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Abstract

By using theoretical model and empirical analysis, we investigate how economic integration affects the impact of welfare policies on the employment. We consider the possibilities of financing public sector, i.e. public consumption and social security expenses, by general labour taxation in an economy which becomes more integrated in international product market. Increasing job mobility implies a change in the distortions arising from taxes and social security contributions levied on labour which affects the possibilities perceive in pursuing welfare policies. The effects of economic integration on the impact of welfare policies on employment depend definitely trade-off between intensified competition and better advantage of economies of scale. As increased trade competition crowds out better advantage of economies of scale, it becomes more costly to maintain welfare systems financed by labour taxation. We test the idea whether economic integration has changed the impact of welfare policies on the employment in European countries using data from the manufacturing sector from 1975 to 2004. Overall, the results provide inconsistent evidence for the hypothesis that economic integration has contributed the distortion effects of welfare policies on the employment.

JEL Classification: F15, H53, J23, J38.

Keywords: economic integration, welfare policies, labour taxation, employment.

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1 INTRODUCTION

Within the past few years, the impact of the economic integration on the possibilities for maintaining an extended welfare state, especially among Northern European countries, and on the labour market have attracted wide interest. One of the concerns is whether it will become more difficult to maintain a large public sector and an extended social security system, which is financed by general labour taxation. The cost of extended welfare state in the international integration may be higher level of unemployment via the distortions arising from taxes and social security contributions levied on labour factor. It has been argued that in an open economy set-up equilibrium employment might be affected by demand factors such as fiscal spending (see, e.g., Gatti 2002, p. 7). On the other hand, as Rodrik (1997, 1998a) and Andersen (2002) argue, economic integration may lead to more volatility and thus increasing need for social insurance arrangements to ensure some income stabilization in the presence of cross-country shocks, uncertainty and risk-aversion. However, increasing job mobility implies a change in the distortions arising from taxes and social security contributions levied on labour which affects the possibilities perceive in pursuing welfare policies. Thus, as Andersen (2003) argues, the need for social insurance arrangements may increase at the same time as it becomes more difficult to finance the system. This study addresses the second of this concern, the problem of maintaining welfare state financed by distortionary labour taxation while tighter economic integration affects the impact of welfare policies on the employment.

Economic integration is a process in which markets for goods and factors of production tend to become perfectly integrated. The mobility of production has been increasing as a consequence of product market integration. As Rodrik (1998b, 1999) argues, open economies, which are free to trade with each other, differ from closed economies in the respect that in particular capital and employers are internationally mobile. However, capital income taxation contributes a relative small proportion of total tax revenue in most European countries which suggest that the mobility of certain tax bases has not a major role for possibility of financing welfare policies in economic integration. On the other hand, product demand will become more sensitive to price differentials between

different countries and firms' location decisions more responsive to relative labour costs. Therefore, competitiveness pressure on the labour market towards greater flexibility is expected to increase under diminishing trade barriers. Hence, it is more natural to address the question of how product market integration affects the consequences of welfare state financed by general labour taxation, although workers are immobile. The impact of welfare policies on employment with economic integration depend definitely trade-off between intensified competition and better advantage of economies of scale. The progress of integration with the wider trade and capital flows has been strengthening the competition between EU countries, which has reflected in the link between wage formation and unemployment. With unionized labour markets a permanent increase in labour income taxation leads the union to demand higher real wage to compensate for the decreased after tax income, and consequence of higher labour costs firms demand labour less.[1] Hence, it can be argued that the possibilities of welfare state to improve employment through fiscal activities is progressively reduced when product market competition increases i.e., the "optimal" level of public spending decreases as a consequence of increased product market competition. On the other hand, with increased integration and competition firms with access to the wider market were expected to be able to expand sales and production to take better advantage of economies of scale while continuing to cover production costs despite lower price-cost margins. Thus, market power may arise from specialization in production and differentiation of products to establish segmented markets. This might decrease the costs of maintain welfare systems. Since product market elasticity with product price is likely to rise with integration, this implies that, with greater trade openness, we should see in turn an increase in costs of maintain welfare systems. As increased trade competition crowds out better advantage of economies of scale, it becomes more costly to maintain welfare systems financed by labour taxation.

The purpose of this study is to examine by using theoretical model and empirical analysis how economic integration affects the impact of welfare policies on the em-

[1] In contrast to competitive labour markets, in the presence of unions the burden of labour taxation will be borne in part by employers and will therefore increase labour costs even if the labour supply is perfectly inelastic. How weak is the impact of increased labour income taxation on wages depends on how highly centralized union-government negotiations are to internalize the effects of higher taxes on more public goods or higher transfers (see, e.g., Calmfors and Driffill 1988, Alesina and Perotti 1997).

ployment. To consider this issue, we need first of all to clarify the effects of welfare state activities and labour taxation on wage formation and employment. Then, we have to examine how these effects depend on how integrated international product market is. In order to study this issue we use a model with three main characteristics. First, we consider an open economy with two sectors: tradable sector and public sector. Second, we suppose that labour markets are unionized which generates rigidities in the wage setting process. The third feature is that we consider differentiated goods produced by monopolistically competitive firms. While the effects of economic integration can work through many different channels, product markets and factor substitution, in this study the economic integration is mainly associated with market power which makes it possible to capture the main quality effects in a manageable way. Finally, the empirical aim is to determine whether European integration has changed the impact of welfare policies on the employment. This has been tested using data from the European countries from 1975 to 2004.

The study is organized as follows. Section 2 develops a theoretical model for empirical analysis. It specifies some basic mechanisms determining how increased integration affects the impact of welfare policies on the employment. Section 3 set up the econometric model while the data is described in Section 4. Section 5 presents the estimation strategy, and reports on the empirical results. The last section concludes the study.

2 THE THEORY

2.1 A Two-sector model

We consider an open economy with two sectors, traded private sector and non-traded public sector. There are many firms n at private sector producing tradable differentiated products with capital and labour as inputs. We suppose that there is another sector, a public sector producing the non-tradable goods only for domestic market. Supposing that product markets are imperfectly competitive, there is monopolistic competition in

tradable good markets adapting the model of Dixit and Stiglitz (1977).[2] The structure of this model is such that consumers demand a variety of differentiated tradable products and non-tradable public goods. Representative consumer's tastes are assumed represented by the utility function

$$V = b\frac{1}{\theta}D^{\theta} - dL^{T} + G \tag{2.1}$$

where $D = \sum_{i=1}^{n} D_i$ is an index of consumption of the differentiated tradable products, G is consumption of the public goods, b is the positive constant, and d captures the disutility of work L^T. Consumers supply labour from which they receive wage income if employed, and unemployment benefits if unemployed.[3] Each consumer maximises their utility function (2.1) subject to the budget constraint. The budget constraint simply requires that the value of expenditure is not more than value of the income: $P^{*}D = I + TR$ where TR is lump-sum transfers from the government, I labour income, and P^{*} represents an index of the price level in terms of international integration. Labour income is $I = (1 - t_w)w$ if employed, and $I = s$ if unemployed where t_w is the wage tax rate, and s is the unemployment benefit.

