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review of the theoretical literature and of the
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The functional distribution of income: a review of the theoretical literature and of the empirical evidence around its recent pattern in European countries

Simone Bertoliⁱ and Francesco Farinaⁱⁱ

Abstract

The interest around the functional distribution has gained a new momentum since the late 1980s with new theoretical advances of Neo-Classical economics and with the contemporary large swing in favour of capital incomes that characterized most European countries. This paper revises the theoretical literature on the interplay between factor shares and economic growth, and it describes the competing evidence around the determinants of the large and enduring fall in the labour share experienced in Europe. The literature has produced a shared consensus on the determinants of the wage push in the 1970s and on the decline of the labour share in the 1980s, but there is still a unsettled debate on the reasons for the enduring decline over the 1990s. The paper also focuses on the possible impact of this significant change in the functional distribution of income on the interpersonal income inequality, evidencing the role in this respect of labour market and welfare institutions.

KEYWORDS: factor shares, income inequality, welfare system.

JEL CLASSIFICATION: D33, E01, E25, J30, O33.

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1. The renewed interest towards the functional distribution of income

The inquiry conducted by Arthur Bowley around the British National Accounts (see Bowley and Stamp 1927) evidenced that the labour share in national income had remained roughly constant across decades; this observation was later regarded as a distinctive feature of the functional distribution of income, whose supposed constancy over time began to be referred to as the Bowley's Law. John Maynard Keynes maintained that the invariance of factor shares was one of the economic facts that were hardest to explain though better recorded, and Nicholas Kaldor included this observation among the stylized facts of economic growth (Kaldor 1948). The shared consensus on the empirical evidence was matched by the increased theoretical predominance of marginalist economics, and both factors contributed to fade away the interest towards the distribution of income among factors of production.

However, a renewed interest around the functional distribution of income has begun to move this issue back in the agenda of economic research since the late 1980s; from a theoretical perspective, the endogenous growth literature attributed a critical role to factor shares along the growth path; from an empirical standpoint, most European countries have experienced a pattern of the labour share since the 1970s that is starkly at odds with its supposed constancy. While in Great Britain the labour share showed cyclical fluctuations around a stable level, in Continental Europe and in Ireland the labour share has been following an hump-shaped pattern with close similarities among countries. The labour share increased significantly until the late 1970s or early 1980s, when its trend reverted and the functional distribution of income shifted in favor of non-labour incomes. The steady decrease from the respective peak years has even exceeded 10 percent of GDP, changes that can hardly be regarded as purely cyclical fluctuations, also because there is currently no apparent signal of a reversal in this pattern that has been prevailing for more than 20 years now.

The scope of this paper is to describe the state of the art of the theoretical and empirical literature around the functional distribution of income to provide a closer understanding of the recent European experience. In this respect, it is important to flag the existence of a notable divide between these two strands of literature, as the theoretical research has been mostly focused on the relationship between factor shares and the rate of economic growth, while the empirical analysis has been mostly concerned with the causes of the shifts in factor shares and it has so far paid little attention to its possible effects, as the underlying causes and the ensuing effects are likely to be closely interrelated.¹

This paper is structured around four main sections. Section 2 provides an overview of the theoretical literature on the determinants of factor shares and of their interrelations with the process of economic growth, and it draws on Bertola et al. (2006) who provide a thorough and far-reaching analysis of the role of income distribution in macroeconomic models. Section 3 analyzes the evolution of the labour share in European countries since the 1970s and it revises the empirical evidence around the determinants of the hump-shaped pattern that characterizes Continental European countries. While there is a broad consensus around the determinants of the rise of the labour share in the 1970s and of its fall in the 1980s, there is a still unsettled debate around the reasons of its enduring fall over the 1990s. This can be partly due to the fact that the widespread fall in labour share across Europe has been matched by differing outcomes in terms of real wage and employment dynamics; with respect to the latter point, we can observe that both Ireland and France recorded a similar reduction in the labour share over the 1990s, but while Lane (1998) reports that employment in the Irish business sector grew by 21 percent over a 10-year period, Caballero and Hammour (1997) referred to the French experience as a "jobless growth". Thus, the search for the underlying common determinants of the shift of the functional distribution of income has to produce results that are consistent – or at least not at odds – with different labour market outcomes.² Section 4 reviews the interplay between the functional and the interpersonal distribution of income, as a major concern about the prolonged fall in the labour share in Europe regards the possible adverse impact on the interpersonal income inequality, and it focuses on the role played by the welfare in this respect; finally, section 5 draws the main conclusions.

2. Theoretical approaches to the functional distribution of income

Although the interest around factor shares dates back to the classical writings of David Ricardo and Karl Marx, this section provides a brief overview of the main theoretical contributions advanced since the 1950s. These contributions, that pertained to either the Post-Keynesian or Neo-Classical tradition and were often developed from a starkly different theoretical perspective, shared the focus on a two-factor economy where the product is divided between capital and labor.³ The Post-Keynesian tradition (Kaldor 1956, Pasinetti 1962) attributed a critical role to the distribution of income between profits and wages in ensuring the equality between aggregate savings and investment, a role that was conversely denied by Neo-Classical economists, where it was factor substitution that ensured the balance of savings and investment along the growth path (Solow 1956). Interestingly, some recent contributions within the Neo-Classical framework have provided support to the Post-Keynesian assumption of differential saving propensities across income sources (Bertola 1993, Alesina and Rodrik 1994) by suggesting that the functional distribution influences the rate of economic growth. Thus, the causal relationship between factor shares and the rate of economic growth runs contrary to the one suggested Post-Keynesian tradition. A further divide resides in the *joint* rather than sequential determination of the rate of economic growth and of the functional distribution of income. However, the presence of increasing returns to scale actually loosens the otherwise tight connection between the technical characteristics of the production process and the size of the factor shares. The functional distribution of income can be sensitive to “differences in the structure of factor and product markets, in factor taxes and subsidies, and in other features of the economy's institutional structure” (Bertola 1996). Still, this is not meant to downplay the role of technical progress in shaping the evolution of the functional distribution of income, as this represents a way through which firms can adapt and react to changes in the institutional framework of the labour market.

2.1 The Post-Keynesian and Neo-Classical models

The economic thought of John Maynard Keynes was presented distinct methodological similarities with the so-called classical economists – most notably Smith, Ricardo, Marx and Malthus – as he relied on the main macroeconomic aggregates - investments, savings, income and employment – as the basic analytical tools to describe the functioning of the capitalist mode of production. However, Keynes drew from some of the classical economists - Malthus more than Marx – also the substantial view of capitalism as an economic system that is very much exposed to the threat of a demand glut. In the *Treatise on Money*, Keynes observed that the acceleration of capital accumulation in the British economy from the 18th to the first half of the 19th century had heavily relied on the compression of consumption demand. In the *General Theory*, his main research addressed the volatility of the volume of investment; in his view, this represented the most important component of aggregate demand, as capital formation constituted the underpinning of a sound functioning of the market economy.

Macroeconomic instability was regarded as a major threat to the viability of a market economy: a recession could lead the entrepreneurs to lose confidence in the future, it could induce a fall of investment decisions and the formation of structural unemployment. As Keynes intended to study the existence of involuntary unemployment in relation to the re-equilibrating properties of a macroeconomic system with a rigid nominal wage rate, he analysed the conditions under which a continuous flow of new capital could bring about the increase in aggregate demand that - after a negative shock - was needed in the medium run to absorb unemployment. In the *General Theory*'s model, investments would have created – through the functioning of the income multiplier - additional savings in the financial market whose amount was exactly equal to the ex-post financing of the new capital. Keynes' lack of confidence in the capacity of the private firms to rely on a sufficient amount of expected consumption demand and to set up accordingly the appropriate amount of investment projects, led him to envisage a sort of “socialization” of investments, involving the State in ensuring that the investment

decisions taken by the entrepreneurs could be smoothly sustained by the portfolio decisions taken by the financial operators, without fears of sudden fall in the stock exchange value of equities.

For a given volume of investments, the higher the propensity to consume, the larger the increase in income and the ensuing formation of savings. In order for entrepreneurs' expectations about future demand to be sustained, the propensity to consume should then not fall short of a critical level. But, notwithstanding the critical role played by the propensity to consume, Keynes never suggested that macroeconomic instability could be traced back to the polarization between the capitalists' and the workers' income levels. Even though he recognized that both the marginal and the average propensity to consume are higher for the working class than for the entrepreneurs and the capitalists, he was afraid of the consequences of redistribution towards the owners of the non-accumulated factor, as public policies oriented to increase the labour share, by lifting both the wage and the employment levels, could have perhaps worsened the fragile "animal spirits" of the entrepreneurs. More specifically, he did not show any interest in devising a welfare system directly devoted to push the labour share up. As a liberal - a *whig*, in the British terminology - his political and social programme consisted in the preservation of the functioning of the capitalist system by suggesting those public policies which in his view were appropriate to sustain aggregate demand, more than to reduce income inequality.

In the first two decades following the Second World War, a group of economists, which had inherited Keynes's intellectual legacy in Cambridge, engaged in an attempt to reconcile his preference for a State intervention oriented to sustaining aggregate demand with the thought of some social reformists such as Lord Beveridge, the founder of the British Welfare State. On the analytical ground, they took two major steps: first, contrary to the well-know sentence by Keynes, they were convinced that the model of the General Theory was to been extended to the future capital accumulation, by bridging the existing gap between the conditions for the macroeconomic equilibrium in the short run and conditions for a steady growth rate in the long run. To this aim, they devised a theoretical framework whereby the functioning of the income multiplier could be combined with the one of the accelerator, that is a variation of income pulling an acceleration in the capital formation. Second, they resumed another methodological aspect of the thought of the classical economists, the attention for the divide between the two fundamental social groups, the workers and the capitalists. Keynes' view about the consumption function – a decreasing propensity to consume with respect to income – was put in terms of propensities to consume and save by the two social groups of the capitalists and the workers.

