



## Profit rate dynamics, income distribution, structural and technical change in Denmark, Finland and Italy

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### ABSTRACT

Under less restrictive assumptions than in previous contributions, this paper highlights various patterns of profit rate dynamics that are common to the countries under scrutiny. Without a substantial re-distribution of income in favour of profits, the profit rate declines. When labour productivity is weak the profits/wages ratio declines leading to a decline in the profit rate, also due to capital deepening. Developments in the capital–labour ratio tend to increase the organic composition of capital while those in the ratio between the capital price deflator and the average wage tend to decrease it. Falls in the profit rate took place in countries with a weak technological change with episodes of Marxian bias. Employment shifted from low to high capital intensity sectors, from low to high organic composition industries and from low to high productivity sectors. Rising strength of labour and realization failures tend to have a greater role than rising organic composition in cyclical profit rate dynamics. Over the cycle, the first mechanism is also the first one to show up, while the others tend to follow it. Theoretical and policy implications are offered.

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### 1. Introduction

The present paper contributes to the empirical analysis of the interweaving of income distribution, structural change, technical change and profit rate dynamics, where by profit rate we mean the ratio of total profits over the capital stock. We do so by introducing a number of novelties to the relevant literature. First we highlight the impact on the aggregate profit rate of sectoral developments not only in technical change, but in income distribution too. This is particularly important on several grounds. In the first place, when analysing economies on a time period of

some decades it is not said profit rate or real wage equalization takes really place as either shocks might be highly persistent or there might be barriers to capital mobility – see Dumenil and Lévy (1993, pp. 155) – in the form of, for instance, sectoral differences in industrial relations, innovation capabilities, barriers to firms' entries and exits, and capital market imperfections. In the second place, the hypothesis of gravitation of profit rates was recently criticized on theoretical grounds (Dupertuis and Sinha, 2009) and it has found a mixed empirical support (Tsoufidis and Tsiliki, 2005; Vaona, 2011). Finally, as showed below, supposing that income distribution is the same across sectors might hide the effect on the aggregate profit rate of labour re-allocation from less to more productive industries. Regarding this issue, in the present work we will make use of panel unit root tests to understand whether sectoral profits/wage bill ratios displayed a mean reverting behaviour.

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A second novelty of this paper is the analysis of countries (Finland, Denmark and Italy) that have so far been overlooked by the literature. Our choice of these countries is largely determined by data availability, as they are those with the most complete information in the STAN OECD database. However, these countries carry a particular economic interest as well. First they are small countries, especially compared to the US, which, as it will be showed below, has attracted most of the attention in the literature. So one might wonder whether small countries, being more exposed to international competition, had a dissimilar profit rate dynamics than larger ones, especially regarding its link with structural change and income distribution. In the second place, these countries differ in terms of product market regulations (Høj et al., 2007), which might had a diverse impact on their economic performance, for instance hampering to various extents the reallocation of production inputs across economic sectors. A further difference among these countries is their system of welfare state, being it “conservative” in Italy and “social-democratic” in Finland and Denmark (Esping-Andersen, 1990). So it is possible to wonder whether different welfare systems produced dissimilar incentives to economic agents, leading to a different dynamics of capital profitability. Finally, Finland, in the last decade, underwent major structural changes and it recovered from a severe banking crisis in the early 1990s, which considerably affected the soundness of its public finances. So it might be an example for many advanced countries to exit the fiscal strains they had been subjected to after the 2008 crisis (IMF, 2009). Given the great diversity of the countries we consider, our main aim is to individuate common developments among them.

The rest of the paper is structured as follows. The next section reviews the relevant literature. Section 3 introduces the accounting framework, defines our variables and illustrates our data sources. Section 4 illustrates the dynamics of the aggregate profit rate and of its components both graphically and resorting to two popular decompositions. It further makes use of wage–profit curves to understand whether technological change was labour saving, capital saving, both labour and capital saving or it was labour saving and capital using. Section 5 explores how this dynamics was affected by structural change both in income distribution and technological development. Section 6 moves to consider the cyclical dynamics of the aggregate profit rate and of its components. The last section concludes, while Appendix A contains the calculations underlying our decompositions.

## 2. Literature review

Being the nature of our contribution empirical, we will mention only briefly theoretical studies and we will give more space to applied works. We cover studies appeared after the mid 1970s. A comprehensive review of previous studies is offered in Shaikh and Tonak (1994).

The dynamics of the aggregate profit rate has been at the centre of a number of different theoretical papers, trying to understand whether, as argued by Karl Marx, aggregate profit rates have an inherent tendency to fall in capital-

ist economies. A first wave of studies, either directly or indirectly, questioned this tendency in general to exist (Okishio, 1961; Samuleson, 1971; Roemer, 1977; Wolff, 1979; Bowles, 1981), but some of their criticisms have been reassessed by more recent works (Shaikh, 1978; Foley, 1986; Michl, 1994; Thompson, 1995; Laibman, 1996).

The empirical literature on the aggregate profit rate dynamics can be divided into two groups: the one concerning the US and the one regarding other countries. A tangential empirical literature is the one regarding wage–profit curves, which we will deal with at the end of this section, as we will resort to this tool to understand whether technological change had any specific bias against or in favour either labour or capital in the countries and time periods here considered.

We review the literature concerning the US following a chronological order with the exception of a digression regarding the issue of productive and unproductive labour.

Weisskopf (1979) tries to understand whether the decline in the US profit rate from 1949 to 1975 was due to rising strength of labour, rising organic composition of capital or to a realisation failure, as in principle these three mechanisms are not mutually exclusive. The empirical evidence there produced on the basis of national accounts data supports more the first explanation than the other two.

Wolff (1979) considers input–output data from 1947 to 1967 showing that both the organic composition of capital and the rate of surplus value increased, but the latter more than the former one leading to an increase in the profit rate. On the other hand, in Wolff (1986) the profit rate turns out to have declined once analysing data from 1947 to 1976. Still, this decline was due more to a decrease in the rate of surplus value than to the increase in the organic composition of capital.

Hahnel and Sherman (1982) investigate the behaviour of the profit rate over the business cycle, distinguishing between early expansion, late expansion and contraction. In early expansion, the profit rate rises because the profit share and, to a greater extent, capacity utilization increase. In late expansion, the profit rate falls because the profit share falls and capacity utilization remains more or less unaltered. Finally, in contraction, the profit rate declines due to a decline in capacity utilization.

Henley (1987) extends the analysis by Weisskopf (1979) to the period from 1949 to 1982 finding that the decline in capital profitability was due to a progressive deterioration from cycle to cycle in capacity utilization and that the increase in the labour share of income can be explained by the increasing expenditure in non-productive staff and in non-wage labour costs.

Michl (1998) concentrates on nonfinancial corporate profitability, highlighting, also by means of regression analysis regarding its trend structure, that its decline can be traced back to a decreasing profit share from 1948 to 1972 and to falling capital productivity from 1972 to 1986. Fichtenbaum (1988) stresses the role of changes in the turnover to understand the cyclical dynamics of the profit rate in US manufacturing from 1949 to 1981.

Wolff (1979, 1986) were followed by a debate showing that the extent of the rise in the organic composition of capital can depend on the distinction between productive

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