm sizes and profit rates converge? Evidence on Gibrat's Law and the persistence of profits in the long run", Applied Economics, 38, 267–278

[23] Greene, W. H. (2003), *Econometric Analysis*, Prentice Hall, Upper Saddle River, New Jersey.

[24] Gschwandtner, A. (2003) Profit persistence in the US: evidence from a new dataset, mimeo, University of Vienna, Vienna, Austria.

[25] Gschwandtner, A. (2005) Profit persistence in the 'very' long run: evidence from survivors and exiters, Applied Economics, 37, 793–806.

[26] Gschwandtner, A. and M. A. Hauser (2008), "Modelling profit series: nonstationarity and long memory", Applied Economics, 40, 1475–1482.

[27] Høj, J., Jimenez, M., Maher, M., Nicoletti, G. and M. Wise (2007), "Product market competition in the OECD countries", OECD Economics Department, Working Paper 575.

[28] Kambahampati, U. S. (1995), "The persistence of profit differentials in Indian industries", Applied Economics 27: 353-361.

[29] Lambson, V., 1991. Industry evolution with sunk costs and uncertain market conditions. International Journal of Industrial Organization 9 (2), 171–196.

[30] Lambson, V., 1992. Competitive profits in the long run. Review of Economic Studies 59, 125–142.

[31] Lee, C.-Y. and I. P. Mahmood (2009), "Inter-industry differences in profitability: the legacy of the structure–efficiency debate revisited", Industrial and Corporate Change, 18: 351-380.

[32] Lianos, T. P. and V. Droucopoulos (1993a), "Convergence and hierarchy of industrial profit rates: the case of Greek manufacturing", Review of Radical Political Economics, 25: 67-80.

[33] Lianos, T. P. and V. Droucopoulos (1993b), "The persistence of profits in the Greek manufacturing industry, 1963-88", International Review of Applied Economics, 7: 163 – 176.

[34] Maldonado-Filho, E. (1998) "Competition and equalization of inter-industry profit rates: the evidence for the Brazilian economy, 1973-85", International Working Group on Value Theory mini-conference at the Eastern Economic Association New York, N.Y.

[35] Maruyama, N. and Odagiri, H. (2002). 'Does the 'persistence of profits' persist?: A study of company profits in Japan, 1964–1997', International Journal of Industrial Organization, 20, 1513-1533.

[36] Meliciani, V. and F. Peracchi (2006), "Convergence in per-capita GDP across European regions: a reappraisal", Empirical Economics, 31, 549-568.

[37] Mueller, D. 1986. Profits in the Long Run. Cambridge, U.K.: Cambridge University Press.

[38] Mueller, D.(ed) 1990. The Dynamics of Company Profits. Cambridge, U.K.: Cambridge University Press.

[39] Orcutt, G. H. and H. S. Winokur (1969), "First order autoregressions: inference, estimation and prediction", Econometrica 37: 1-14.

[40] Pianta, M. and M. Tancioni (2007), "Innovations, wages, and profits", Journal of Post-Keynesian Economics 31: 101-123.

[41] Quenouille, M. H. (1956), "Notes on bias in estimation", Biometrika, 43: 353-360.

[42] Schiantarelli, F., 1996, Financial constraints and investment: methodological issues and international evidence, Oxford Review of Economic Policy, 12, 70-89.

[43] Tsaliki, P. and L. Tsoulfidis (1998), "Alternative theories of competition: Evidence from Greek manufacturing", International Review of Applied Economics, 12, 187-205.

[44] Tsoulfidis, L. and P. Tsaliki (2005), "Marxian Theory of Competition and the Concept of Regulating Capital: Evidence from Greek", Review of Radical Political Economics 37, 5-22.
[45] Wolff, E. N. (2003), "What's behind the rise in profitability in the US in the 1980s and in the 1990s?", Cambridge Journal of Economics, 27, 479-499.
[46] Yurtoglu, B. B. (2004), "Persistence of firm-level profitability in Turkey", Applied Economics, 36, 615-625.
[47] Zacharias, A. (2001), "Testing Profit Rate Equalization in the U.S. Manufacturing Sector: 1947–1998", Jerome Levy Economics Institute Working Paper No. 321.

Table 1 – Heterogeneous non-linear time trends in industry profit rates in Denmark, 1970-2005

Estimation method: SURE on transformed data to account for first order serial correlation

	Coef.	Std. Err.	z-stat	p-value	[95% Conf. Interval]	
Agriculture, Hunting, Forestry and Fishing						
α	-0.084	0.007	-11.610	0.000	-0.098	-0.070
β	0.430	0.123	3.510	0.000	0.190	0.671
γ	-1.056	0.379	-2.790	0.005	-1.798	-0.314
φ	0.663	0.269	2.460	0.014	0.135	1.191
ρ	0.259	-	-	-	0.504	-0.004
R^2			0.900			
Mining and Quarrying						
α	0.334	0.111	3.020	0.003	0.117	0.551
β	-3.296	1.215	-2.710	0.007	-5.678	-0.914
γ	7.273	2.640	2.760	0.006	2.100	12.447
φ	-4.319	1.615	-2.670	0.007	-7.484	-1.154
ρ	0.843	-	-	-	0.926	0.613
R^2			0.161			
Food products, beverages and tobacco						
α	-0.004	0.020	-0.200	0.844	-0.042	0.035
β	0.540	0.322	1.680	0.094	-0.091	1.171
γ	-0.817	0.916	-0.890	0.373	-2.613	0.979
φ	0.375	0.623	0.600	0.547	-0.846	1.597
ρ	0.502	-	-	-	0.681	0.240
R^2			0.411			
Textiles, textile products, leather and footwear						
α	-0.050	0.027	-1.840	0.065	-0.103	0.003
β	0.273	0.363	0.750	0.452	-0.439	0.985
γ	-0.552	0.883	-0.630	0.531	-2.283	1.178
φ	0.352	0.562	0.630	0.530	-0.748	1.453
ρ	0.792	-	-	-	0.912	0.567
R^2			0.151			