To summarize the contributions of Post-Keynesian economists, we initially refer to a simple macroeconomic accounting model of an economy that produces a single good that serves for both consumption and investment purposes. The factors of production are represented by a non-accumulated exogenously given factor, that is labour, and by an accumulated factor, capital. In the Post-Keynesian tradition, the savings decisions accommodate the rate of growth of capital that is exogenously determined by "the possibilities of expansion of the markets" (Pasinetti 1962). The functional distribution of income plays a key role in accommodating the aggregate savings level to the exogenously given level of investment, as workers and capitalists have different saving propensities (Kaldor 1956), so that a shift in the functional distribution influences aggregate savings. The Post-Keynesian modelling of saving choices marked a significant departure from the hypothesis introduced by contemporary marginalist economists, who assumed savings do not depend on the source of income and where also the interpersonal distribution of income does not influence aggregate savings insofar as economic agents have linear saving propensities (e.g. Solow 1956).

As it has been mentioned, the critical assumption introduced by the Post-Keynesians is represented by the different saving propensities out of wages and profits (Kaldor 1956), that Pasinetti (1962) actually extended to the case where a share of profits also accrues to workers, so that workers' saving propensity does not any more coincide with the propensity to save out of wages. This corrected an apparent inconsistency, as a positive propensity to save out of wages should have led anyway to workers' participation in the

profits, either through the purchase of equity shares or through the extension of loans to the capitalists.

Some simple algebra from Pasinetti (1962) allows to show that the profit share in national income is determined by the rate of accumulation of the physical capital. The national income Y is shared between profits Π and wages W :

$$Y = \Pi + W \quad (1)$$

The profits Π accrue both to capitalists, Π_k , and to workers, Π_w ; the saving propensity of the capitalists is s_k , while s_w is the saving propensity of the workers. Thus, aggregate savings are given by:

$$S = s_w(W + \Pi_w) + s_k\Pi_k = s_wY + (s_k - s_w)\Pi_k \quad (2)$$

In equilibrium, aggregate savings need to be equal to the exogenously given level of investment:

$$I = S \quad (3)$$

Combining (2) with (3), with some simple but tedious algebra we can derive the profit share in national income:

$$\frac{\Pi}{Y} = \left(\frac{1}{s_k - s_w} \right) \left[\frac{I}{Y} - s_w + r s_w \left(s_k \frac{K}{I} - \frac{K}{Y} \right) \right] \quad (4)$$

where r is the interest rate at which the workers extend loans – out of their savings – to the capitalists and K is the economy-wide capital stock. The rate of profit can be obtained from (4) dividing each side by the incremental capital output ratio v :

$$\frac{\Pi}{K} = \frac{\Pi}{vY} = \left(\frac{1}{s_k - s_w} \right) \left[\frac{I}{K} - \frac{s_w}{v} + r s_w \left(s_k \frac{Y}{I} - 1 \right) \right] \quad (5)$$

Pasinetti (1962) argues that In the long run equilibrium the interest rate needs to be equal to the profit rate, so that setting r equal to Π/K in (5) and with some simple algebra we get:

$$\frac{\Pi}{K} = \frac{1}{s_k} \frac{I}{K} \quad (6)$$

provided that aggregate investments I are not equal to s_wY . Multiplying both sides of (6) by v , we observe that in equilibrium the profit share is equal to:

$$\frac{\Pi}{Y} = \frac{1}{s_k} \frac{I}{Y} \quad (7)$$

The striking result derived by Pasinetti (1962) is that even if one assumes that workers have a positive saving propensity and that a share of profits also accrues to them, condition (7) is identical to the relationship that would be derived if – as in Kaldor (1956) – one assumes that all profits accrue to capitalists and that there is zero saving propensity out of wages. Thus, workers' savings behaviour influences the distribution of profits between workers and capitalists but has no influence on the functional distribution of income. This is solely determined by the exogenously given investment level and by capitalists' saving propensity. From (7), the Post-Keynesian economists derived the conclusion that a faster rate of capital growth needed to be accommodated by a shift in the functional distribution in favour of profits.

An interesting corollary of the extension of Kaldor (1956) provided by Pasinetti (1962) is that in the long-run the link between the functional and the interpersonal distribution of income can be rather weak. As labour earnings have an interpersonal distribution that is more equal than the one of profits, an increase in the labour share of income can lower the interpersonal income inequality. But, from (5), we know that the functional distribution of income is insensitive to the distribution of capital incomes between the two social classes, so that different levels of interpersonal inequality can be coherent with an invariant functional distribution.

Goodwin (1967) contributed to extend the Kaldorian analysis in a different respect from Pasinetti (1962), focusing on the interaction between the growth path and cyclical fluctuations. In a modified Goodwin growth cycle model, which presents the same steady-state features of the Pasinetti's appraisal of the Kaldorian model, it can also been shown that - for a critical value of the workers' propensity to save - the presence of a constant rate of unemployment over the cycle negatively affects the labour share (Sordi 2001).

The innovative contributions advanced by Post-Keynesian economists on the causal relationship between the functional distribution of income and the rate of economic growth were rejected by the Neo-Classical tradition, where the functional distribution of income is determined by the efficient allocation of productive factors across firms and plays no role in the determination of the aggregate level of savings. Under the assumption of perfectly competitive goods and factor markets, a firm i takes its own production decision according to the following process of profit maximization:

$$\max_{K_i, L_i} (f_i(K_i, L_i) - rK_i - wL_i) \text{ subject to } K_i, L_i \geq 0 \quad (8)$$

where w and r are the price of services of the two factors, and f_i is a linearly homogeneous production function. The economy-wide production level is given by:

$$F(K, L) \equiv \max_{K_i, L_i} \int_F f_i(K_i, L_i) dQ(i) \text{ subject to } \int_F L_i dQ(i) \leq L, \int_F K_i dQ(i) \leq K \quad (9)$$

where F denotes the set of firms, and $Q(i)$ is the distribution function of the firms. If labour and capital can be costlessly allocated between production units, the first-order conditions of (9) determine the equality between the factor prices w and r and the respective marginal productivity in correspondence to the maximum aggregate output level. Thus, the functional distribution of income is determined by the technical characteristics of the aggregate production function.

Solow (1956) developed his seminal contribution to the theory of economic growth employing a linearly homogeneous aggregate production function as in (9); a positive fraction δ of capital, the accumulated factor of production, depreciates in every period, while the aggregate savings turn into gross investment that increase the stock of capital. Solow (1956) ruled out any influence of the functional distribution of income on aggregate savings as he assumed a constant propensity s to save out of national income; as the functional distribution of income needs not to be constant along the process of economic growth, provided that there is a non unitary elasticity of substitution, this implicitly entails that the savings rate is not sensitive to changing factor shares. Moreover, there is no feedback from the rate of growth to the functional distribution, as in (5), because the latter is solely determined by the technological parameters and by the current level of the capital-output ratio v .⁴ The analysis of the optimal growth path for the *Kingdom of Solovia* proposed by Phelps (1961) produced an interesting insight that would have contributed, in the 1990s, to renew the interest towards the interaction between the functional distribution of income and the rate of economic growth: the so called Golden Rule of accumulation entails that steady-state consumption is maximized if the savings propensity s is equal to the profit share in national income. Phelps (1961) was highlighting that in correspondence of the welfare-maximizing steady-state the aggregate savings were exactly equal to capital incomes, but this equality did not entail any connection between income sources and propensity to save, as the latter was still

assumed to be invariant across economic agents.⁵ More than 30 years later, Bertola (1993) and Alesina and Rodrik (1994) independently reached the conclusion that the different saving propensities out of profits and wages assumed by Kaldor (1956) – and criticized by contemporary Neo-Classical economists – can actually be regarded as the outcome of an optimization process undertaken by infinitely-lived agents along a balanced growth path.

Thus, in the early Neo-Classical literature, the functional distribution had no apparent impact on aggregate savings as consumption choices are taken by forward-looking economic agents that maximize an additively separable utility function and can smooth consumption across time thanks to perfectly functioning credit markets. Growth and the evolution of the functional distribution of income are jointly determined by the allocation of output between consumption and investment, and there is no causal relationship between the two as in the Post-Keynesian tradition. Along the growth process, the functional distribution of income may change in response to an increase in the stock of the accumulated factor of production, and this depends on the technological property of the aggregate production function. If there is a unitary elasticity of substitution between the two factors of production – as in the widely-adopted Cobb-Douglas production function – then factor shares remain constant along the growth process and the independence between the functional distribution of income and economic growth is complete. This function has been extensively relied upon in the economic literature as it was coherent with one of the most well-known “stylized facts” advanced by Kaldor (1948) on the growth process of developed countries.