By imposing the symmetry assumption a consumer maximizing will set

$$D = \left(\frac{P^{*}}{b}\right)^{\frac{-1}{1-\theta}} \tag{2.2}$$

where $\varepsilon = \frac{1}{1-\theta} > 1$ is the product-demand elasticity. The product-demand elasticity can be thought as an increasing function of the number of products $\varepsilon = \varepsilon(n)$, where

[2] This approximates a situation in which there are a large number of varieties and each firm has some power over the pricing of its product.

[3] Note that d has interpretation of a reservation wage i.e., for any after tax wage above d the consumer supplies inelastically its working time (normalized to unity), which is a reasonable approximation to the fact that labour supply elasticity is usually found to be small.

$\varepsilon'(n) > 0$, and n is the number of products/firms. An increase in the number of firms leads to an increase in the degree of competition. The demand of products type *i* is given as

$$D_i = D\left(\frac{p_i}{P^*}\right)^{-\phi} = a\, p_i^{-\phi}\, P^{*\phi-\varepsilon} \tag{2.3}$$

where p_i represents the price of variety *i* with $\phi > 1$ denoting the elasticity of substitution between any two products types (see Helpman and Krugman 1989). The elasticity of substitution among differentiated goods can be thought as a decreasing function of the advantage of economies of scale $\phi = \phi(a)$, where $\phi'(a) < 0$, and $a \equiv \frac{A}{A^*}$ is an exogenous comparative productivity for domestic tradable sector relative to foreign. A growth in the advantage of economies of scale leads to a decrease in the degree of substitution among differentiated goods within sector.[4]

The effects on imperfectly competitive product markets of increased integration via declining trade costs are basically of two counteracting sorts. Hence, it turns out to vary competition by varying both advantage of economies of scale holding ε constant, and number of firms holding ϕ constant. Let τ denotes a trade cost due to transactions costs and other trade barriers related to foreign trade.[5] First, individual producers with access to the wider market were expected to be able to expand production to take better advantage of economies of scale, i.e., $\frac{\partial \phi}{\partial a}\frac{\partial a}{\partial \tau} > 0$. This has associated to reduced market imperfection and to increased incentive of product-differentiating. Second, market entry becomes easier and/or less costly implying that more goods become traded goods. With

[4] Together with interaction between number of products/firms and degree of price competition, trade and economic integration can be seen as the result of the interaction between product differentiation and economies of scale. Each industry contains a large, but limited because of economies of scale, number of potential differentiated products that consumers regard as imperfect substitutes. Given the opportunity to trade, industries will specialize in the production of different ranges, while the degree of price competition will increase.

[5] For simplicity, we assume that the trade costs of import and export outputs are equal.

increased integration and competition, an firm's market share becomes increasingly sensitive to price changes raising the elasticity of the consumption price i.e., $\frac{\partial \varepsilon}{\partial n}\frac{\partial n}{\partial \tau} < 0$. In the imperfect competition, we have then the condition of pricing rule for products types

$$P^* \geq \left[\sum_{i=1}^{n} \frac{(1+\tau)}{a} p_i^{1-\phi}\right]^{\frac{1}{1-\phi}}. \tag{2.4}$$

In optimum, the price equals to the marginal revenue from exporting, where we must have that relative trade cost equals to mark-up factor i.e. $\frac{1+\tau}{a} = \frac{\phi+\varepsilon}{\phi+\varepsilon-1}$ (see, e.g., Helpman and Krugman 1989, p. 18). We summarize the characterization of the optimal pricing rule in

Proposition 1 *Lower trade costs with increased integration, higher number of firms and in consequence of its higher elasticity of product demand will reduce the mark-up price, whereas better advantage of economies of scale and in consequence of its lower elasticity of substitution between differentiated products will raise it, ceteris paribus.*

The government provides public goods and social security in the form of transfers related to unemployment and other lump-sum subsidies. Public demand for product variety j is associated price index of non-tradable domestic market by $\overline{P} = \left[\sum_{j=1}^{m} \overline{p}_j^{\frac{1}{\xi}}\right]^{\xi}$ where "¯" indicates a public sector. Government faces a downward sloping public demand curve

$$G = \overline{p}^{-\xi} \tag{2.5}$$

where ξ is the demand elasticity of public goods implying that public demand for product variety j can be written

$$G_j = G\left(\frac{\overline{p}_j}{\overline{P}}\right)^{\frac{1-\xi}{\xi}}. \tag{2.6}$$

Note that this way of specifying public consumption, as Andersen (2003) argues, rules out relative demand shifts between public and private consumption as a source of relative price changes.[6] We assume for simplicity that there is not tax rate on capital, and the unemployment benefit is not taxable income. Hence, the taxes are levied only on labour capturing the empirical fact that general labour taxation (wage tax rate t_w and social security contributions t_p) accounts for most of public sector revenue. Let *N* be the labour force, and thus [$N - L^T$] is unemployment where L^T is total employment. Then we can write the budget constraint of government as:

$$\overline{P}(G + TR + S) = t^T w^T L^T \tag{2.7}$$

where w^T refers total wage rates, *TR* is total expenses to transfers, and $S = s(N - L^T)$ is total expenses on unemployment benefits. Consequently, the labour tax rates $t^T \equiv (t_w + t_p)$ are endogenous adjusting so as to balance the budget.

The firm considers the gross wage of private sector $\tilde{w}$ as given consisting of the net-of-tax wage[7] plus the social security contributions t_p, so that $\tilde{w} = (1 + t_p)w$. For example, an increase in employer's social security contributions shifts the labour demand curve inward by increasing the cost of labour (see, e.g., Pissarides 1998). As Holmlund et al. (1989) explain if there is complete nominal wage rigidity, employment takes the whole burden of adjustment.[8] Assuming that linear-homogenous technology can be rep-

[6] Since we consider the distortion effects of welfare activities this assumption simplifies to isolate the direct effects disregarding any relative price effects that may arise if the distribution of income affects aggregate demand.

[7] A rise in wage tax increases the labour costs when a rise of wage tax is compensated by an increase in the negotiated wages.