	Coef.	Std. Err.	z-stat	p-value	[95% Conf. Interval]	
Wood and products of wood and cork						
α	0.003	0.041	0.060	0.949	-0.077	0.082
β	1.074	0.674	1.590	0.111	-0.246	2.395
γ	-2.354	1.937	-1.220	0.224	-6.150	1.442
φ	1.423	1.322	1.080	0.282	-1.169	4.014
ρ	0.495	-	-	-	0.702	0.251
R^2			0.324			
Pulp, paper, paper products, printing and publishing						
α	-0.030	0.014	-2.060	0.040	-0.058	-0.001
β	0.206	0.229	0.900	0.366	-0.242	0.654
γ	-0.494	0.623	-0.790	0.428	-1.716	0.728
φ	0.346	0.416	0.830	0.406	-0.470	1.161
ρ	0.600	-	-	-	0.776	0.333
R^2			0.223			
Chemical, rubber, plastics and fuel products						
α	0.049	0.010	4.680	0.000	0.028	0.069
β	-0.775	0.174	-4.440	0.000	-1.117	-0.433
γ	1.628	0.510	3.190	0.001	0.628	2.627
φ	-0.924	0.351	-2.630	0.008	-1.612	-0.236
ρ	0.436	-	-	-	0.639	0.144
R^2			0.474			
Other non-metallic mineral products						
α	-0.031	0.020	-1.550	0.120	-0.070	0.008
β	0.034	0.329	0.100	0.918	-0.611	0.679
γ	0.349	0.941	0.370	0.710	-1.494	2.193
φ	-0.273	0.641	-0.430	0.670	-1.530	0.984
ρ	0.491	-	-	-	0.671	0.208
R^2			0.267			

continues

Table 1 – Heterogeneous non-linear time trends in industry profit rates in Denmark, 1970-2005
Estimation method: SURE on transformed data to account for first order serial correlation

continued

	Coef.	Std. Err.	z-stat	p-value	[95% Conf. Interval]	
Basic metals, metal products, machinery and equipment						
α	-0.039	0.010	-4.080	0.000	-0.057	-0.020
β	-0.421	0.149	-2.840	0.005	-0.713	-0.130
γ	1.156	0.419	2.760	0.006	0.335	1.977
φ	-0.747	0.286	-2.610	0.009	-1.307	-0.187
ρ	0.517	-	-	-	0.716	0.226
R^2			0.810			
Machinery and equipment						
α	0.048	0.020	2.340	0.019	0.008	0.088
β	-0.252	0.328	-0.770	0.442	-0.895	0.391
γ	0.492	0.903	0.540	0.586	-1.278	2.262
φ	-0.240	0.604	-0.400	0.691	-1.425	0.944
ρ	0.589	-	-	-	0.760	0.254
R^2			0.266			
Transport equipment						
α	-0.008	0.047	-0.170	0.865	-0.099	0.083
β	1.079	0.730	1.480	0.139	-0.351	2.510
γ	-3.227	2.221	-1.450	0.146	-7.580	1.125
φ	1.951	1.583	1.230	0.218	-1.151	5.054
ρ	0.351	-	-	-	0.596	0.059
R^2			0.184			
Manufacturing nec						
α	0.001	0.029	0.040	0.968	-0.056	0.059
β	0.666	0.423	1.580	0.115	-0.163	1.495
γ	-1.644	1.065	-1.540	0.123	-3.732	0.444
φ	1.039	0.687	1.510	0.130	-0.307	2.386
ρ	0.744	-	-	-	0.888	0.454
R^2			0.179			
Electricity, Gas and Water supply						
α	0.005	0.015	0.350	0.725	-0.024	0.034
β	-0.428	0.223	-1.920	0.054	-0.865	0.008
γ	1.209	0.589	2.050	0.040	0.054	2.364
φ	-0.798	0.390	-2.040	0.041	-1.563	-0.033
ρ	0.613	-	-	-	0.779	0.321
R^2			0.131			

	Coef.	Std. Err.	z-stat	p-value	[95% Conf. Interval]	
Construction						
α	-0.093	0.048	-1.950	0.051	-0.186	0.001
β	0.496	0.792	0.630	0.532	-1.057	2.049
γ	-1.204	2.303	-0.520	0.601	-5.717	3.309
φ	0.653	1.583	0.410	0.680	-2.449	3.756
ρ	0.444	-	-	-	0.650	0.140
R^2			0.232			
Wholesale and Retail Trade; Restaurants and Hotels						
α	-0.004	0.018	-0.220	0.825	-0.038	0.030
β	1.198	0.292	4.100	0.000	0.625	1.771
γ	-2.954	0.858	-3.440	0.001	-4.636	-1.272
φ	1.878	0.594	3.160	0.002	0.715	3.041
ρ	0.420	-	-	-	0.642	0.150
R^2			0.701			
Transport and storage and Communication						
α	-0.036	0.017	-2.040	0.041	-0.070	-0.001
β	-0.569	0.231	-2.460	0.014	-1.021	-0.117
γ	1.363	0.550	2.480	0.013	0.285	2.441
φ	-0.811	0.348	-2.330	0.020	-1.494	-0.128
ρ	0.752	-	-	-	0.866	0.504
R^2			0.568			
Finance, Insurance, Real Estate and Business Services						
α	-0.034	0.011	-3.220	0.001	-0.055	-0.013
β	-0.247	0.153	-1.620	0.106	-0.546	0.052
γ	0.679	0.396	1.710	0.087	-0.098	1.456
φ	-0.446	0.262	-1.700	0.088	-0.959	0.067
ρ	0.634	-	-	-	0.782	0.299
R^2			0.650			

Table 2 – Heterogeneous non-linear time trends in industry profit rates in Finland, 1975-2007
Estimation method: SURE on transformed data to account for first order serial correlation

	Coef.	Std. Err.	z-stat	p-value	[95% Conf. Interval]	
Agriculture, Hunting, Forestry and Fishing						
α	0.149	0.013	11.400	0.000	0.123	0.174
β	-0.423	0.179	-2.370	0.018	-0.773	-0.073
γ	0.823	0.450	1.830	0.068	-0.059	1.705
φ	-0.471	0.291	-1.620	0.105	-1.041	0.099
ρ	0.693	-	-	-	0.390	0.837
R^2			0.912			
Mining and Quarrying						
α	0.296	0.042	7.030	0.000	0.214	0.379
β	-0.992	0.503	-1.970	0.048	-1.977	-0.007
γ	2.183	1.161	1.880	0.060	-0.094	4.459
φ	-1.269	0.725	-1.750	0.080	-2.690	0.153
ρ	0.803	-	-	-	0.543	0.918
R^2			0.749			
Food products, beverages and tobacco						
α	0.243	0.011	22.040	0.000	0.222	0.265
β	-0.436	0.179	-2.430	0.015	-0.787	-0.085
γ	2.134	0.552	3.870	0.000	1.053	3.216
φ	-1.615	0.394	-4.100	0.000	-2.387	-0.844
ρ	0.129	-	-	-	-0.177	0.382
R^2			0.988			
Textiles, textile products, leather and footwear						
α	0.244	0.009	27.140	0.000	0.227	0.262
β	-0.765	0.131	-5.820	0.000	-1.022	-0.507
γ	1.694	0.375	4.520	0.000	0.959	2.429
φ	-0.986	0.260	-3.790	0.000	-1.497	-0.476
ρ	0.368	-	-	-	0.027	0.586
R^2			0.985			