2.2 Endogenous growth and overlapping-generation models

The seminal contribution by Romer (1986) gave rise to the literature on endogenous growth that suggests the possibility that non-decreasing marginal return to the accumulated factor could fuel a self-sustaining process of economic growth. The non-decreasing marginal return may be due, *inter alia*, to a positive technological externality from the investment in physical capital (Romer 1986), from the investment in education (Lucas 1988) or to the role of public goods (Alesina and Rodrik 1994). The simplest way to represent a system that features the possibility of an endogenous growth is the so called augmented-capital model, where the aggregate output Y_t is determined by a function that is linearly homogeneous in K_t and L_t times a time-varying function A_t that represents the level of disembodied productivity (Bertola 1993):

$$Y_t \equiv A_t K_t^\alpha L_t^{1-\alpha}, \text{ where } A_t = K_t^{(1-\alpha)} \quad (10)$$

Such an aggregate production function displays increasing returns to scale if A_t is an increasing function of the accumulated factor of production; Romer (1986) assumed that $A_t = K_t^{(1-\alpha)}$, so that the marginal social productivity of capital is independent on the existing stock of capital. If factors are priced in competitive markets according to their marginal *private* productivities, then capital owners are not compensated for the externalities produced by their investments and aggregate investments are deemed to fall short of their socially optimal level. This opens up an entirely new set of possible interactions between the functional distribution of income and the rate of economic growth that passes through the realm of the political economy, as any attempt to promote aggregate savings entails a shift in the functional distribution of income. Bertola (1993) showed that the rate of economic growth is decreasing in the labour share of national income, but that, in the presence of an uneven distribution of factor ownership, a majority vote system could actually lead – as in Alesina and Rodrik (1994) – to the implementation of a policy that penalizes capital incomes. As Bertola (1996) observes, “the aggregate propensity to save decreases and growth slows down if disposable income is distributed away from capital”.

Notwithstanding the similarities, it is important to underscore a crucial factor that differentiates the analysis of the relationship between the functional distribution of income and economic growth in the endogenous growth theory and in the

Post-Keynesian tradition: for Kaldor (1956) and Pasinetti (1962) there was a clear causal relationship, as factor shares needed to accommodate for changes in the exogenously given rate of growth, while “income distribution and economic growth need to be *jointly* modeled in a modern framework of analysis” (Bertola 1993). The two factors are connected by a causal relationship – whose direction runs *contrary* to the one underlined by Post-Keynesian economists – in so far as there is an attempt to modify the functional distribution of income determined on the market in order to influence the rate of economic growth.

The contributions by Bertola evidenced – in a Neo-Classical framework – the role played by the functional distribution of income in determining the pace of economic growth; a major implication of his research has been represented by the qualification that a redistribution of incomes towards the profit share needs not to be beneficial from growth once one abandons the hypothesis of infinitely-lived agents. Adopting an overlapping generation model with finitely-lived agents, Bertola (1996) showed that an increase in the profit share may thwart the rate of economic growth. If we assume two-period lived agents - who work when young and consume out of their savings when old – and rule out any inter-generational transfer, then there is a perfect overlap between the two age groups and the social classes of workers and capitalists. This entails a saving behaviour that is opposite to that of the Post-Keynesian tradition, as the young-workers have a positive saving propensity while the old-capitalists consume all their incomes. If we assume that agents maximize a logarithmic utility function, so that optimal savings are independent on the rate of return, aggregate savings are increasing in the labour share of income. However, Bertola (1996) argues that, although the findings derived from models with infinitely-lived agents are not robust to the shift towards an overlapping generation framework, “the implications of simple two-period OLG models are arguably misleading as well”. Bertola (1996) evidences that is *a priori* unclear in which direction the functional distribution of income should be moved from its *laissez-faire* initial position in order to stimulate economic growth, as the relationship of the factor shares with the level of aggregate savings is highly dependent on the parameterization of the model, once we abandon the simple two-period overlapping generation model.

2.3 Non neutral technical progress

As the functional distribution is determined by the efficient allocation of factors of production across firms, technical change can influence the division of income between labour and capital, insofar as there is a non unitary elasticity of substitution and technical change is not “Harrod neutral”. If we assume a CES aggregate production function and a capital-augmenting technical progress,

$$F(A_t K, L) \equiv \left[\alpha (A_t K)^{\frac{\sigma-1}{\sigma}} + (1-\alpha) L^{\frac{\sigma-1}{\sigma}} \right]^{\frac{\sigma}{\sigma-1}} \quad (11)$$

where A_t represents the time-varying parameter capturing capital-augmenting technical progress and σ represents the constant elasticity of substitution between capital and labour. Under (11), the profit share is given by:

$$\frac{\Pi}{Y} = \frac{\alpha (A_t K)^{\frac{\sigma-1}{\sigma}}}{\left[\alpha (A_t K)^{\frac{\sigma-1}{\sigma}} + (1-\alpha) L^{\frac{\sigma-1}{\sigma}} \right]} = \alpha A_t^{\frac{\sigma-1}{\sigma}} \left(\frac{K}{Y} \right)^{\frac{\sigma-1}{\sigma}} \quad (12)$$

The profit share increases along the growth process as long as $\sigma > 1$, and in this case a capital-augmenting technical progress results in a shift of the functional distribution of income towards the profit share, as it is straightforward to observe that:

$$\frac{\partial(\Pi/Y)}{\partial A_t} = \frac{\alpha(\sigma-1)}{\sigma A_t} \left(\frac{A_t K}{Y} \right)^{\frac{\sigma-1}{\sigma}} > 0 \text{ if } \sigma > 1 \quad (13)$$

By a similar reasoning, we can observe that a labour-augmenting technical change is detrimental for the profit share of income if the two factors of production are technical substitutes.

So far, we have considered just two factors of production, namely capital and labour, but some additional insights can be gained through a greater detail of the non-accumulated factor, represented by the distinction between skilled and unskilled workers. This issue comes to play at this stage as the elasticity of substitution between capital and the two kinds of labour needs not to be the same (see Krussell et al. 1997 for evidence in this respect). This entails that a capital-augmenting technical change could unevenly impact skilled and unskilled workers, thus influencing simultaneously the functional distribution of income and the dispersion of wage earnings. However, the impact on wage dispersion is *a priori* ambiguous. On the one hand, an innovation leading to a capital-augmenting technical progress can determine an upward shift in the capital share, which is likely to decrease the number of the employed low-skill workers, thus reducing the wage dispersion. On the other hand, it is also likely that the boost to productivity after technical progress will determine an output expansion, which will in turn determine an increase in employment and a wider wage dispersion.⁶ The skill-biased technical change has been analysed by Acemoglu (2002) who adopts a CES function, as in (11), where two different kinds of labour, L_L and L_H , that are heterogeneous with respect to their skill level, represent the factors of production:

$$G(A_{Ht}L_H, A_{Lt}L_L) \equiv \left[\beta(A_{Ht}L_H)^{\frac{\nu-1}{\nu}} + (1-\beta)(A_{Lt}L_L)^{\frac{\nu-1}{\nu}} \right]^{\frac{\nu}{\nu-1}} \quad (14)$$

where A_{Ht} and A_{Lt} represent respectively the high and low-skilled augmenting technical change. From (14), the ratio between the wage of the highly and of the low-skilled workers is given by:

$$\frac{w_{L_H}}{w_{L_L}} = \frac{\beta}{(1-\beta)} \left(\frac{L_H}{L_L} \right)^{-\frac{1}{\nu}} \left(\frac{A_{Ht}}{A_{Lt}} \right)^{\frac{\nu-1}{\nu}} \quad (15)$$

If the elasticity of substitution ν between highly-skilled and low-skilled workers is greater than 1, then a technical change that is biased towards the highly-skilled will result in an increase in the wage, or skill, premium. Any rise in the wage premium as a consequence of a skill-biased technical change brings about an increase in wage inequality, due to the raise in the upper section of income distribution.⁷ The skill-biased technical change can also directly impact on the labour share. The expulsion of low-skilled workers, caused by the recourse to labour-saving techniques, does not only entail a widening wage dispersion, it also reduces the wage and the employment rates of the low-skilled labour force, reinforcing the fall of the labour share. Moreover, there can also be an indirect effect of the mismatch between the skill-oriented labour demand and the labour supply on the labour share. In fact, the more the labour demand for high-skilled workers augments, the more a public sector has the incentive to improve the efficiency of the educational system by investing more funds in high and university education. If the labour supply catches up with the increasing labour demand for the highly educated young, the lower the incentive for skill-biased technical change and then the fall in the labour share.

3. The evolution of factor shares in European countries

Any description of the pattern of the functional distribution in Europe and any assessment of the empirical relevance of the competing theories about its determinants

and possible economic effects clearly needs to move from sound estimates of factor shares. As all the theoretical models revised in section 2 describe a two-factor economy employing labour and capital, a natural starting point is to come about with an estimate of the labour share and then to attribute to capital incomes the residual part of GDP. Still, both the computation of the labour share and the proposed residual definition of the capital share are fraught with difficulties.

3.1 The challenging measurement of factor shares

As a first approximation, one could identify the labour share as the ratio of the compensation of employees – i.e. gross wages perceived by dependent workers, including vacation and sick leave allowances and the contributions paid by the employers to, say, pension, insurance and health schemes - over GDP. Although this definition has been relied upon in some analysis (e.g. Finnoff and Jayadev 2006, Checchi and García-Peñalosa 2004) and might at first appear unproblematic, it is nevertheless confronted with two distinct – and somehow contrasting – objections. The first one relates to the observation that in theoretical models labour is portrayed as a non accumulated factor, while in the real world the gross wages paid to dependent workers can also contain a premium for the skills they have acquired through their investments in education. Coherently with this theoretical perspective, Mankiw, Romer and Weil (1992) argue that this component of the gross wages should form part of the capital rather than of the labour share, as it represents the remuneration for an investment in an accumulated factor - namely human capital. Conversely, one could rather argue that the ratio of the compensation of employees over GDP underestimates the labour share as it makes no imputation for the incomes of both the self-employed and the proprietors, and that it might also provide a biased representation of its trend, as it is sensitive to sectoral movements of the labour force.⁸ This could represent a relevant concern when looking at Eastern European countries, where a sizeable portion of the labour force is still moving out of the agricultural sector,⁹ but the adequacy of the ratio of the compensation of employees over the GDP to provide an unbiased representation of the evolution of the labour share may be questioned also for Western European countries; most of these countries have recently experienced an increasing share of temporary rather than permanent working contracts, and often – from a juridical perspective – workers are regarded as self-employed workers that provide services to the employers that hire them, although they may perform the very same tasks of dependent employees.