[8] If there is correspondingly complete nominal wage flexibility, the increase in social security contributions is completely shifted back on wages.

resented in traded sector by CES (constant elasticity of substitution)[9] production function form, it can be specified as

$$Y = \left[L^{\varphi} + K^{\varphi}\right]^{\frac{1}{\varphi}} \tag{2.8}$$

where elasticity of substitution between capital and labour is defined $\sigma \equiv \frac{1}{1-\varphi} \geq 0$, and capital is denoted by *K*. The elasticity of substitution is defined as the effect of a change in relative factor prices on relative inputs of these two factors, holding output constant (see Allen 1938, or Hamermesh 1993). The conditional labour costs can be derived as

$$w = \left[\frac{Y}{L}\right]^{\frac{1}{\sigma}}. \tag{2.9}$$

We assume imperfect competition in the product market i.e., each single firm faces a downward sloping demand curve

$$Y = D(p) = p^{-(\phi+\varepsilon)}. \tag{2.10}$$

The closer substitutes for output Y on the international market are the more elastic output demand becomes. Profit maximization implies that the firms will set a price, which exceeds the marginal cost by a constant mark-up factor, i.e. $\frac{\phi+\varepsilon}{\phi+\varepsilon-1} > 1$. In a process of integration, there are pressures for the mark-ups to decline with increasing elasticity of product demand.[10] On the other hand, a decrease in the product-substitution elasticity

[9] The CES function exhibits constant returns to scale. However, trade may give rise to take advantage of economies of scale in production.

[10] Whenever an economy faces a larger number of firms in an integrated world market, trade itself leads to a decline in the mark-ups. Hence, the degree of competition tends to increase when more goods become traded. By increasing competition facing individual firms in product markets, it is intended that firms should lower their mark-ups of prices over marginal costs. For instance, Hoon (2001) has affirmed that as domestic and foreign firms compete in the markets for traded goods, there are pressures for the mark-ups to decline.

may compensate this effect.[11] Under the assumption of wage taking behaviour labour demand can be written by using equations (2.9) and (2.10)

$$L = p^{-(\phi+\varepsilon)}\tilde{w}^{-\sigma} . \tag{2.11}$$

The labour market is assumed to be imperfectly competitive. It is commonly accepted that the monopoly union model in a simple way (see, e.g., Booth 1995) captures the qualitative implications of different labour market models at least in respect to generate unemployment, and in the wage response to wage income taxation and the degree of centralization. Wages is set by trade union, and it is assumed that union is large enough to be able to negotiate over wages, but small enough to take welfare policy as given. Union maximize the income of their members subject to the labour demand function (2.11). Union's objective function is given by

$$\Omega = L(1-t_w)w + (N-L)s . \tag{2.12}$$

Maximization of (2.12) with respect to wage rate yields an equation for the equilibrium wages

$$w = \frac{\eta_{LL}}{(\eta_{LL}-1)}\frac{s}{(1-t_w)} \tag{2.13}$$

where $\eta_{LL} \equiv -\left(\frac{\partial L}{\partial w}\frac{w}{L}\right)$ is elasticity of labour demand with wages. For simplicity, in the present setting, unemployment benefits are not taxable income.[12] Considering how wages respond to changes in welfare activities, we find that for unemployment benefits there is both a direct effect in terms of raising the reservation wage of workers, $\frac{\partial w}{\partial s} > 0$,

[11] For example, Bottasso and Sembenelli (2001) conclude using Italian firm level data that EU Single Market Program has lead to a decrease in the mark-up and an increase in productivity for those firms that were expected, ex-ante, to be more sensitive to the abolition of external trade barriers.

[12] It is well-known that the effect of unemployment benefits for wage formation depends on whether unemployment benefits are taxes by the same rate as wages or not (Pissarides 1998).

and an indirect effect in terms of raising tax rate, $\frac{\partial w}{\partial t_w} > 0$. These results capture the standard result (see, e.g., Alesina and Perotti, 1997) that an increase in public sector activities may lead to a wage increase. For simplicity, in the present setting, it is assumed that trade union is small enough to take welfare policy as given, but how weak is this impact on wages depends on how highly centralized union-government negotiations are to internalize the effects of higher taxes on more public goods or higher transfers (see, e.g., Calmfors and Driffill 1988). As Summers et al. (1993) suggest, one may conjecture that if wage setting is centralised and workers are represented by a very large trade union, then they are likely to develop a more moderate attitude in negotiations, and union would take into account the budgetary implications of unemployment subsidies.[13] Wages would thus be set to a lower level. Although, our trade union is large enough to set wages, but not large enough to negotiate over welfare policy with the government, this implies that looking at the empirical determinants of employment countries might be partitioned in groups with patterns of wage negotiations.

A key parameter for wage rates between sectors is the elasticity of labour demand. There is a qualitative difference between the traded and non-traded sectors, since the latter have the possibility of passing an increase in wages partly into prices while this is not possible in the former case. Hence, we assume that labour demand is less elastic in public sector as compared tradable firms in private sector. We have then the condition of wage rule for sectors

$$w = \frac{\eta_{LL}}{(\eta_{LL} - 1)} \frac{s}{(1 - t_w)} \leq \overline{w} = \frac{\overline{\eta}_{LL}}{(\overline{\eta}_{LL} - 1)} \frac{s}{(1 - t_w)} \tag{2.14}$$

reflecting that the competitive pressure is higher in traded firms, and therefore the wages may not be higher in private sector than public sector. Rodrik (1997) argues that, since the demand for labour is a derived demand, which varies proportionately with the elasticity of demand for goods, the integration of goods markets alone makes the de-

[13] Summers et al. (1993) define centralised wage setting as unions' ability to perceive the government budget constraint i.e., to be aware of a linkage between taxes and benefits received. They suggest that

mand for domestic labour more elastic because of declining mark-ups.[14] Then, with heightened foreign competition the unions face more elastic labour demand relation and thus moderate their wage demands ($\frac{\partial w}{\partial \eta_{LL}} < 0$). For example, Huizinga (1993), and Danthine and Hunt (1994) find that the creation of firm level competition increases the elasticity of labour demand which moderates union's wage demand i.e., increased goods market competition leads lower wages and then higher employment. However, the effect of integration on the price sensitivity of the market share may be compensated by its direct effect on the market share i.e., market power can arise from specialization in production and differentiation of products being able to take better advantage of economies scale with segmented markets. Nickell et al. (1994), and Stewart (1990) find evidence of a positive (time series) relationship between wages and market share. This suggests that the sharing of mark-ups and of higher wages being associated with market. We summarize the effects of integration on wages for private sector in

Proposition 2 *Lower trade costs with increased integration, higher number of firms and in consequence of its higher elasticity of product demand* ($\frac{\partial \varepsilon}{\partial n}\frac{\partial n}{\partial \tau} < 0$) *will increase the elasticity of labour demand* ($\frac{\partial \eta_{LL}}{\partial \varepsilon} > 0$) *and thus decrease wages pressure* ($\frac{\partial w}{\partial \eta_{LL}} < 0$), *whereas better advantage of economies of scale and in consequence of its lower elasticity of substitution between differentiated products* ($\frac{\partial \phi}{\partial a}\frac{\partial a}{\partial \tau} > 0$) *will decrease the labour-demand elasticity* ($\frac{\partial \eta_{LL}}{\partial \phi} > 0$) *and thus increase wages* ($\frac{\partial w}{\partial \eta_{LL}} < 0$).