	Coef.	Std. Err.	z-stat	p-value	[95% Conf. Interval]	
Wood and products of wood and cork						
α	0.306	0.036	8.610	0.000	0.237	0.376
β	-1.914	0.496	-3.860	0.000	-2.886	-0.941
γ	4.474	1.266	3.530	0.000	1.992	6.956
φ	-2.737	0.821	-3.330	0.001	-4.346	-1.128
ρ	0.522	-	-	-	0.218	0.699
R^2			0.872			
Pulp, paper, paper products, printing and publishing						
α	0.318	0.028	11.490	0.000	0.264	0.373
β	-0.857	0.401	-2.140	0.033	-1.643	-0.071
γ	1.775	1.056	1.680	0.093	-0.295	3.845
φ	-1.002	0.695	-1.440	0.150	-2.364	0.361
ρ	0.598	-	-	-	0.287	0.760
R^2			0.943			
Chemical, rubber, plastics and fuel products						
α	0.406	0.048	8.500	0.000	0.312	0.500
β	-3.499	0.654	-5.350	0.000	-4.781	-2.217
γ	8.050	1.875	4.290	0.000	4.375	11.725
φ	-5.166	1.339	-3.860	0.000	-7.790	-2.542
ρ	0.515	-	-	-	0.254	0.726
R^2			0.924			
Other non-metallic mineral products						
α	0.281	0.036	7.750	0.000	0.210	0.352
β	-0.046	0.494	-0.090	0.926	-1.014	0.923
γ	0.171	1.235	0.140	0.890	-2.249	2.591
φ	-0.123	0.797	-0.150	0.877	-1.686	1.439
ρ	0.398	-	-	-	0.079	0.635
R^2			0.937			

continues

Table 2 – Heterogeneous non-linear time trends in industry profit rates in Finland, 1975-2007
Estimation method: SURE on transformed data to account for first order serial correlation

continued

	Coef.	Std. Err.	z-stat	p-value	[95% Conf.	Interval]
Basic metals, metal products, machinery and equipment						
α	0.057	0.030	1.900	0.057	-0.002	0.117
β	-0.904	0.423	-2.140	0.032	-1.732	-0.076
γ	1.928	1.081	1.780	0.074	-0.191	4.046
φ	-1.079	0.701	-1.540	0.124	-2.454	0.295
ρ	0.736	-	-	-	0.882	0.470
R^2			0.125			
Machinery and equipment						
α	0.691	0.156	4.420	0.000	0.385	0.997
β	-4.734	1.626	-2.910	0.004	-7.920	-1.547
γ	10.816	3.644	2.970	0.003	3.674	17.958
φ	-6.623	2.259	-2.930	0.003	-11.049	-2.196
ρ	0.873	-	-	-	0.959	0.649
R^2			0.359			
Transport equipment						
α	-0.066	0.029	-2.300	0.021	-0.123	-0.010
β	-0.507	0.455	-1.120	0.265	-1.398	0.384
γ	2.887	1.372	2.100	0.035	0.198	5.576
φ	-2.257	0.970	-2.330	0.020	-4.158	-0.357
ρ	0.313	-	-	-	0.570	0.011
R^2			0.541			
Manufacturing nec						
α	-0.011	0.028	-0.390	0.696	-0.066	0.044
β	1.062	0.442	2.400	0.016	0.195	1.929
γ	-2.691	1.280	-2.100	0.035	-5.200	-0.183
φ	1.725	0.877	1.970	0.049	0.007	3.444
ρ	0.512	-	-	-	0.700	0.189
R^2			0.393			
Electricity, Gas and Water supply						
α	-0.130	0.021	-6.080	0.000	-0.172	-0.088
β	0.907	0.273	3.330	0.001	0.373	1.442
γ	-2.116	0.700	-3.020	0.002	-3.487	-0.744
φ	1.315	0.457	2.880	0.004	0.419	2.212
ρ	0.769	-	-	-	0.888	0.520
R^2			0.496			

	Coef.	Std. Err.	z-stat	p-value	[95% Conf.	Interval]
Construction						
α	0.175	0.089	1.970	0.048	0.001	0.349
β	-0.353	1.246	-0.280	0.777	-2.794	2.089
γ	1.310	3.162	0.410	0.679	-4.887	7.507
φ	-0.915	2.047	-0.450	0.655	-4.928	3.097
ρ	0.712	-	-	-	0.852	0.481
R^2			0.267			
Wholesale and Retail Trade; Restaurants and Hotels						
α	0.037	0.037	1.010	0.315	-0.035	0.109
β	-0.538	0.339	-1.590	0.113	-1.203	0.127
γ	1.183	0.745	1.590	0.112	-0.278	2.643
φ	-0.686	0.457	-1.500	0.133	-1.581	0.210
ρ	0.915	-	-	-	0.983	0.685
R^2			0.090			
Transport and storage and Communication						
α	-0.108	0.030	-3.610	0.000	-0.167	-0.050
β	0.385	0.278	1.390	0.166	-0.160	0.930
γ	-0.857	0.623	-1.380	0.169	-2.078	0.363
φ	0.506	0.389	1.300	0.193	-0.257	1.269
ρ	0.887	-	-	-	0.970	0.643
R^2			0.323			
Finance, Insurance, Real Estate and Business Services						
α	-	-	-	-	-	-
β	-	-	-	-	-	-
γ	-	-	-	-	-	-
φ	-	-	-	-	-	-
ρ	0.956	-	-	-	1.000	0.747
R^2			-			