Although both the above objections to the use of compensation of employees over GDP as a proxy of the labour share appear to have their own merits, it is only the second one that has been addressed in the empirical literature. A first adjustment was proposed by Johnson (1954), who imputed two thirds of the self-employed and proprietors' incomes to labour and the rest to capital income, and such a rule of thumb correction has been extensively relied upon (e.g. the recent paper by Guscina 2006). A more accurate approach has been pursued by Young (1995), who relies on micro-level data – including sex, age and education - to estimate sector-specific wage equations for the employees, then using the estimated coefficients to impute wages to the self-employed. While this approach appears to be extremely accurate, although threatened by a possible selection bias of the self-employed, it is nevertheless highly data-demanding and it cannot be relied upon when only national accounts data are available.

Gollin (2002) advances a pragmatic approach that relies just on national accounts data, and one of his proposed alternative adjustments has being extensively adopted in the literature (e.g. Bentolila and Saint-Paul 2003, Torrini 2005); this relies on the figures of the dependent and self-employed workers: the ratio of the compensation of employees over GDP is scaled up by a factor that is equal to the proportion of self-employed in the employed labour force, with an underlying assumption of average wage equality across self-employed and employed workers.

Clearly, the alternative adjustment procedures produce differing measures of the labour share, so that figures derived from different studies should be compared with extreme caution, the more so as some papers just report that they are correcting for

self-employment, without providing further details about how this adjustment is actually carried over (e.g. Giammarioli et al. 2002). Moreover, it is important to stress that the adjustment proposed by Gollin (2002) can be implemented at differing degrees of refinement, which renders the assumption of average wage equality between self-employed and employees more or less realistic (Torrini 2005). Clearly, the most straightforward adjustment is performed on economy-wide figures, although a sounder approach would entail to rely on sector-specific figures.¹⁰ Assuming that the hypothesis of wage equality holds true at a certain level of sectoral decomposition of the economic system, this could nevertheless fail at any grosser level of aggregation, as composition effects would come into play. A final problem of any adjustment based on national accounts figures is that it is time-invariant. This method could cause severe distortions, in particular in the case of the recent research on the determinants of evolution of the labour share in Europe over a long time frame. Two observations are in order. First, a compositional effect may bias the computation of the self-employed in the labour share, as these workers are very much present in the jobs of the service sectors, and the employment increase which has taken place in the last decade in many EU countries has mainly occurred in the service sector, the GDP share of which has soared a lot. Second, it is also likely that in the most recent years the skill composition of the self-employed have encountered underlying changes.

Even when a satisfying estimation of the labour share has been derived, one may nevertheless feel uncomfortable with the definition of the capital share as the complement of the labour share. Indeed, such a residual definition entails the attribution of the questionable label of capital incomes to such items as the extra-profits arising from non competitive market structures and as the real estate rents.¹¹ However, national account figures do not represent a proper ground for an adjustment of the capital share that corrects for rent incomes; thus, the possible relevance of rents in shaping the pattern of the capital share is most often only indirectly controlled for, e.g. including some proxies of the non competitive structure of product markets among the determinants of the change of factor shares (Blanchard and Giavazzi 2001, Ripatti and Vilmunen 2001, Torrini 2005). This entails that there are good reasons why the empirical literature refers mostly to the labour rather than to the capital share of income, without advancing the unwarranted claim that – as it appears in the theoretical modeling – they represent just two sides of the same coin, as the complement of the labour share contains a mixture of capital and rent incomes that cannot be easily disentangled.

3.2 The evolution of labour share in Europe since the 1970s

The unique European country that has displayed a stand-alone behavior with respect to its functional distribution is the United Kingdom, as its labour share has shown minor fluctuations around a stable level since the 1970s, so that it presents a much closer similarity with the experience of the United States than with the other European countries. According to Giammarioli et al. (2002), these fluctuations are determined by the evolution of the business cycle as in the presence of restrictions to the dismissal of workers the labour share tends to move counter-cyclically. Although the British labour share has remained stable from a medium-run perspective, its cyclical fluctuations have been far from negligible as - according to Poterba (1997) - the labour share in the business sector was 5.1 percentage points higher in 1975 than in 1973, and then it declined by 5.9 percentage points in a two-year time. On the other hand, Continental European countries - and Ireland – share a strikingly similar pattern, with their respective labour shares peaking somewhere between the late 1970s to the early 1980s, and then following a steadily declining pattern.

[Table 1 around here]

Having spelled out the definitional and measurement issues related to the labour share, Table 1 reports the change in the labour share – narrowly defined as the ratio of the compensation of employees over GDP – between 1975 and 2000 for a selected number

of European countries that are taken from Finnoff and Jayadev (2006). The reported fall in the labour share has amounted to more than 16 percent of GDP for Ireland, 13 percent for Luxembourg and around 10 percent for Italy, Portugal and Norway. As the labour share peaked in the early 1980s rather than in 1975 for some countries – as Belgium, Greece and Sweden, then the recorded fall is significantly larger when use the peak year rather than 1975 as the term of comparison. Table 2 and Figure 1 report the evolution of the labour share in Denmark, Germany, Italy and Norway between 1970 and 2003, with data derived from the OECD STAN database, and the labour share is adjusted for self-employment assuming wage equality between employees and self-employed workers at the sectoral level. Figure 1 provides visual evidence of the hump-shaped evolution of the labour share for these four countries, and of its enduring fall in the 1990s well below the level recorded in the early 1970s.

[Table 2 around here]

[Figure 1 around here]

3.3 Determinants of the increase in the labour share in the 1970s

Several factors - trade diversion, technical change, a changing unions' bargaining power, growing oligopolistic sectors, labour market institutions – are natural candidates to explain the falling labour share across European countries. The economic literature displays a fairly broad consensus around what caused the substantial increase in the labour share throughout continental Europe over most of the 1970s: it was the interplay of institutional reforms and of external shocks – coupled with a decrease in labour productivity growth. Between the late 1960s and the early 1970s employment protection increased in most countries¹², and the institutional framework regulating labour market has recorded just minor and piecemeal changes since then (Boeri et al. 2000). Caballero and Hammour (1997) observe that the “substantial institutional buildup in favor of labour [represented] a way for labour to share more evenly in the rapid European expansion since the end of the war” as over the 1950s and 1960s the growth of real wages had lagged behind the increases in labour productivity.¹³

The Parliaments of most European countries passed regulations that introduced dismissal restrictions and established significant severance payment; thus, labour was conferred a better capacity to appropriate the production rents as the bargaining power of labour unions increased substantially.

But soon after these institutional changes were introduced, the European countries were hit by significant external shocks – i.e. the unprecedented increases in the price of oil in 1973 and 1979 – and suffered from a prolonged period of stagnation. This was strengthened by the slowdown in total factor productivity growth: the five-year average growth rate of TFP for 15 OECD European countries decreased from above 5 percent per year in the late 1960s to close to 1 percent per year in the late 1970s (Blanchard and Wolfers 2000). Because of the recently introduced institutional changes, firms had little room for passing on to labour the cost of this economic downturn, so that, in the face of a declining business sector value added, the labour share rose. Not only firms were unable to protect their profit levels through a cut in labour costs, but wages actually increased over the 1970s at a substantially faster pace than labour productivity. Caballero and Hammour (1997) and Berthold et al. (2002) provide evidence in this respect for France and Germany respectively, while Blanchard and Giavazzi (2001) provide data for Spain and Italy that confirm that the growth of real wage exceeded that of productivity.

The increasing trend in the labour share came to an halt in most countries somewhere between the late 1970s and early 1980s, and a later – initial – recovery of the profit share is interpreted by most authors as a natural leveling-off of the functional distribution of income that had been substantially altered over the 1970s. Firms, that had been suffering from the wage increases because of legal restrictions and because of a limited short-run elasticity of substitution between factors of production, began to shift towards techniques that were less labour-intensive. Thus, there is a rather widespread consensus

that the very same factor that had impressed an upward trend to the labour share in the 1970s were also responsible for its subsequent fall, as the greater capacity of workers to appropriate capital rents had occurred under extremely unfavorable conditions that triggered a lagged reaction on the side of firms. But this fall did not stop as the labour share returned to its early 1970s levels as it kept on turning into a 20 years long decline. After the fall in the total factor productivity by which many European economies have been hit in the 1980s, labour market institutions impeded that the lower “warranted wage” (the wage corresponding to the Harrod-neutral technical progress and thus consistent with stable employment) could establish (Blanchard, 2006). However, the understanding of the empirical factors underlying this enduring pattern is still far from complete.

3.4 Competing interpretations around the determinants of the prolonged fall

As it has been just said, the decline of the labour share in the 1980s is mostly regarded as a natural response to its rise over the previous decade that had been induced by the combined effect of institutional changes and of external shocks. Some authors (Caballero and Hammour 1997, Berthold et al. 2002) maintain that this interpretation fits well also with the further shift of the functional distribution in favor of labour that took place over the 1990s. This claim – and the ensuing empirical validation – rests on the idea of a substantially different elasticity of substitution between factors of production in the short and in the long run. According to this interpretation, the appropriation push by workers induced firms to move towards more capital intensive techniques and this reduced their demand for labour; the ensuing higher unemployment could then soften the risk of a further appropriation push that would have thwarted profits, so that the falling labour share and the increasing unemployment in European countries can be still regarded as “long-run consequences of institutional shocks” (Berthold et al. 2002).