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labour taxation is less distorting with respect to labour supply decisions in countries with more centralised wage bargaining.

Given the equilibrium wage rate (2.13) and labour costs $\tilde{w} = (1+t_p)w$, we have equilibrium employment for traded sector by using equation (2.11)

$$L = p^{-(\phi+\varepsilon)}\left[\frac{\eta_{LL}}{(\eta_{LL}-1)}\frac{(1+t_p)s}{(1-t_w)}\right]^{-\sigma}. \tag{2.15}$$

We see that an increase in the elasticity of product demand triggered by more firms (i.e., ε rises) decreases the labour demand ($\frac{\partial L}{\partial \varepsilon} < 0$). Product demand becomes more price elastic when product markets are more integrated, but is the effect of product market integration on the price sensitivity of the market share larger than its direct effect on the market share. For example, individual firms with access to the wider market might be able to expand sales and production taking better advantage of economies scale (i.e., ϕ falls) which can be associated to decreased market imperfection and thus increased labour demand ($\frac{\partial L}{\partial \phi} < 0$). Furthermore, when the unions face more elastic labour demand relation and thus moderate their wage demands ($\frac{\partial w}{\partial \eta_{LL}} < 0$), we find that increased labour-demand elasticity increase labour demand ($\frac{\partial L}{\partial \eta_{LL}} > 0$) due to the reduced market power of unions. Accordingly, if unions are less aggressive passing increases in wage taxes and unemployment benefits into wages implying better employment, these points out that economic integration may imply an implicit structural reform of labour markets through the effects it has on union market power.[15] However, as Andersen (2003) ar-

[14] Applying one of the four Hicks-Marshall laws of derived demand, the demand for anything is likely to be more elastic, the more elastic is the demand for any further thing, which it contributes to produce (Hicks 1966, p. 242).

[15] Rodrik (1997) explains when the shock of product market is a negative one; there is a larger decrease in employment in the more open economy than there is in the more closed economy. A consequence of integration is greater instability in labour-market outcomes when openness magnifies the effects of shocks on labour demand. An inward shift and a flattening of the demand curve for labour reduce average earnings. Increased trade makes it more costly for workers to achieve a high level of labour standards and benefits. The larger the elasticity of demand for labour, the higher the share of any such costs that must be borne by the workers themselves.

gues, even though international integration may reduce the distortionary effects of unemployment benefits and taxation on wage formation it does not necessarily follow the distortionary effects on employment are reduced. In addition, in the process of integration international trade can increase the elasticity of substitution between labour and capital. As Rodrik (1997) argues, the increasing mobility of capital means that the demand for labour will generally be more responsive to changes in the factor prices. Firms can substitute other factors of production for immobile workers more easily by investing. We find that in consequence of decreased trade costs as substitutability increases (i.e., σ rises) labour demand becomes more sensitive to labour costs. Hence, despite the wage moderation the employment consequences may become larger because tighter integration increases the sensitivity of employment to wage costs. We summarize the characterization of the impact of economic integration on distortionary employment effects in

Proposition 3 *As increased trade competition crowds out better advantage of economies of scale,* $\frac{\partial \phi}{\partial a}\frac{\partial a}{\partial \tau} < \frac{\partial \varepsilon}{\partial n}\frac{\partial n}{\partial \tau}$*, and the elasticity of substitution between capital and labour increases,* $\frac{\partial \sigma}{\partial \tau} < 0$*, in the process of economic integration, the larger are distortionary effects of welfare policies on employment, the less centralized is the wage formation process.*

Consider the equilibrium employment in the non-traded public sector. Similarly, for public sector it follows

$$\bar{L} = \bar{p}^{-\xi}\left[\frac{\bar{\eta}_{LL}}{(\bar{\eta}_{LL}-1)}\frac{(1+t_p)s}{(1-t_w)}\right]^{-\bar{\sigma}}. \tag{2.16}$$

We can see that, in this framework, economic integration does not affect on public employment neither via the scale effects of integration nor through increasing labour-demand elasticity. Furthermore, in the non-traded sector, it is possible to pass through an increase in wages partly into prices while this is not possible in the traded sector

($\xi < \varepsilon$). However, public consumption improving public employment[16] is able to affect firm's competitiveness via the labour taxation (the distortion) financing increased expenditures (using the budget constrain of government (2.7)). The impact of increased public expenditures on international competitiveness results from the negative effects of labour taxes on the disposable income. The loss of competitiveness via higher labour costs causes a reduction in the demand for exports and a fall in private employment. This means that, if an increase in wage taxes is compensated by higher wages or an increase in employers' social security payments cause an increase in labour costs, economic integration worsens the ability of government in improving employment via welfare policy when competition crowds out public consumption. Besides, in non-traded sector, an increase in labour taxation and no cuts on public wages replace partly the positive impact of public consumption on public employment ($\frac{\partial \bar{L}}{\partial G} > 0$) by the opposite effects of higher labour costs ($\frac{\partial \bar{L}}{\partial \tilde{\bar{w}}} < 0$) depending on how centralized labour market are. It is less costly to maintain welfare activities, if labour markets are highly centralized.[17]

In summary, increasing job mobility implies a change in the distortions arising from taxes and social security contributions levied on labour which affects the possibilities perceive in pursuing welfare policies, i.e. public consumption and social security expenses, in an economy which becomes more integrated in international product market. The effects of economic integration on the impact of welfare policies on employment depend definitely trade-off between intensified competition and better advantage of economies of scale. As increased trade competition crowds out better advantage of economies of scale, it becomes more costly to maintain welfare systems financed by labour taxation.

[16] The government demands labour to produce public goods. This captures that for most countries, as Andersen (2001) explains, employment constitutes the major part of public consumption, and wage costs are the dominant expenditure item.

[17] Empirical support for the importance of this mechanism has recently been provided by Alesina and Perotti (1997) and Daveri and Tabellini (2000).

3 ECONOMETRIC MODEL

Our empirical aim is to test whether economic integration has changed the impact of welfare policies on the employment looking at a panel of European countries. The strategy is to take the theoretical model in Section 2 as a basis for econometric identification. In particular, we use the equilibrium conditions for employment in traded and non-traded sector. Let l_{it} be the employment rate in country *i* and time *t*. Taking a linear approximation of equations (2.15) and (2.16) aggregate employment for each period can be written as a regression function

$$l_{it} = \alpha(\omega_{it}) + \mu(t_{w_{it}}) + \beta(y_{it}) + \rho(tr_{it}) + \chi(g_{it}) + e_{it} \tag{3.1}$$

where ω is real labour price, t_w wage-based tax rate, *y* real GDP index, *tr* ratio of government transfers to GDP, and *g* ratio of government wage-based consumption to GDP. The error terms are denoted *e*. Supposing that the scale returns are constant we estimate constant-output labour price of employment using restricted least squares procedure, $\beta = 1$ with constant output.[18] By estimating levels, it is assumed that there are no significant time lags between the changes of labour prices and the employment responses. Hamermesh (1983) reports that typical adjustment lags are six months to one year, so in the annual data lags should not be too important at the country level.