Table 3 – Heterogeneous non-linear time trends in industry profit rates in Italy, 1980-2006

Estimation method: SURE on transformed data to account for first order serial correlation

	Coef.	Std. Err.	z-stat	p-value	[95% Conf. Interval]	
Agriculture, Hunting, Forestry and Fishing						
α	-0.014	0.008	-1.720	0.085	-0.031	0.002
β	-0.641	0.117	-5.490	0.000	-0.870	-0.412
γ	1.338	0.328	4.070	0.000	0.694	1.981
φ	-0.792	0.224	-3.540	0.000	-1.230	-0.353
ρ	0.491	-	-	-	0.726	0.123
R^2			0.918			
Mining and Quarrying						
α	0.098	0.031	3.130	0.002	0.037	0.159
β	0.574	0.414	1.390	0.165	-0.237	1.385
γ	-0.636	1.087	-0.580	0.559	-2.767	1.495
φ	0.144	0.716	0.200	0.841	-1.259	1.547
ρ	0.652	-	-	-	0.814	0.301
R^2			0.790			
Food products, beverages and tobacco						
α	-0.035	0.008	-4.300	0.000	-0.051	-0.019
β	0.890	0.116	7.670	0.000	0.663	1.118
γ	-1.957	0.313	-6.250	0.000	-2.571	-1.344
φ	1.171	0.208	5.630	0.000	0.764	1.579
ρ	0.555	-	-	-	0.740	0.219
R^2			0.839			
Textiles, textile products, leather and footwear						
α	0.001	0.011	0.070	0.942	-0.021	0.023
β	0.041	0.148	0.280	0.782	-0.249	0.331
γ	-0.176	0.379	-0.470	0.641	-0.918	0.566
φ	0.138	0.247	0.560	0.575	-0.345	0.622
ρ	0.656	-	-	-	0.822	0.367
R^2			0.046			

	Coef.	Std. Err.	z-stat	p-value	[95% Conf. Interval]	
Wood and products of wood and cork						
α	-0.033	0.006	-5.830	0.000	-0.044	-0.022
β	-0.432	0.076	-5.690	0.000	-0.580	-0.283
γ	0.970	0.231	4.190	0.000	0.517	1.424
φ	-0.586	0.167	-3.510	0.000	-0.913	-0.259
ρ	0.289	-	-	-	0.559	-0.010
R^2			0.949			
Pulp, paper, paper products, printing and publishing						
α	-0.016	0.012	-1.380	0.167	-0.039	0.007
β	0.298	0.157	1.890	0.058	-0.010	0.605
γ	-0.843	0.421	-2.000	0.045	-1.667	-0.018
φ	0.591	0.280	2.110	0.035	0.043	1.139
ρ	0.601	-	-	-	0.805	0.267
R^2			0.279			
Chemical, rubber, plastics and fuel products						
α	-0.006	0.016	-0.370	0.709	-0.037	0.025
β	-0.218	0.191	-1.140	0.252	-0.592	0.155
γ	0.155	0.455	0.340	0.734	-0.737	1.046
φ	-0.011	0.287	-0.040	0.970	-0.573	0.551
ρ	0.782	-	-	-	0.906	0.448
R^2			0.491			
Other non-metallic mineral products						
α	-0.004	0.015	-0.260	0.796	-0.033	0.026
β	0.207	0.204	1.010	0.310	-0.193	0.607
γ	-0.078	0.526	-0.150	0.882	-1.108	0.952
φ	-0.027	0.342	-0.080	0.937	-0.698	0.644
ρ	0.645	-	-	-	0.848	0.355
R^2			0.557			

continues

Table 3 – Heterogeneous non-linear time trends in industry profit rates in Italy, 1980-2006
Estimation method: SURE on transformed data to account for first order serial correlation

continued

	Coef.	Std. Err.	z-stat	p-value	[95% Conf. Interval]	
Basic metals, metal products, machinery and equipment						
α	-0.012	0.011	-1.080	0.280	-0.034	0.010
β	-0.497	0.153	-3.250	0.001	-0.797	-0.198
γ	1.109	0.401	2.760	0.006	0.323	1.895
φ	-0.652	0.264	-2.470	0.013	-1.169	-0.135
ρ	0.606	-	-	-	0.776	0.223
R^2			0.772			
Machinery and equipment						
α	-0.014	0.011	-1.240	0.214	-0.036	0.008
β	0.180	0.135	1.330	0.184	-0.085	0.444
γ	-0.228	0.319	-0.720	0.474	-0.854	0.397
φ	0.104	0.200	0.520	0.604	-0.289	0.497
ρ	0.782	-	-	-	0.896	0.500
R^2			0.322			
Transport equipment						
α	-0.114	0.021	-5.480	0.000	-0.155	-0.073
β	0.396	0.244	1.620	0.106	-0.084	0.875
γ	-0.631	0.571	-1.110	0.269	-1.750	0.487
φ	0.288	0.357	0.810	0.420	-0.411	0.987
ρ	0.793	-	-	-	0.930	0.470
R^2			0.692			
Manufacturing nec						
α	-0.008	0.004	-2.180	0.029	-0.016	-0.001
β	-0.010	0.053	-0.190	0.848	-0.114	0.094
γ	0.448	0.171	2.630	0.009	0.114	0.782
φ	-0.373	0.126	-2.950	0.003	-0.621	-0.125
ρ	0.142	-	-	-	0.437	-0.193
R^2			0.749			
Electricity, Gas and Water supply						
α	-0.006	0.011	-0.570	0.569	-0.028	0.015
β	-0.307	0.129	-2.380	0.017	-0.560	-0.054
γ	-0.133	0.307	-0.430	0.666	-0.734	0.469
φ	0.309	0.195	1.590	0.112	-0.072	0.691
ρ	0.753	-	-	-	0.893	0.471
R^2			0.850			