Caballero and Hammour (1997) calibrate a simulation model using French data to analyze the impact of a shock in the key model parameters that represent the ability of labour to appropriate capital to provide empirical support to their theoretical arguments. Their finding is that “as an explanation of the French experience over the last thirty years [1967-1995], the appropriation push provides a highly parsimonious account”, and that their model with a high long-run elasticity of substitution can closely replicate the evolution of the French functional distribution as “after increasing with higher wages in the short run, the labour share drops by much more than in the fixed-technology case, and ultimately falls below its original level.” (Caballero and Hammour 1997).¹⁴ The idea that the appropriation push of the 1970s has actually backfired for workers, is supported also by Berthold et al. (2002) who provide estimates of the long-run elasticity of substitution between capital and labour in France and Germany with data for 1970 to 1995.¹⁵ The estimated elasticities of substitution – obtained through the seemingly unrelated regression method - range between 1.43 and 1.73 for Germany and between 1.45 and 2.19 for France, and in all cases but one it is possible to reject the null hypothesis of that the true elasticity is equal to 1.¹⁶

But the “parsimonious account” of the evolution of the labour share first advanced by Caballero and Hammour (1997) has been challenged by a wide array of competing interpretations, as Blanchard (2000) argued that the data fit properly with an interpretation based just on the wage push only for the 1980s. Blanchard and Giavazzi (2001) provide data on the evolution of the capital/labour ratio and on the wage rate per efficiency unit of labour for France, Italy, Spain and Germany from 1970 to 1998; they observe that since the late 1980s the real wages in all four countries fell below their 1970 levels, but this fall did not determine a return of the capital/labour ratio to its previous level, as it settled at a significantly higher level than in 1970s. Blanchard and Giavazzi (2001) wonder whether “this evolution [can] be explained by the long lags and the expectational effects coming from a putty-clay technology, or by costs of adjusting factor proportions more generally” and suggest that only expectations of future large increases in the real wage could justify the long-lasting high level of the capital-labour ratio but that this seems highly unrealistic given the great emphasis on wage moderation in

European countries. Thus, the economic literature has addressed the question of what could explain the enduring fall of the labour share during the 1990s, and the competing theoretical and empirical arguments evidence the role of changes in the sectoral composition of production, country-specific factors, institutional changes and technical progress.¹⁷

3.5 Sectoral composition of production and country-specific factors

Provided that the best opportunities for technical change embodied in new processes and products are concentrated in the widening services sector, the composition effect is bound to be an accelerating factor both in the fall of the labour share and in the enlarging wage inequality. In fact, the services will require an increasing share of skilled workers, which widens the wage premium and then turns the market income distribution towards higher inequality. It is often argued that a countervailing factor may be represented by the “trickling down” to the low income individuals of the increasing returns of a faster growth embodying technical change. In other words, the increase in total factor productivity could spread over the manufacturing sectors; higher demand expectations in traditional sectors will raise the employment rate of low-skilled and low-wage workers, thus determining a larger wage dispersion but a possible recovery in the labour share.

Gollin (2002) observes that differences in the labour share across countries could be determined – at least partly - by their sectoral distribution of production, as each sector is characterized by specific factor shares. De Serres et al. (2002) focus on the relevance of *composition effects* in accounting for the evolution of the labour share over time in OECD countries. De Serres et al. (2002) compute a corrected labour share that is obtained weighting the sector-specific labour shares with weight that are equal to the period average (1970-1998) sectoral composition of output. Such a correction is meant to remove composition effects and reveal just the changes in the labour share that are determined by changes within sectors. The authors argue that the decline of the labour share that has been observed in European countries over the 1980s and 1990s can to a non negligible extent be attributed to the increasing share of services in GDP.

Holding the sectoral composition of GDP equal to its period average results in a milder downward trend of the labour share for most countries, most notably for France and Italy, and even in a reversal of the trend for Germany since the mid 1980s. Still, the change in the sectoral composition of production falls short of – and admittedly is not meant to – provide a complete explanation of the hump-shaped pattern of labour share in European countries, that, as it is observed by Saint-Paul and Bentolila (2003), still characterizes most countries even when time-invariant sectoral weights are applied. Nevertheless, a broader point of both Gollin (2002) and De Serres et al. (2002) is that the aggregate evolution of the labour share can hide notably differing within-sector changes, that can have a saying about the relevance of competing theories about the factors behind the shifts in the functional distribution of income.¹⁸ The impact of, say, trade openness on the functional distribution of income should be greater in the manufacturing than in the service sector, as the former is generally more exposed than the latter to international competition. Thus, focusing the analysis at a more detailed level could help to unveil sector and also country-specific factors that have contributed to drive the hump-shaped evolution of the aggregate labour share. An extremely telling example in this respect is provided by Torrini (2005), who observes that the shift in favor of non labour incomes in Italy since the 1990s has been driven by the rise of real estate prices and by the large-scale privatizations that have been occurring in the services sector since 1992. Torrini (2005) argues that “between 1970 and 2003 the profit share increased by 2.8 percentage points at the aggregate level, but this is entirely due to the price increase in the dwelling sector”. Additionally, Torrini (2005) recalls the Italian government engaged itself in massive dismissals of state owned enterprises since 1992, in an attempt to gather resources to reduce the burden of an overwhelming public debt. These privatization concerned mainly the energy, finance, transport and telecommunication sectors – amounting to one third of the non-manufacturing business

sector - were accompanied by newly introduced labour regulations had eased worker dismissals for large firms¹⁹ and under a regime of lax public supervision of sectors that had a monopolistic character. Torrini (2005) observes that the newly privatized sectors recorded significantly increasing profit shares that account for the whole aggregate increase as “these sectors [...] took the advantage of the impact of privatizations on productivity growth and wage dynamics that were not matched by a major reduction in market power”. Thus, the recent shift in the functional distribution away from labour incomes is traced back institutional changes that led to a massive transfer of rents towards capital incomes.

3.6 The impact of technical progress and institutional changes

Contrary to the assumptions reflected in the Cobb-Douglas production function, the labour share of GDP is not constant over time in most industries of the developed countries (Hornstein et al. 2005, Jones 2003, Ripatti and Vilmunen 2001). However, even if the Cobb-Douglas is substituted with the CES aggregate production function, implying that the labour share is not constant but rather depends on factor inputs, the evidence of noticeable movements in factor shares is not solved. It cannot be denied that the country that during the 1990s has experienced both a high growth rate and a rise in the capital share – the United States – was also the country with an impressive increase in investment by the high-tech sectors. The explanation for diverging evolution of the capital and labour shares in the OECD countries can then be twofold. While the remarkable rise in the capital share in the United States could be traced back to innovation, the reduction of the labour share in Europe could depend on the depressing impact on the employment rate of the very sluggish growth in capital stock after the distributive conflicts of the 1970s (Rowthorn, 1999). After the rise in the labour share, European firms made recourse to labour-saving techniques, which resulted in a reversal of the trend of the labour share (Blanchard, 2006). In the European countries, however, labour market institutions are much stronger than in the United States. By affecting both the wage and the employment levels, they represent an essential determinant of the labour share.

Since it is mostly present in oligopolistic sectors, technical progress is often accompanied by the diffusion of non-competitive market conditions. Thus, the functional income distribution depends on the *mark-up* that oligopolistic price-setters are able to impose. The expansion of firms belonging to the ICT sectors could have allowed firms to increase their *mark-up* (Ripatti and Vilmunen 2001). Just as it was theorized by Kalecki (1954, 1971) and Steindl (1952), the margin of profits are created and defended by keeping moderating the nominal wage dynamics and by holding excess capacity in order to prevent an undesired entry of new competitors in case of unexpected demand increases. In an imperfect competition market, capitalists are able to sustain the expansion of the market in the first stages of the product life. Since at the beginning the innovative goods are mainly targeted for the high income individuals with an inelastic demand they feel free to keep the price high and even raise the *mark-up*. Once the life of the product has come to its “mature” stages, and the imitative firms have catch-up so that the price continuously declines, the volume of profits may be kept constant by a widening of the market size as well as through an enlargement of the share of the population that can afford to buy the “mature” product. Since a large share of physical capital owned by the capitalists represents a strong incentive to invest in innovative products, an unequal functional income distribution is good for growth.

Let us then analyse to what extent the interplay between labour-saving technical change and non-competitive conditions in labour market (due to the presence of institutions) and in the product market (due to the market power of price-setter firms) matter for the evolution of functional income distribution.

The explanation based on institutional factors and the one that rests mostly on the role of technical progress can be intertwined because, as it is argued by Caballero and Hammour (1997), technical progress can be induced by an institutional shock that increases the opportunity for labour to appropriate capital.

Guscina (2006) analyzes data that are derived from the OECD Stan database and refer to the 1960-2000 period and she includes two alternative measures of technical progress among the determinants of the labour share.²⁰ The econometric analysis is realized for the years before and after 1985, the year around which a reversal in the pattern of the labour share is found in most sample countries. The results suggest that prior to 1985 technical progress has been labour-augmenting, while it has turned to be capital-augmenting since then; this change in the pattern of the technical progress is actually not directly measured, but it is inferred from the switch in the estimated coefficient of either of the two variables that are meant to be proxies of technical change. From 1960 to 1985, a 1 percent increase in labour productivity is estimated to produce a 0.3 percent increase in the labour share, while after 1985 the same variation in technical progress has induced a decrease in the labour share by 0.2 percent. The findings by Guscina (2006) support the theoretical argument around the impact of non-neutral technical progress in shifting the functional distribution of income. Also Bentolila and Saint-Paul (2003), who analyze the evolution of the labour share with sectoral data, find that total factor productivity – that should provide a measure of capital-augmenting technical progress – has a negative and significant impact on the labour share, although they cannot provide an estimate of the magnitude of this effect as total factor productivity is measured as an index.²¹

With respect to the experience of specific countries, Ripatti and Vilmunen (2001) provide an account of the experience of Finland since the mid-1970s. The severe recession of the early 1990s – due to the collapse of external trade with the former Soviet Union – induced a significant restructuring of the Finnish economy that seems to have produced long-lasting effects on the functional distribution of income. The surge of the ITC sector has been characterized by an ensuing non-neutrality of technical progress over the 1990s, that has been predominantly capital-augmenting. The authors estimate that capital productivity has grown at 20.4 percent *per annum* between 1995 and 1999, while labour productivity had decreased by 1.3 percent, and this contributes to explain the increase in the profit share in the Finnish GDP. Faini et al. (2003) claim that technical progress has been the leading factor behind the fall in the labour share in Italy, as this could actually explain more than 90 percent of its observed changes.