Supposing that the scale returns are not constant we estimate non-constant-output coefficients of the labour price. If both scale and constant-output labour prices are consistently estimated, then the difference between these two is the estimate of the scale effects, and it would provide indirect evidence about the competitiveness of product market. Thus, it can be determined the impact of integration's scale effects on the impact of welfare policies on the employment by controlling demand factors. To estimate scale effect labour price of employment for each period, this suggests the following regression equation

[18] In the short run, a changes in the costs of labour will induce a change in output, i.e. the estimates of labour price includes the scale effects. The long run labour price would be estimated without production measurement or with output as constant. (See, e.g., Hamermesh 1986, p. 449.)

$$(3.2) \qquad l_{it} = \Phi(\omega_{it}) + \mu(t_{w_{it}}) + \beta(y_{it}) + \rho(tr_{it}) + \chi(g_{it}) + u_{it}$$

Here u is an error term. The scale effect β measures the impact of international demand shock on employment. We use two different instrument variables: the share of country's i exports to the other EU-countries in production and the share of the country's i output of European Union in production which are deflated by a price competitiveness indicator. The first attempts to measure foreign demand of country's products, and the second attempts to measure the overall demand of European Union. Furthermore, a price competitiveness indicator measures the international product market competition.

Table 4.1 Coverage, density and co-ordination of labour relations in EU-countries.

Country	Union Density	Union Coverage Index	Co-ordination: Union	Co-ordination: Employer
NOR-group				
Austria	46.2	3	3	3
Denmark	71.4	3	3	3
Finland	72.0	3	2	3
Sweden	82.5	3	3	3
CON-group				
Belgium	51.2	3	2	2
France	9.8	3	2	2
Germany	32.9	3	2	3
Greece				
Italy	38.8	3	2	2
Luxembourg				
Netherlands	25.5	3	2	2
Portugal	31.8	3	2	2
Spain	11.0	3	2	1
BRIT-group				
Ireland	49.7	3	1	1
United Kingdom	39.1	2	1	1

Notes: (1) Coverage measures the extent to which contracts signed by organised unions extend to the rest of the labour force. (2) Density measures the rates of net union density, i.e., the number of union members net of pensioners divided by the labour force. (3) Co-ordination measures the extent of contracting co-ordination within different union and employers organisations. The index provides a qualitative ranking of countries: 1 = low, 2 = medium, and 3 = high.

Sources: OECD Jobs Study (1994), Nickell (1997), and Golden (1996).

To measure the degree of centralisation of labour markets, we use the indexes constructed by OECD Jobs Study (1994) for coverage ratio, Golden (1996) for union density, and Nickell (1997) for co-ordination, which are reported in Table 4.1. These indexes rank EU-countries in order of centralisation. We partition countries in three groups[19]: the NOR-group includes Scandinavian countries, and Austria, where trade unions are large and centralised; the CON-group includes countries (except Austria) in continental Europe, where unions play an important role but are decentralised; and the BRIT-group includes Ireland and United Kingdom, where labour markets are quite competitive. We allow the wage-based tax rate coefficient to vary across these groups of EU-countries by multiplying t_w by three dummy variables taking a value of unity if the country belongs to the group and zero otherwise.

4 DATA

The employment equations are estimated using panel data of European countries[20] based on the statistics of OECD database sources: OECD Statistics of International Trade, OECD Taxing Wages Statistics, OECD Productivity Database, OECD National Accounts Statistics, and OECD Economic Outlook Database. The panel data covers years from 1975 to 2004. Table 4.2 reports summary statistics of the observations. Estimation requires measures of employment, real labour price, labour taxation, government transfers, government consumption and real production for all country-year observations. The deflating variable is a producer price index. Employment rate comes directly from OECD Economic Outlook Database as a share of workers in labour force. Real average labour price is constructed as a unit labour cost equals nominal annual wages plus social security costs paid by employers deflated by the producer price index and divided by the number of workers. Employment is supposed to depend on the la-

[19] This classification is suggested by several previous studies (Blanchard 1997, Bruno and Sachs 1985, Calmfors and Driffill 1988, Cameron 1984, Daveri and Tabellini 2000, Layard et al. 1991, Nickell and Layard 1999).

[20] The countries are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and United Kingdom.

bour costs negatively. The higher are labour price, the slighter is the labour demand. Labour tax rate includes direct average taxation plus social security payments paid by employees divided by total wages. We expect real wages to increase with the labour tax rate. This effect could be small, if the labour markets are much centralised, and thus the negative impact of higher labour tax rate on employment could be small. If trade unions play an important role in wage negotiations, but are not so centralised as to take into account the repercussions of higher wages, we expect the negative effect on employment to be large. The cross-sectional variation in the employment rates is dominated by fixed effects at the country level. Labour market legislation differs markedly across countries but has not changed much since the 1970s (Nickell, 1997). Thus, as Daveri and Tabellini (2000) argue, the correlation between labour taxes and employment is only captured by simultaneously exploiting the time series and cross-country variations of the data, and by distinguishing among countries on the basis of their labour market institutions.

The data of government expenditures based on OECD National Accounts Statistics. The ratio of government transfers to GDP includes public expenditure on unemployment subsidies and other social transfers. It is supposed that the unemployment benefits decrease employment. However, the evidence of Nickell and Layard (1999) suggests that the unemployment benefits seem to have little impact on overall labour input. While high benefits lead to high unemployment, they also lead to high participation because they make participation in the labour market more attractive i.e., participation being necessary to be eligible for the high benefits. This is consistent with a weak impact of unemployment benefit on employment ratio, because the higher unemployment effect and the higher labour market participation effect tend to cancel out. It is not clear that the size of net effect should also depend on trade union strength and centralisation, since even in competitive labour markets higher replacement rates could have a large effect on employment through individual search or bargaining attitudes. Finally, we also expect that employment rate depends on ratio of government wage-based consumption to GDP positively. Although, public consumption improving public employment is able to affect country's competitiveness via the increasing distortions of labour taxation financing increased expenditures.

Table 4.2 Variable summary statistics.