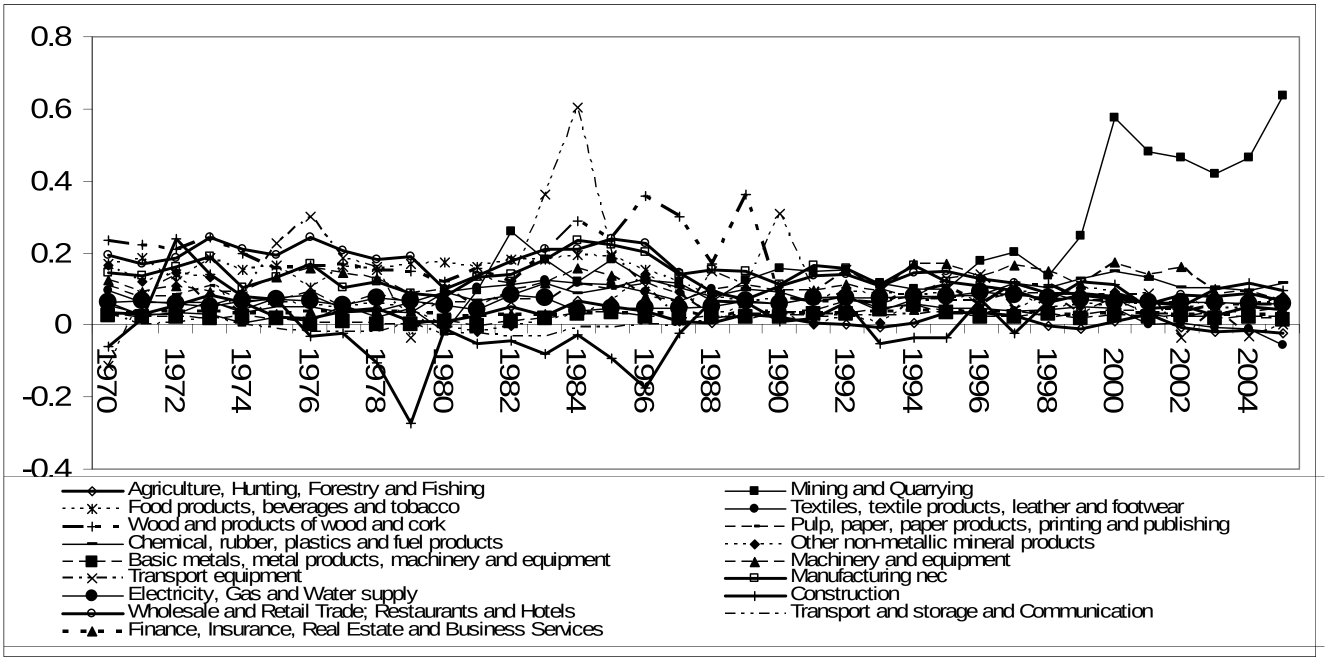
	Coef.	Std. Err.	z-stat	p-value	[95% Conf. Interval]	
Construction						
α	0.138	0.027	5.100	0.000	0.085	0.191
β	0.436	0.335	1.300	0.193	-0.220	1.092
γ	-0.838	0.805	-1.040	0.298	-2.415	0.739
φ	0.477	0.509	0.940	0.348	-0.520	1.475
ρ	0.747	-	-	-	0.901	0.413
R^2			0.854			
Wholesale and Retail Trade; Restaurants and Hotels						
α	0.026	0.008	3.130	0.002	0.010	0.043
β	-0.044	0.107	-0.410	0.683	-0.252	0.165
γ	0.010	0.259	0.040	0.968	-0.497	0.518
φ	0.023	0.164	0.140	0.891	-0.300	0.345
ρ	0.748	-	-	-	0.873	0.418
R^2			0.517			
Transport and storage and Communication						
α	0.011	0.020	0.570	0.568	-0.028	0.050
β	-0.678	0.218	-3.100	0.002	-1.106	-0.250
γ	1.307	0.508	2.570	0.010	0.312	2.303
φ	-0.753	0.318	-2.370	0.018	-1.376	-0.130
ρ	0.841	-	-	-	0.927	0.546
R^2			0.522			
Finance, Insurance, Real Estate and Business Services						
α	0.023	0.012	1.940	0.052	0.000	0.047
β	-0.539	0.124	-4.350	0.000	-0.782	-0.296
γ	0.976	0.276	3.530	0.000	0.435	1.518
φ	-0.536	0.170	-3.150	0.002	-0.870	-0.202
ρ	0.839	-	-	-	0.939	0.564
R^2			0.544			

Table 4 – Heterogeneous non-linear time trends for selected industry profit rates in the US, 1948-1997
Estimation method: SURE on transformed data to account for first order serial correlation

	Coef.	Std. Err.	z-stat	p-value	[95% Conf. Interval]	
Durable goods						
α	0.022	0.018	1.210	0.225	-0.014	0.058
β	2.101	0.313	6.710	0.000	1.487	2.714
γ	-5.015	0.853	-5.880	0.000	-6.687	-3.342
φ	3.131	0.570	5.500	0.000	2.015	4.247
ρ	0.692	-	-	-	0.471	0.816
R^2			0.785			
Nondurable goods						
α	0.103	0.016	6.490	0.000	0.072	0.135
β	1.155	0.263	4.390	0.000	0.639	1.670
γ	-2.821	0.683	-4.130	0.000	-4.159	-1.482
φ	1.820	0.446	4.080	0.000	0.946	2.694
ρ	0.755	-	-	-	0.536	0.862
R^2			0.863			