4. From factor shares to the interpersonal income distribution: the role of Labour Market and Welfare institutions

The most recent contributions on factor shares can be included within a broader renewal of interest towards the income distribution, that has been brought back “from the cold” to the stage of economic analysis since the late 1990s (Atkinson 1997). The literature has produced a lively and still unsettled debate on the trend and the determinants of interpersonal income inequality, both within and across countries (see inter alia Bourguignon and Morrison 2002, Cornia and Kiisky 2001, Sala-i-Martin 2002, Milanovic 2002). The dramatic fall in the labour share of national income could have a significant adverse impact on the interpersonal distribution of income within European countries. Most decompositions of inequality indexes immediately indicate that a decrease in the labour share is bound to increase interpersonal income inequality, as labour incomes are more equally distributed than non-labour incomes across individuals. Although there are clearly a lot of interfering factors – that will be analyzed below – the relevant size of the fall of the labour share across European countries suggest that this relationship between functional and interpersonal income distribution should emerge also in a simple bivariate analysis, as the shift away from labour incomes can be expected to have played a leading role. Still, the available evidence is at *prima facie* not supportive of a tight connection between the two distributions, in line with the implications of Pasinetti (1962). Atkinson (2000) evidences that France and Italy recorded a decreasing level of income dispersion with respect to 1977 all over the 1980s and early 1990s; over the same period, West Germany recorded a modest increase, while the United Kingdom, that is the unique European country with a stable labour share – observed a 40 percent increase in the interpersonal dispersion of incomes. Brandolini and Smeeding (2007) report that income

inequality increased substantially in the United Kingdom over the 1980s, while it changed little in West Germany and France and it displayed no clear tendency in Italy. Cornia et al. (2003) report that income inequality has increased significantly in the United Kingdom and to a lesser extent in Italy, while it has remained roughly constant in France and it has been falling in Germany from the 1960s to the 1990s.

Thus, it is necessary to move to the analysis of interfering factors that mediate the impact of even such a substantial drop of the labour share on the size distribution of income. A first factor could be represented by an increasingly widespread distribution of the ownership of financial assets, as Guscina (2006) argues that “the effect on workers’ wealth [of the fall of the labour share] might have been smaller owing to the increasing direct and indirect ownership of equities by households”. However, the evidence in this respect is limited, and it actually runs in the opposite direction. Brandolini et al. (2005) observe that in Italy the Gini index of the ownership of financial assets has increased from 0.66 in 1991 to 0.81 in 2000, so that “while the ownership of equities and mutual funds spread across all classes during the 1990s, their amount came to account for a large proportion of portfolios only among the very wealthy”.

A second factor that needs to be accounted for is the impact of the tax system; the functional distribution of income is pre-tax, while personal incomes can be recorded net of direct taxes; thus, a decrease in the direct taxed on labour income could – at least partially – offset the fall in the labour share. According to O’Toole (1997), quoted in Lane (1998), in Ireland the tax burden on labour incomes decreased – depending on the income level - between 4.6 and 8.1 percent from 1988 to 1996, and this contributes to explain why unions accepted a pre-tax wage moderation policy that contributed to a fall in the labour share by 9.7 percent over the same period. Moreover, the factor shares themselves may be sensitive to the tax structure, as an uneven imposition across income sources could induce forms of income shifting: a low corporate tax rate can stimulate workers to become entrepreneurs or it may create the incentives for entrepreneurs to modify the legal organization of the firm, switching from the single proprietorship to the form of a strictly held corporation, thus inflating the capital share. In Europe, income shifting represents a share between 10 and 17 percent of corporate tax revenue and it seems to have raised the ratio of corporate tax to GDP by some 0.2 percentage points since the early 1990s (de Mooij and Nicodème 2007).

Furthermore, some of the effects of a fall in the labour share on the interpersonal income inequality could be differed; as it is observed in section 3, the compensation of employees, that represent the principal component of the labour share, includes both wages and salaries and the contributions made by the employers to pension schemes and social security programs. If the fall in the labour share is determined by a decline in wage and salaries, the impact on the interpersonal distribution of income should be more direct, but when this is caused by a reduction of the employers’ contribution, then it could entail lower pensions in the future and an ensuing lagged effect on future income inequality but no impact on current income (Piketty 1997). If we observe the ratio of the compensation of employees to GDP for Italy – that is, we are not adjusting for self-employment – from OECD (2004), we can observe that this has declined by 8.4 percent from its peak year, 1977, to 2003 and that close to four tenths of this decline were constituted by a reduction in the components of compensation of employees other than wages and salaries.

Last but not least, a common declining trend in the labour share across Continental European countries has been counteracted or augmented by differing performances in employment creation, and this represent a further reason while no clear mapping from the functional distribution of income to interpersonal inequality emerges. Nevertheless, the labour share represent a significant determinant of income inequality, and its impact can be better controlled for in a multivariate analysis. Checchi and García-Peñalosa (2004) represents the first attempt to analyze the impact of shifts in the functional distribution of income on the Gini coefficient of income distribution applying econometric techniques to a panel dataset. Their empirical analysis, that is based on an unbalanced panel on 16 OECD countries²² from 1960 to 1996, is based on a theoretical modeling around the impact of labour market institutions in determining the wage premium of the skilled over unskilled workers, the unemployment rates for the two kinds of workers and

the factor shares. They rely on a CES production function with physical capital and an aggregate index of skilled and unskilled labour, whose respective wages are set in non competitive markets. Their model entails that the Gini coefficient is decreasing in the labour share and in the unemployment benefit, it is increasing in the wage premium while the sign of the unemployment rate is ambiguous.

Their data for the labour share are taken from the OECD (2004) and they are not adjusted for self-employment. Data on income inequality come from Deninger and Squire (1996) and Brandolini (2003). The other control variables are represented by the unemployment rate, a measure of the unemployment subsidy, by the ratio between the ninth and the first decile of the earnings distribution – that is meant to proxy wage inequality – and by a linear time trend. The estimates – that are obtained through a pooled OLS – suggest that the labour share has an economically and statistically significant impact on income inequality: when it is evaluated at sample means, the estimated elasticity of the Gini coefficient of income distribution with respect to the labour share ranges between -0.28 and -0.89, and the results by Checchi and García-Peñalosa (2004) are robust also to the adoption of instrumental variables to correct for possible endogeneity, that determine a higher estimated effect of the functional over the size distribution of income.²³ Daudey and García-Peñalosa (2005) analyze the same relationship on a larger panel of both developed and developing countries over the 1970-1994 period.²⁴ The data on the labour share are derived from the UNIDO database and refer to the manufacturing sector alone, and are not corrected for self-employment because of the lack of relevant data. The labour share is interacted with the size of the manufacturing sector, and the results from both cross-sectional and panel analysis confirm that the labour share is negatively associated with personal income inequality, although the size and the significance of the estimated effect vary across specifications. Daudey and García-Peñalosa (2005) argue that “external shocks that tend to reduce the labour share may call for corrective policies in order to offset their distributional implications”, and this conclusion could be related to the finding by Diwan (2001) that financial crisis tend to have an adverse and long-lasting effect on the labour share.

The limited empirical evidence on the relationship between the functional and the interpersonal income distribution suggests to the need to further explore – from a theoretical perspective – some of the extremely relevant *interfering factors*. More precisely, we address the issue of how the interpersonal income distribution is conditioned by the way in which labour market and welfare institutions influence the labour share, wage differentials, and the employment and the participation rates.

As a first approximation, one could argue that the labour market institutions influence the distribution of market incomes – both between factors and across individuals – while the welfare institutions affect the interpersonal distribution of disposable income, although such a neat division falls short of providing a definite picture.

The minimum wage – either introduced by law or defended by trade unions in a process of collective bargaining – and the employment protection legislation are alleged to weaken the incentive and the efficiency of the job search, as the reserve wage of the unemployed is lifted up. In addition, the minimum wage can discourage firms to hire low-skilled workers, as this could exceed their expected productivity; the participation rate could suffer from an excessively high minimum wage, as the elderly and the female labour force could suffer from a reduction in the demand for their labour force. Finally, the employment protection legislation is a scheme of employment insurance which is reported to reduce the labour demand, as firms are discouraged by the high firing cost it entails, especially when it is matched by large and long-lasting unemployment benefits. The evidence about the impact of unemployment benefits on labour supply is mixed: on the one side, generous transfers hamper the compliance with the offer of a low-wage job; on the other side, once unemployed workers are not pressed by an insufficient unemployment insurance to accept whatever job is offered to them, the job search is facilitated and the efficiency of the matching is higher. Furthermore, the level of union density, the universal coverage of labour contracts and the centralised (nationwide and/or sectoral) organization of negotiations affect the evolution of the labour share. The bargaining power of the labour force is positively correlated with these institutional characteristics of the labour market (Checchi and García-Peñalosa 2004). The attempt of

labour market institutions to defend the wage levels of low skilled workers not only does change the wage dispersion across skill levels, but it may also impinge on the employment rate.