Variable	Obs	Mean	Std. Dev.	Min	Max
GDP-index (real)	450	76.12	18.69	28.02	118.2
Employment rate	450	92.97	3.698	81.56	99.82
Labour price (real)	450	73.58	28.07	2.670	116.9
Labour tax rate	450	17.38	10.07	0.040	44.39
Ratio of transfers (real)	450	0.226	0.112	0.007	0.499
Ratio of public consumption (real)	450	0.143	0.066	0.009	0.388
Exports share (real)	450	0.016	0.015	0.0001	0.083
EU-output share (real)	450	0.067	0.093	0.0003	0.687

For the equation (3.2), we use two different instrument variables: the share of country's exports to the other EU-countries in production and the share of the country's output of European Union in production deflated by the country's price competitiveness indicator. Country's exports to the other EU-countries and price competitiveness indicator are based on Foreign Trade OECD Statistics. Another instrument variable, the production of European countries is based on OECD National Accounts Statistics. Real GDP index, another of endogenous variables, comes directly from the data of productivity. A rise in exports increases country's production, which is supposed to increase the employment. In theory, the labour demand is supposed to depend on the output positively. If product demand rises and thus production increases, the firms' demand for factors rises. The assumption is that higher export signals better scale economies (or less foreign competition).[21] On the other hand, the more the rest of the EU accounts for the output of country, the more competitive the product market is for this country's firms. Finally, an increase in the competitiveness indicator means that an country's price competitive ability decrease is supposed to decrease the product demand and thus employment.

5 EMPIRICAL ANALYSIS

The empirical study of the effects of fiscal policy in open economies has typically focused on the role of government purchases of goods and services and on its effects on the relative price of non-tradables. Papers by Froot and Rogoff (1991), De Gregorio, Giovannini and Krueger (1994), and De Gregorio, Giovannini and Wolf (1994) finds empirical support of different degrees that an increase in government spending on goods and services, falling more heavily on labour-intensive non-tradable goods, leads to an appreciation of the relative price of non-tradable goods via an increase in the demand for labour. Concerning empirical studies on the intersection of public finance and labour economics, several contributions have looked at the effects of taxation on unemployment, particularly in closed economies. For example, paper by Daveri and Tabellini (2000) finds that the increase in unemployment and the slowdown in economic growth are related, because of higher taxes on labour. Recent research by Kiander et al. (2004) analyses the relationship between unemployment, labour taxation and public spending using a panel data of OECD countries. Their estimation results suggest that the countries where wage setting takes place at the firm level have used labour taxes less extensively in financing welfare spending compared to countries with centralised or decentralised bargaining.

The empirical work closest to this study is the one conducted by Alesina and Perotti (1997). They use a model of open economy to study the effects of government expenditures and distortionary taxation on competitiveness using a panel data of 14 OECD countries from 1960 to 1990. They find that an increase in government transfers financed by labour taxation generate a loss of international price competitiveness. However, their study does not focus on how the competitiveness of product market affects employment. This study is the first to estimate how economic integration affects the impact of welfare policies on the employment using panel data of EU-countries.

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[21] Péridy (2004) finds using data of four EU countries over the period 1975 - 2000 that exports unambiguously rise with the degree of scale economies.

5.1 Estimation strategy

There are some issues to mention regarding the estimation strategy. One is the exogeneity of the regressors in the equation (3.1) and (3.2). As Hamermesh (1986) discusses, some of them might actually be endogenous variables because firms (government) make their output (wage-based consumption) and employment decisions jointly. Quandt and Roser (1989) estimated an equilibrium model of the labour market, and used it to test the assumption of production exogeneity. They did not reject the assumption that production is exogenous. On the other hand, not only because of this potential problem, we estimate both of constant-output labour price of employment by using least squares, and scale effect labour price of employment by using controls as instruments and by supposing that production is endogenous. Furthermore, there is potential source of spurious correlation due to the possibility of endogeneity of labour tax rates and unemployment benefits. For instance, a common EU-wide shock that decreased employment could have forced to increase tax rates to pay for increased unemployment benefits. Because of this potential correlation problem, we construct variable of government transfers expenditures rate to GDP including both of unemployment subsidies and other social transfers, and labour tax rate is wage-based.[22] If some regressors are endogenous, then least-squares parameter estimates will suffer endogeneity bias, the net direction of which is not clear.[23]

A third issue is that the income tax system is progressive and income tax brackets are in general not indexed. During periods of high inflation many taxpayers tend to be pushed up to higher brackets merely because their nominal income increases. As a result, the average tax rate increases. When wage and price inflation are correlated, this effect might bias our estimates of the coefficient of the average tax rate. On the other hand, Alesina and Perotti (1997) find that excluding high-inflation years doesn't affect

[22] To cope with this possible endogeneity of these variables, we also estimated the specifications by replacing current values of labour tax rate and the ratio of transfers with their lagged values, but it shown that lagged estimators result in insignificant estimates. As Kiviet (1995) suggests, when a model for panel data includes lagged dependent explanatory variables, then the estimation procedures are asymptotically valid only when the number of observations in the time dimension gets large. However, our set of data has restricted sample size both of in the cross-section dimension and time dimension.

the coefficients of the tax variable. A fourth issue is that the positive relationship between the labour tax rate and unit labour costs might be influenced by the fact that two highly correlated variables appear at the denominator and the numerator in estimating equations (3.1) - (3.2). If variation in wages dominates the behaviour of unit labour costs and of the tax rate, one should expect that negative relation between these two will be picked up by our estimates. As Alesina and Perotti (1997) argue, if instead the estimated effect of the tax rate is still negative, one can feel confident that the relation being estimated is not caused by the way we constructed the tax variable.[24] Because of this potential correlation problem, we estimate the specifications in the dynamic model with lagged value of unit labour costs.

Supposing that integration has influenced on the effects of welfare policies, it is also necessary to determine the effects of welfare policies on employment for periods before integration and during process of integration; so we divide time series into two periods: 1975-1989, and 1990-2004. We first estimate the employment equations in levels by OLS and GLS using common intercepts over countries. Labour market institutions are important determinants of employment. As Daveri and Tabellini (2000) argue, institutions are hard to measure and they differ a lot across countries, but have changed only very slowly over time. Hence, the appropriate estimation method is by fixed effects i.e., with country-specific intercepts which can proxy for institutions. Thus, we estimate the employment equation in levels by OLS with country dummies as intercepts. Although, taking time differences also controls for unobserved time-invariant country fixed effects influencing the employment level. However, time-differencing can also aggravate regressor measurement error and result in inconsistent estimates.[25] Hsiao (1986) argues that if variables are indeed subject to measurement errors, exploiting panel data to control for the effects of unobserved individual characteristics using standard differenced estimators may result in even more biased estimates than simple OLS estimators using

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[23] Because the endogenous variable is correlated with the disturbance, the least squares estimators of the parameters of equations with endogenous variables on the right-hand side are inconsistent (see, e.g., Greene, 2000).

[24] We also estimated the specifications with rate of wage tax to GDP, but it shown no difference of results between constructed wage tax variables.