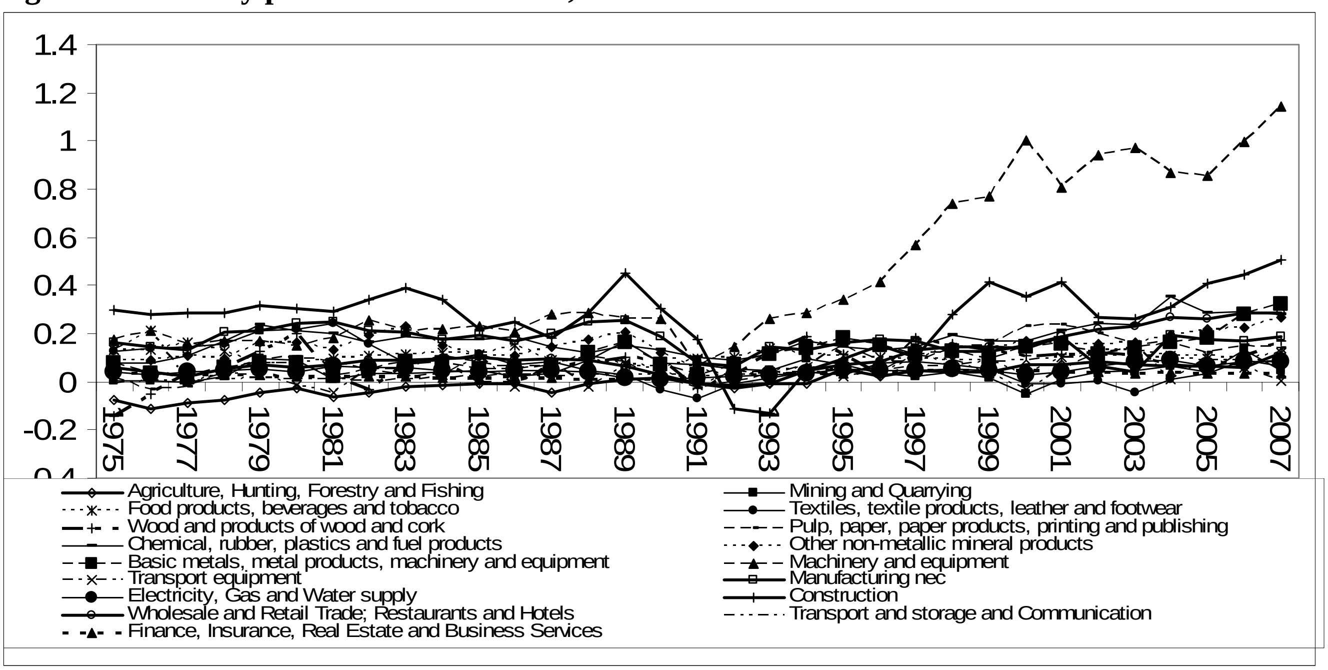
	Coef.	Std. Err.	z-stat	p-value	[95% Conf. Interval]	
Wholesale trade						
α	0.043	0.023	1.910	0.056	-0.001	0.087
β	1.989	0.329	6.050	0.000	1.345	2.633
γ	-5.048	0.795	-6.350	0.000	-6.605	-3.490
φ	3.284	0.505	6.510	0.000	2.295	4.273
ρ	0.841	-	-	-	0.665	0.921
R^2			0.757			
Retail trade						
α	0.079	0.016	5.060	0.000	0.049	0.110
β	0.721	0.218	3.310	0.001	0.294	1.149
γ	-1.488	0.516	-2.880	0.004	-2.499	-0.477
φ	0.926	0.324	2.850	0.004	0.290	1.562
ρ	0.866	-	-	-	0.652	0.939
R^2			0.792			

Figure 1 - Industry profit rates in Denmark, 1970-2005



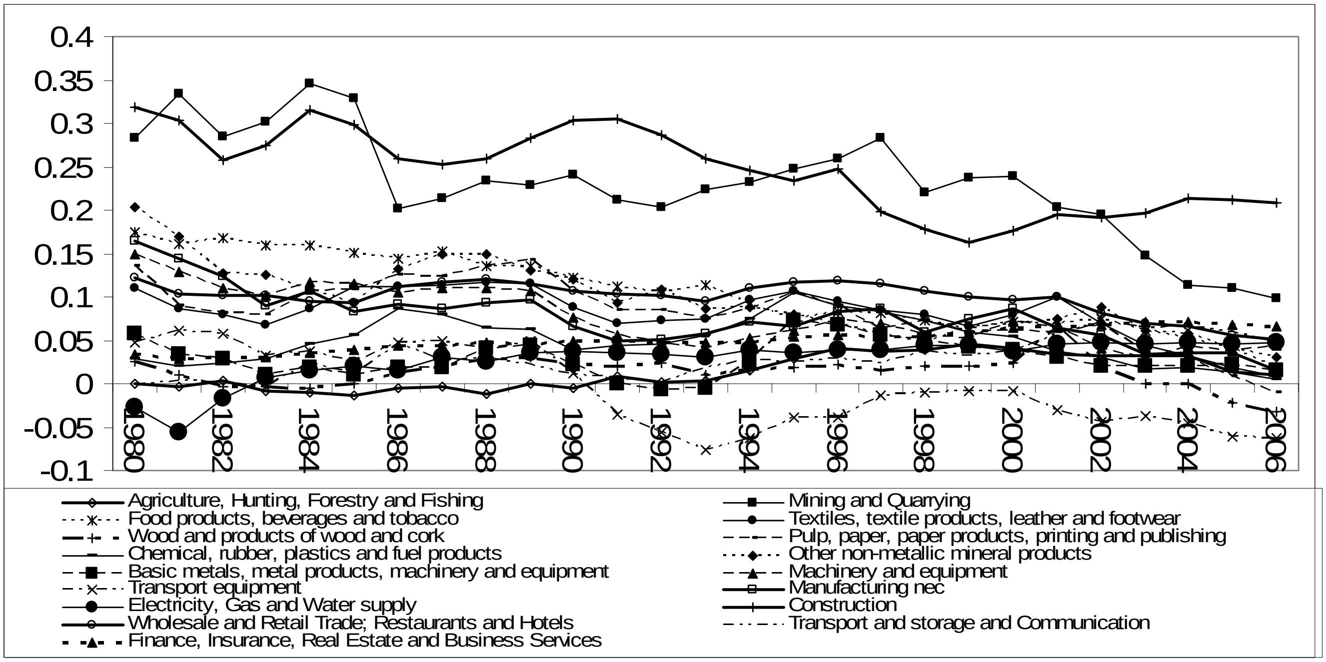
Source: author's elaboration on OECD and national data.