The interplay between labour market institutions and technical change is a crucial factor in shaping the passage from functional to interpersonal distribution. A country that is hit by a negative shock, caused by a wage dynamics faster than the one of labour productivity, can adjust in ways that are mediated by its labour market institutions and that produce different effects on the labour share and the wage distribution. In the European countries, until the first half of the 1980s, the choice of labour-saving techniques let the wage inequality to remain constant (as the cut in the bottom section of the wage distribution resulted in a wage compression), while the increase in unemployment caused the widening of the inequality of market incomes. According to the hypothesis put forward by Krugman (1996), due to the strengthening of labour market regulation, Europe has been creating since then a lower income inequality at the cost of a much higher unemployment rate; quite on the contrary, in the deregulated labour market of the United States the natural unemployment rate progressively decreased, as the wage level of low-skilled workers can rapidly adjust to match their productivity level. According to Acemoglu (2002), instead, between labour market institutions and technical change there is not an unidirectional causality nexus, but a tight interdependence. While in the United States firms improve their efficiency by substituting the low-skilled workers with machines and/or high-skilled workers, in Europe firms are forced by labour market institutions – namely, minimum wage and employment protection legislation - to adopt complementary technologies, which are suited both for high and low skilled workers. The rationale is that this type of investment allows the firm to reach the size of production at which the minimum wage is no longer binding and the less productive workers are efficiently employed. The investment in complementary technologies then allows the employer to increase profits without suffering from labour market regulations, which may help to explain why ICT sector grew at a much slower pace in Europe (Acemoglu 2003). As already said, in the United States the skill-biased technical change impinges both on the labour share and on wage inequality due to the opening of a skill premium. In Europe, the technical choices implemented by the firms in their interaction with the labour market regulation make wage dispersion to depend on the skill premium, the unemployment rate and the share of unskilled workers (Atkinson and Brandolini 2006, Croci Angelini and Farina 2007a, Koeniger and Leonardi 2007).

If one considers the unemployment insurance as a part of the reshuffling of market incomes operated by tax and transfers, one could miss a precise understanding of the size of redistribution. The difference between the an inequality measure, say the Gini coefficient, for the distribution of market and disposable incomes should not be directly considered an indicator of the capacity of welfare institutions to correct the dispersion across earnings deciles. Though the unemployment benefits are a major determinant of the extent to which the distribution of disposable income does not coincide with the distribution of market incomes - the influence of pensions is also remarkable in this respect (Darby and Melitz, 2007), these transfers are also an important determinant of the wage levels determined in the market. The ratio between the unemployment insurance and the employment insurance is crucial in determining the wage distribution. The higher the ratio, the more wage dispersion is compressed, as the high costs of firing the low-skilled workers are bound to increase the unemployment rate by cutting off from the wage distribution individuals belonging to the lowest deciles. Provided that the rise in the remuneration of high-skilled workers is greater than the number of dismissed low-skilled workers, the labour share could increase. Since a low inequality of market incomes is likely to result from a low wage dispersion, the ex post distribution of disposable income will be determined by the extent of both unemployment benefits and non-cash benefits.

labour market and welfare institutions have an ambiguous impact on interpersonal income inequality determined by the market forces, as the shrinking of the capital share is counterbalanced by the larger quantity of unemployed individuals. Overall, it is likely that the market income inequality increases, but a decrease of the disposable income inequality should follow, depending on the size of redistribution implied by the

unemployment benefits. In Scandinavian countries the Welfare transfers have been very effective in allowing a flexible labour market to boost market incentives, at the same time reversing the dispersion across market income levels at the level of households' disposable income (Croci Angelini and Farina 2006).²⁵

As said, another labour market institution influencing the labour share are the degree of centralization of the negotiations about the wage and labour conditions. The more contracts are signed at the regional and sectoral levels, and the higher is the percentage of temporary vis-à-vis long-term contracts, the lower is the low-skill wage and the higher the employment rate. The expansion of the service sector, which is characterized by a high percentage of autonomous workers, has magnified the difference between the earnings distribution and the wage distribution due to the ambiguity involved in the attribution to the labour share of the former. The difference between earnings and wage inequality can give an insight on the relevance of the impact of the service sector in terms of the lowering in the number of the employees vis-à-vis the labour force which is employed with temporary contracts. By conducting the Theil decomposition in within sectors and between sectors variation in earnings and wage inequality - on the ECHP database, for the period 1994-2001 - in the Continental countries (Germany, Netherlands, Belgium) both earnings and wage inequality appear to increase within sectors. Since this result manifests also between sectors, the indication is that the service sector is behind the larger dispersion at the sectoral level. On the other hand, the United Kingdom presents a higher inequality for earnings and a lower inequality for wages, both within and between sectors, which is a possible sign of increased dispersion in the upper portion of the earnings distribution caused by the expansion of the ICT service companies. Overall, a divide has opened up in European countries between those economies in which the investments in the ICT sectors have increased the high-education and high-salaries of autonomous workers and the economies which lag behind, because of lack of advances both in product and process innovation and in the formation of the human capital (Croci Angelini and Farina 2007b).

5. Conclusions

The renewed interest towards the functional distribution of income has not yet produced a shared theoretical and empirical consensus around the determinants and the possible effects of the substantial fall of the labour share in most European countries over the last 25 years. While the Post-Keynesian tradition emphasizes the close interconnection between factor shares and economic growth, as the labour share needs to adjust so to produce an aggregate level of savings coherent with firms' investment decisions, the Neo-Classical approach rejected this causal interpretation, regarding the functional distribution and the rate of growth as jointly determined. The recent contributions to the growth literature, emphasizing the relevance of factor shares in a context of non-decreasing returns to capital, would suggest a positive association between the size of the capital share and economic growth. However, this hypothesis seems to fit poorly with the sluggish growth that coupled the decline of the labour share in most European countries. The limited – and often contrasting - evidence on the relevance of the various factors that could explain the prolonged shift of the functional distribution away from labour incomes, can be at least partly attributed to the methodological issues that need to be addressed to produce a consistent measurement of factor shares; different solutions to the need to account, say, for self-employment or changes in the sectoral composition of production, hinder a full comparability of the findings of the various empirical studies.

Following the skill-biased technical change approach, one might think that the sharp increase in the capital share experienced by most European countries over the last two decades has to be traced back to a capital-augmenting technical change coupled with a greater than one elasticity of substitution between capital and labour. One implication of this possible account of the change in factor shares is that the dispersion across wages is likely to augment, although such a connection between factor shares and earnings inequality has actually failed to emerge. This suggests that the technological decisions of European firms could have been deeply influenced by labour market institutions, as

restriction to worker dismissals induced them to resort to complementary technologies, whereby increases in productivity are expected from the unskilled learning from the skilled workers, and wage inequality is restrained by the limited possibility to introduce skill-biased techniques.

Furthermore, the decrease in the labour share has highlighted the critical role played by the welfare system in mediating the relationship between the functional distribution and the dispersion in the interpersonal distribution of disposable incomes. Indeed, no one-to-one mapping between the two distributions emerged, as some of the countries that experienced the largest drops in the labour share – as Germany, France and Italy – have been also characterized by a fairly stable interpersonal inequality. Yet, the system of tax and transfers does not simply alter ex post the distribution of market earnings, but it also produces significant effects on labour market outcomes themselves. In countries where labour market flexibility is widespread – most notably the United Kingdom - the skill-biased technical change does not seem to cause a reduction in wage dispersion through the firing of the low-skilled and low-wage workers, but quite on the contrary to boost employment through the output expansion fuelled by higher productivity in the high-tech service sectors. Hence, the fall in the labour share has slowed down, but wage dispersion has widened. As most European countries are engaged in large scale reforms of their welfare systems, a deeper understanding of the interrelations between factor shares, institutional factors, and the rate of economic growth could contribute to the current economic and political debate.

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Tables and Figures

Table 1. Change in the ratio of compensation of employees to GDP in selected European countries

Country	Compensation of employees over GDP			Peak year	Compensation of employees over GDP in peak year	Change
	1975	2000	Change			
Austria	54	52	-2.0	1978	54.9	-2.9
Belgium	57	52	-5.0	1980	60.4	-8.4
Finland	57	47	-10.0	1976	58.6	-11.6
France	55	52	-3.0	1981	56.6	-4.6
Germany	58	54	-4.0	1981	59.0	-5.0
Greece	32	33	1.0	1985	42.5	-9.5
Italy	51	41	-10.0	1975	51.7	-10.7
Netherlands	60	52	-8.0	1975	59.7	-7.7
Portugal	60	49	-11.0	1975	59.6	-10.6
Sweden	61	59	-2.0	1978	66.2	-7.2
United Kingdom	65	55	-10.0	1975	64.9	-9.9
Denmark	57	53	-4.0			
Iceland	50	51	1.0			
Ireland	57	40	-17.0			
Luxembourg	63	50	-13.0			
Norway	58	47	-11.0			
Spain	51	50	-1.0			
Switzerland	61	62	1.0			

Note: the data are from the United Nations Common Database, and are not adjusted for self-employment; the data referring to 1975 and 2000 are taken from Finnoff and Jayadev (2006), while the other data are authors' calculations.