[25] We also estimated the specifications with all variables measured in first differences, but it shown that differenced estimators result in more biased estimates. Taking into account our data restrictions we didn't take longer differences.

cross-sectional data alone. We start by estimating the employment equations in levels. For the equations (3.1), to estimate constant-output labour price of employment we use ordinary least squares estimation with fixed effect (OLS) and generalized least squares estimation (GLS); and for the equations (3.2), to estimate scale effect labour price of employment we apply instrumental variables estimation (2SLS and G2SLS). In fact, when we adopt GLS estimation procedure, it allows for heteroscedasticity with cross section correlation.[26] Then, we proceed with the generalized method of moments (GMM) estimation, which provides a convenient framework for obtaining consistent and at least asymptotically efficient estimators for the dynamic panel data (Bond, 2002).[27] More specifically, the equations (3.1) were estimated using the first-differenced GMM method developed by Arellano and Bond (1991). This method estimates the model in first differences but uses the lagged variables in levels as instruments. The equations (3.2) were estimated using the first-differenced instrumental variables (IV) estimation applying FD2SLS for dynamic panel data with lagged employment rate and lagged value of unit labour costs.

5.2 Estimation results

Our results for specifications by estimating levels are presented in table 5.1. In column 1 and 2, is reported estimated constant-output labour price of employment for total period 1975-2004, and sub-periods 1975-1989 and 1990-2004. Furthermore, in column 3 and 4, is reported estimated scale effect labour price of employment. The results are independent on whether we estimate specifications by OLS with fixed effect or GLS. In all

[26] The heteroskedasticity means that the variances of the error terms are not constant across observations, but may arise with the value of observation. Thus, the estimators are not efficient. (See, e.g., Greene, 2000.) Anderson (1993) explains controlling for heteroskedasticity would require weighting observations which estimated elasticities are relatively imprecise. The logic of weighted least squares (WLS) is that observations with smaller variances receive a larger weight and therefore have greater influence in the estimates; similarly, observations with greater variances receive a smaller weight and therefore have smaller influence in the estimates (Greene 2000, p. 512).

[27] Comparing results of the different estimation method between Daveri and Tabellini (2000), which estimate unemployment equation both of in levels by OLS and in first difference by OLS and GLS, and Kiander et al. (2004) estimating unemployment equation by dynamic method (GMM), suggests that unemployment is positively correlated with labour tax rates in Europe. Their estimated coefficients differ somewhat because of different used set of countries, classification of countries, set of variables, and time period.

these regressions, the coefficients of the labour price have the expected sign, and they are statistically significant. The estimated value of the labour price is also relatively stable across different models. If both constant-output and scale-effect labour price of employment are consistently estimated then the difference between these two is an estimate of the scale effect. It is shown that the difference between constant-output and scale-effect labour price of employment don't become nearer an estimate of the scale effect over integration by estimating levels. However, coefficients of scale effects have the expected sign, and they are statistically significant. Our results for specifications by using dynamic panel data estimation are presented in table 5.2. In column 5, is reported estimated constant-output labour price of employment for total period and sub-periods, and in column 6, is reported estimated scale effect labour price of employment. Contrary to results in levels, by using GMM and FD2SLS methods, we find that the difference between constant-output and scale-effect labour price of employment become nearer an estimate of the scale effect over integration. Comparing first and last sub-period, we find that the negative impact of labour price on the employment have increased over integration with constant output, but have decreased allowing scale effects appear. This may imply that economic integration has caused on implicit structural reform of labour markets through the effects it has on union market power, i.e. moderating wage demands to improve employment.

The basic result is that scale effects strengthen the negative impact of labour tax rate on the employment. Comparing constant-output and scale effect estimations, the coefficients of labour tax rate in generally have unexpected sign without integration effect, and expected sign by using instruments. However, magnitude of the parameter is not stable across different models. There is for total and both sub-periods some coefficients of unexpected sign and/or statistically insignificant by using GMM and FD2SLS methods. Furthermore, by using both method in levels, there is for first sub-period some coefficients of unexpected sign, and they are statistically insignificant. This negative relationship between the labour tax rate and unit labour costs might be influenced by the fact that two highly correlated variables appear at the denominator and the numerator. If variation in wages dominates the behaviour of unit labour costs and of the tax rate, one should expect that negative relation between these two will be picked up by our estimates.

Table 5.1 Regression results for employment (in levels).

Method	Equation (3.1) OLS		Equation (3.1) GLS		Equation (3.2) 2SLS		Equation (3.2) G2SLS	
	[1]		[2]		[3]		[4]	
Period 1975 - 2004								
Constant	48.33	(26.0)	48.92	(21.1)	91.20	(53.9)	90.80	(49.6)
GDP					0.174	(5.65)	0.180	(6.00)
Labour tax - Nor	0.093	(0.65)	0.096	(0.96)	-0.033	(-1.77)	-0.051	(-2.02)
Labour tax - Con	0.178	(1.16)	0.471	(3.57)	-0.227	(-4.70)	-0.191	(-4.09)
Labour tax - Brit	1.875	(9.56)	1.240	(8.10)	-0.211	(-2.17)	-0.186	(-2.22)
Labour price	-0.623	(-37.7)	-0.645	(-38.0)	-0.135	(-7.15)	-0.139	(-7.41)
Transfers	-71.05	(-7.38)	-55.97	(-5.59)	-33.28	(-10.4)	-32.32	(-10.3)
Public consumption	162.1	(11.1)	142.1	(9.25)	59.34	(10.2)	58.17	(10.3)
Number of obs	450		450		450		450	
R^2 (within)	0.888		0.885		0.537		0.535	
F-test (p-value)	98.69	0.000			67.78	0.000		
CHI^2			2839	[6]			405.8	[7]
Sub-period 1975 - 1989								
Constant	56.41	(37.9)	55.99	(20.7)	78.82	(6.43)	74.59	(4.96)
GDP					0.486	(1.73)	0.562	(1.68)
Labour tax - Nor	0.314	(2.82)	0.141	(1.40)	0.186	(1.83)	0.028	(0.43)
Labour tax - Con	-0.274	(-2.33)	-0.176	(-1.46)	-0.250	(-3.20)	-0.104	(-1.08)
Labour tax - Brit	0.086	(0.32)	0.262	(1.29)	-0.094	(-0.46)	0.096	(0.43)
Labour price	-0.471	(-25.7)	-0.466	(-23.8)	-0.294	(-3.01)	-0.313	(-2.77)
Transfers	-40.03	(-3.74)	-37.85	(-3.32)	-19.09	(-1.42)	-18.79	(-1.21)
Public consumption	51.19	(3.35)	49.60	(3.05)	34.62	(2.57)	34.52	(2.11)
Number of obs	225		225		225		225	
R^2 (within)	0.891		0.889		0.473		0.432	
F-test (p-value)	265.6	0.000			31.85	0.000		
CHI^2			1358	[6]			121.7	[7]
Sub-period 1990 - 2004								
Constant	47.59	(9.86)	50.54	(10.7)	91.68	(35.8)	89.79	(31.3)
GDP					0.089	(2.02)	0.124	(2.63)
Labour tax - Nor	0.211	(0.95)	0.285	(2.32)	-0.336	(-4.71)	-0.216	(-3.61)
Labour tax - Con	0.372	(1.27)	0.532	(3.02)	-0.008	(-0.90)	-0.082	(-1.02)
Labour tax - Brit	2.769	(11.3)	1.615	(8.47)	-0.431	(-2.53)	-0.275	(-1.71)
Labour price	-0.677	(-20.7)	-0.706	(-19.9)	-0.048	(-1.52)	-0.070	(-2.03)
Transfers	-2.754	(-0.19)	19.18	(1.36)	-26.09	(-5.93)	-23.86	(-5.34)
Public consumption	50.21	(2.16)	18.75	(0.82)	46.10	(6.63)	43.39	(6.26)
Number of obs	225		225		225		225	
R^2 (within)	0.813		0.792		0.528		0.517	
F-test (p-value)	31.46	0.000			65.88	0.000		
CHI^2			660.9	[6]			181.0	[7]