Figure 2 - Industry profit rates in Finland, 1975-2007



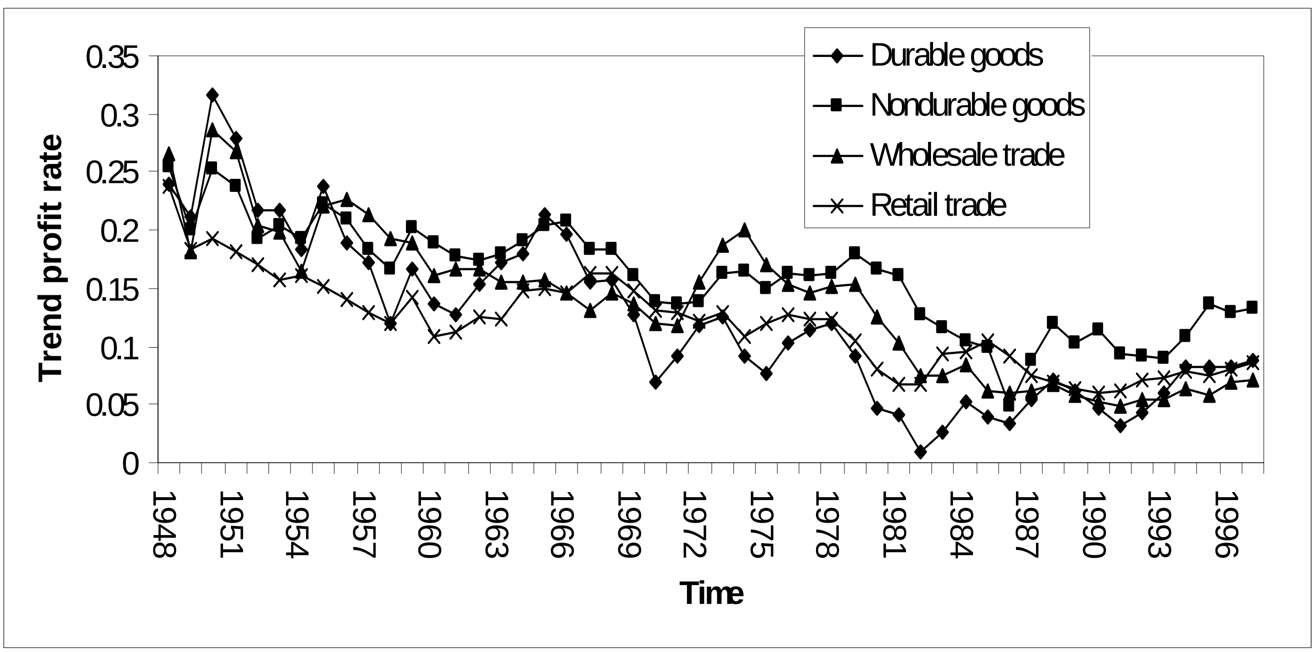
Source: author's elaboration on OECD and national data.

Figure 3 - Industry profit rates in Italy, 1980-2006



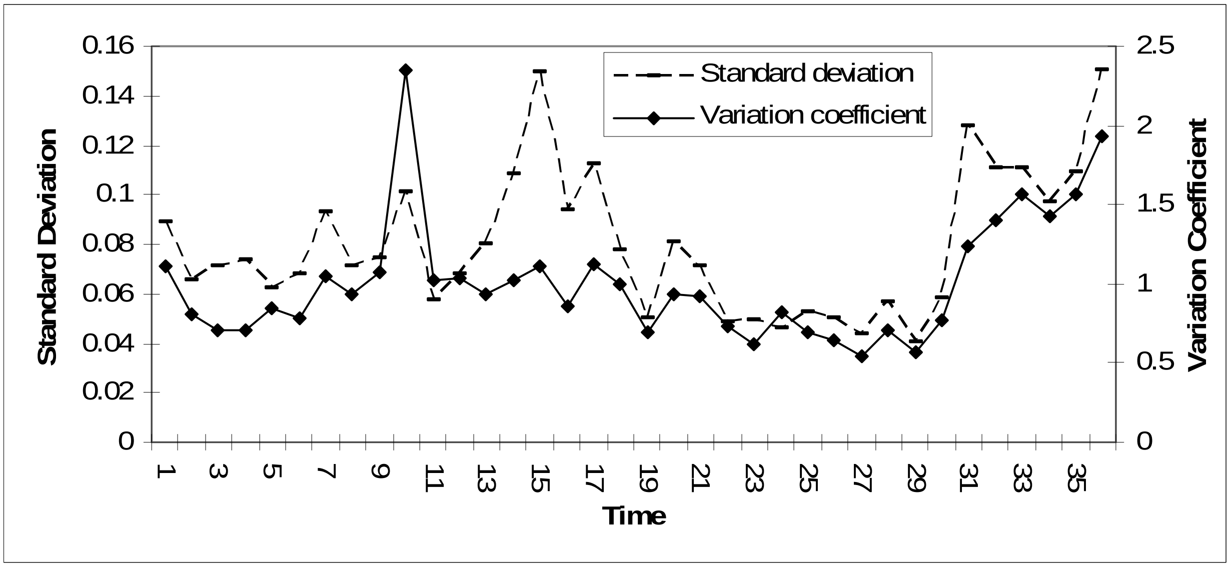
Source: author's elaboration on OECD and national data.

Figure 4 – Industry profit rates for selected industries in the US, 1948-1997



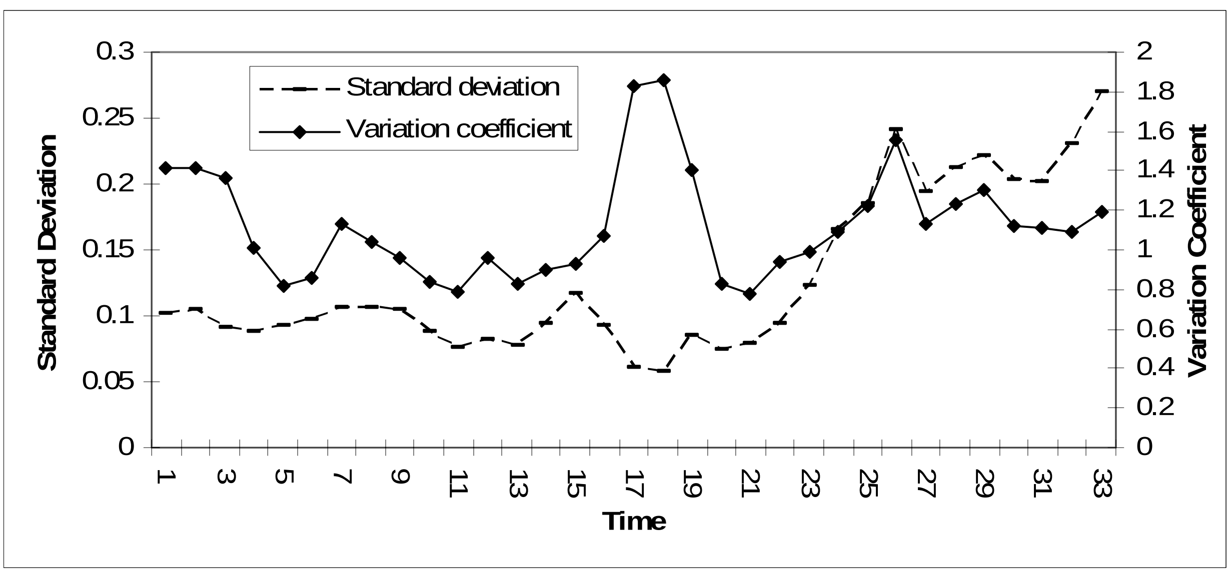
Source: author's elaboration on data from the Bureau for Economic Analysis