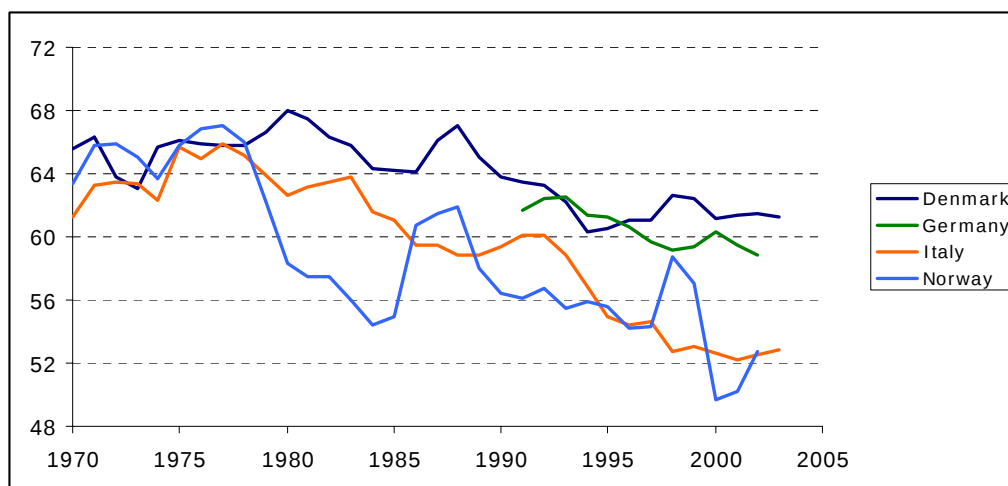
Table 2. Labour share, selected countries 1970-2003

year	Denmark	Germany	Italy	Norway
1970	65.6		61.3	63.4
1971	66.3		63.3	65.8
1972	63.8		63.4	65.9
1973	63.1		63.4	65.1
1974	65.7		62.4	63.6
1975	66.1		65.7	65.8
1976	65.9		65.0	66.8
1977	65.8		65.9	67.0
1978	65.8		65.1	66.0
1979	66.7		63.9	62.2
1980	68.0		62.6	58.3
1981	67.5		63.2	57.5
1982	66.3		63.4	57.4
1983	65.8		63.8	56.0
1984	64.4		61.6	54.4
1985	64.2		61.1	54.9
1986	64.1		59.5	60.7
1987	66.1		59.4	61.4
1988	67.0		58.8	61.9
1989	65.1		58.8	58.0
1990	63.8		59.4	56.4
1991	63.4	61.7	60.1	56.1
1992	63.3	62.4	60.1	56.7
1993	62.2	62.5	58.9	55.5
1994	60.3	61.4	56.9	55.9
1995	60.6	61.3	55.0	55.6
1996	61.1	60.6	54.4	54.3
1997	61.1	59.6	54.7	54.3
1998	62.7	59.1	52.7	58.8
1999	62.5	59.4	53.1	57.1
2000	61.2	60.3	52.6	49.7
2001	61.3	59.4	52.3	50.2
2002	61.5	58.8	52.5	52.7
2003	61.3		52.8	

Authors' calculations from OECD (2004)

Note: Labour share defined at the sectoral level (2-digit ISIC classification) as compensation of employees over value added at basic prices; correction for self-employment assuming average wage equality at the sectoral level; sectoral labour share are then aggregated according to sectoral weights in GDP.

Figure 1. Labour share, selected countries 1970-2003



Endnotes

¹ The exceptions refer to Batini et al. (2000), who estimate the impact of the labour share on the inflation rate in Great Britain and Hein and Ochsén (2003) who estimate the different propensities to save out of profits and wages in Germany and France.

² To provide a telling example of this, we can consider the explanation that rely on biased technical progress to explain both the fall in the labour share and the increase in wage dispersions: most empirical researches suggest the existence of a much wider wage dispersion in the United States than in other OECD countries (Devroye and Freeman 2001, Leuven et al. 2004, Blau and Kahn 1996 and 2004), and that – within Europe – it is the United Kingdom that has experienced by sharpest increase in wage inequality, notwithstanding the constancy of its labour share (Atkinson 2000).

³ Bertola et al. (2006) argue that the non accumulated factor can be indifferently interpreted as labour or land.

⁴ Conversely, if there is non unitary elasticity of substitution, the functional distribution of income becomes sensitive to the ratio between the two production factors and economic growth has an influence on the functional distribution of income, while the latter is still insensitive to the former. If the elasticity of substitution σ is higher (lower) than 1, i.e. the two factors are technical substitutes (complements), then the profit share increases (decreases) along the growth process.

⁵ Nevertheless, Phelps (1961) suggests a differential saving behaviour according to the source of income, as he observes that the Solovians were greatly relieved in their search for growth once they recognized that the optimal level of savings was equal to the capital share as “no wonder for they had invested most of their profits and consumed most of their wages anyway”.

⁶ In case technical progress comes as a labour-augmenting innovation, wage inequality is likely to increase, as a consequence of both a larger number of low-wage jobs in the service sectors and of top salaries.

⁷ If we introduce the additional hypothesis that the acceleration in the technical change produces also an “erosion effect” on the productivity - and thus on the wage level - of the low-skill, the wage dispersion widens also because of a concomitant fall at the bottom of the distribution (Galor and Mahov, 2000).

⁸ Krueger (1999) argues that the increase of the ratio of employees compensation over GDP recorded in the United States over the second half of the 20th century can be explained by the shift out of agriculture – where self-employment is predominant – to manufacturing and services.

⁹ World Bank (2006) reports that between 1992 and 2003 the share of the labour force employed in agriculture in Poland declined from 25.0 percent to 18.4 percent, while the corresponding figures for Hungary stand at 11.4 and 5.5 percent respectively.

¹⁰ Torrini (2005) observes that this choice has a significant impact on both the level and the observed trend of the Italian profit share: in 2003, this stands at 34.8 percent when the adjustment for self-employment is made at the sectoral level and at 36.7 percent when the adjustment is at the aggregate level; even more remarkably, in the first case the increase in the profit share between 1970 and 2003 is 2.8 percent while it reaches 6.4 percent in the second one.

¹¹ Moreover, the joint impact of liberalized and globalized capital markets and of the so-called *financialization* of the world economy has further complicated the statistical measurement and the computation of capital earnings.

¹² For example, the student protests in May 1968 in France led to Grenelle accords that increased employment protection in France (Caballero and Hammour 1998); in Italy, the *Statuto dei Lavoratori*, that introduced significant restrictions to unjustified dismissal of workers, was approved in 1970.

¹³ “Just taking Germany as a leading example, productivity growth exceeded wage growth on an almost regular basis during this catch-up phase, resulting in labour shortages and in a large number of guest workers flowing in.” (Berthold et al. 2002).

¹⁴ The authors, who do not just focus on the evolution of the labour share, observe that their findings are strengthened as their simulation model allows “to offer a unified explanation for the path of a key aggregates which, far from having moved in tandem, experienced dramatic changes in their comovements.” (Caballero and Hammour 1997).

¹⁵ This analysis is also complemented by a simple ordinary least squares regression on OECD countries data that suggests that the unemployment rate increased more where the cumulative change in the labour share had been larger, reinforcing the intuition that the move towards more capital intensive techniques has been more pronounced where the appropriation push had been stronger.

¹⁶ An interesting extension of the analysis is performed on US data, that are used by Berthold et al. (2002) to estimate separately the elasticity of substitution of capital with skilled and unskilled labour. The estimates are consistent with the idea that skilled workers are complement to capital, as the corresponding long-run elasticity

of substitution is 0.67, while for low skilled workers it stands at 1.67. The authors argue that “increasing firing costs and raising in particular wages at the lower end of the spectrum [...] are particularly harmful from the long-run employment perspective.” Note, however, that the European experience shows that wage dispersion has increased more in the United Kingdom than in Continental countries (Atkinson 2000), so that an apparent relationship between the appropriation push and wage inequality seems not to emerge.

¹⁷ An additional determinant is represented by the current process of globalization, through the increased real and financial openness of most countries; some papers (e.g. Diwan 2000 and 2001, Lee and Jayadev 2005, Guscina 2006) have provided an assessment of the idea first put forward by Rodrik (1997) that an increased international mobility of capital improves its bargaining position with respect to labour, as it provides it with a better opt-out alternative. We do not revise their findings, that are broadly supportive of the argument by Rodrik (1997), as these paper do not focus on European countries but rather on a wide set of both developed and developing countries. An interesting “outlier” in the literature that is worth mentioning is Finnoff and Jayadev (2006), who bring to the forefront a factor – the increasing participation of women in the labour force – that is not considered by any other empirical analysis.

¹⁸ As an aside, it is interesting to observe – from Giammarioli et al. (2002) - that the anti-cyclical evolution of the labour share is more pronounced in the manufacturing than in the services sector in all their sample countries but France, as “the service sector is characterized by a higher use of part time and fixed term contracts. In those contracts, dismissal costs are generally lower than in the case of permanent jobs, and therefore the expected labour hoarding in this sector will be lower” (Giammarioli et al. 2002).

¹⁹ The employment in the business sector declined by 1 million full-time equivalent workers between 1991 and 1994, that is 4.6 percent of total employment (Torrini 2005).

²⁰ These are the change in the ratio of GDP to the total number of hours worked and change in the average productivity per worker.

²¹ The sample analyzed by Bentolila and Saint-Paul (2003) includes 12 OECD countries, comprising Belgium, Germany, Finland, France, Italy, the Netherlands, Norway and Sweden.

²² The sample includes ten European countries: Belgium, Denmark, Finland, France, Germany, Italy, the Netherlands, Norway, Sweden and the United Kingdom, although Belgium, France and the Netherlands have respectively just 4, 6 and 9 observations.

²³ These estimates are confirmed also by in a later version of this paper, Checchi and García-Peñalosa (2005), where the authors also relied on an adjustment for self-employment – that is however left unspecified – and where the estimates were obtained with a three-stage least square estimator. Moreover, the authors stress that “the results are basically unchanged when we computed quinquennial averages of the data [and] when we restrict the data to the subsample of countries for which we have longer time series”.

²⁴ The sample includes Belgium, France, Hungary, Italy, the Netherlands and Spain, that is to say only 6 out of 40 sample countries.

²⁵ Brandolini and Smeeding (2007) estimate the difference in the Gini coefficient of the market and disposable income distribution, that can be attributed to the redistributive role of the fiscal system; besides Scandinavian countries, also in Germany and France the fiscal system is able to reduce the dispersion of market incomes by around 40 percent.



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