Figure 5 – Standard deviation and variation coefficient of industry profit rates in Denmark, 1970-2005



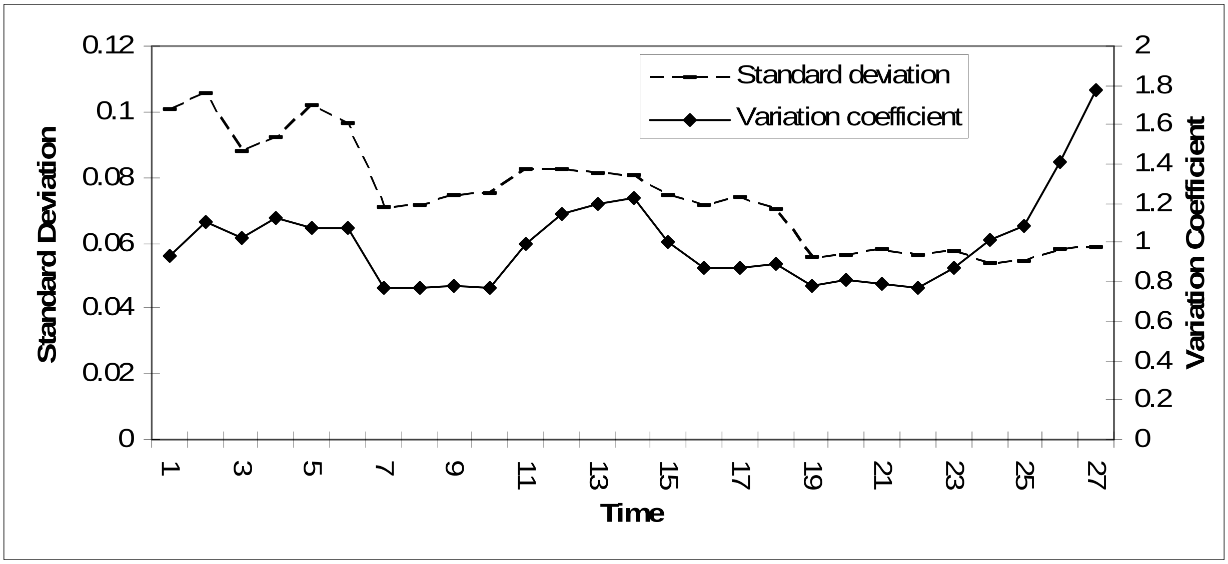
Source: author's elaboration on OECD and national data.

Figure 6 – Standard deviation and variation coefficient of industry profit rates in Finland, 1975-2007



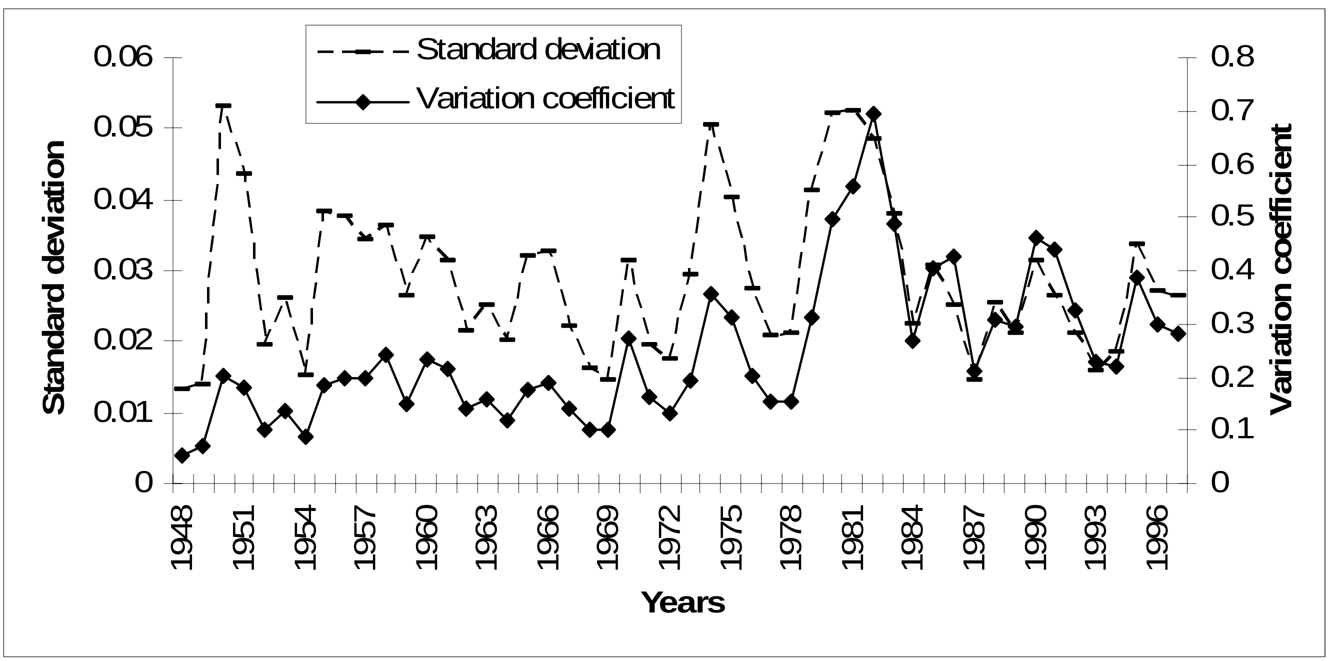
Source: author's elaboration on OECD and national data.

Figure 7 – Standard deviation and variation coefficient of industry profit rates in Italy, 1980-2006



Source: author's elaboration on OECD and national data.

Figure 8 – Standard deviation and variation coefficient of industry profit rates in the US, 1948-1997



Source: author's elaboration on data from the Bureau for Economic Analysis.