Notes: (1) Dependent variable is employment rate. (2) Values of t-ratios are reported in parentheses. (3) Degrees of freedom are presented in square brackets. (4) Column [1]: estimated by OLS with fixed effect. (5) Column [2]: estimated by GLS allowing correlation across countries. (6) Column [3]: estimated by IV with fixed effect. (7) Column [4]: estimated by IV.

Table 5.2 Regression results for employment (dynamic panel data estimation).

Method	**Equation (3.1) GMM**		**Equation (3.2) FD2SLS**	
	[5]		**[6]**	
Period 1975 - 2004				
Employment	0.970	(110.)	0.417	(7.80)
GDP			0.197	(1.86)
Labour tax - Nor	0.019	(0.64)	-0.053	(-1.75)
Labour tax - Con	0.168	(5.01)	-0.024	(-0.57)
Labour tax - Brit	0.250	(6.15)	-0.056	(-0.50)
Labour price	-0.023	(-3.65)	-0.136	(-3.60)
Transfers	-6.659	(-3.48)	-4.093	(-1.75)
Public consumption	14.86	(4.86)	10.37	(2.66)
Number of obs	420		420	
R^2 (within)			0.675	
Sargan test (p-value)	510.8	(0.000)		
AR(1)		(0.105)		
AR(2)		(0.000)		
CHI^2 (p-value)			464.7	(0.000)
Sub-period 1975 - 1989				
Employment	0.811	(25.9)	0.397	(7.62)
GDP			0.198	(2.00)
Labour tax - Nor	-0.021	(-0.41)	-0.016	(-0.48)
Labour tax - Con	0.023	(0.43)	-0.060	(-1.06)
Labour tax - Brit	-0.272	(-2.25)	-0.224	(-2.73)
Labour price	-0.081	(-5.32)	-0.131	(-3.99)
Transfers	-22.68	(-6.04)	-5.548	(-1.30)
Public consumption	30.26	(5.75)	11.82	(2.07)
Number of obs	210		210	
R^2 (within)			0.826	
Sargan test (p-value)	147.9	(0.003)		
AR(1)		(0.000)		
AR(2)		(0.943)		
CHI^2 (p-value)			218.7	(0.000)
Sub-period 1990 - 2004				
Employment	0.947	(70.3)	0.497	(8.22)
GDP			0.067	(2.80)
Labour tax - Nor	0.027	(0.61)	-0.192	(-2.91)
Labour tax - Con	0.081	(1.40)	0.019	(0.28)
Labour tax - Brit	0.315	(5.26)	-0.037	(-0.18)
Labour price	-0.025	(-2.26)	-0.094	(-3.20)
Transfers	-4.942	(-1.71)	-6.313	(-1.79)
Public consumption	15.78	(3.36)	14.11	(2.42)
Number of obs	210		210	
R^2 (within)			0.693	
Sargan test (p-value)	314.5	(0.271)		
AR(1)		(0.000)		
AR(2)		(0.010)		
CHI^2 (p-value)			240.5	(0.000)

Notes: (1) Dependent variable is employment rate. (2) Values of t-ratios are reported in parentheses. (3) Column [5]: GMM refers to Arellano and Bond (1991) estimation method. (4) Column [2]: FD2SLS refers to first-differenced IV estimation method. (5) Sargan test for over-identifying restrictions. (6) Arellano-Bond test for first and second order autocorrelation of the differenced errors.

We note that, for total period by estimating levels allowing scale effects appear, the negative impact of labour tax rate on the employment is highest in countries, where trade unions play an important role but are decentralised. This finding supports the idea that the increase in labour taxation should be most harmful to employment in mid-centralised countries. However, by using FD2SLS method, the negative impact of labour tax rate on the employment is significant only in countries, where wage bargaining is centralised. On the contrary, Daveri and Tabellini (2000) suggest that unemployment is strongly and positively correlated with labour taxation in Europe, but no significant relationship in countries where bargaining is centralised or co-ordinated.[28]

Unexpected, scale effects weaken the negative impact of transfers on the employment. In generally, the coefficients of transfers are higher without integration effect than by using instruments. However, it is shown that the coefficients of the ratio of transfers have become greater over integration with scale effects. The coefficients of the ratio of transfers have expected sign, and they are statistical significant, except some coefficients for sub-periods. This may reflect the fact that international integration leads a structural change of social security system, i.e. increasing need for social insurance arrangements to ensure some income stabilization in the presence of cross-country shocks. While high benefits lead to high unemployment, they also lead to high participation because they make participation in the labour market more attractive i.e., participation being necessary to be eligible for the high benefits.

Furthermore, we note that scale effects weaken the positive impact of public consumption on the employment. The coefficient of the ratio of wage-based consumption is higher without integration effect than by using instruments. Although, it is shown that the coefficient of consumption have become greater over integration with scale effects, and decrease with constant output. The coefficients of the ratio of consumption have expected sign, and they are statistical significant; except, without integration effect, for last sub-period, this coefficient is by estimating levels statistically insignificant.

[28] We estimated the employment equations both of in levels and in first-differences also without labour costs which are not reported here. These findings support the idea that the increase in labour taxation should be less harmful to employment in centralised countries.

Overall, the results provide inconsistent evidence for the hypothesis that economic integration has contributed the distortion effects of welfare policies on the employment. While, the results provide some support that scale effects of international integration strengthen the negative impact of labour tax rate on the employment. Although, scale effects weaken the negative impact of transfers on the employment, negative impact is increased over integration. On the other hand, integration weakens the positive impact of public consumption on the employment.

6 CONCLUSIONS

The purpose of this study has been twofold to investigate how economic integration affects the impact of welfare policies on the employment by using theoretical model and empirical analysis. We consider the possibilities of financing public sector by general labour taxation in an economy which becomes more integrated in international product market. We build the theoretical framework for estimating employment and determining the impact of economic integration on the effects of welfare policies. In a general theoretical model of intra-industry trade, we analyzed how economic integration changes the impact of welfare policies on the employment. A model captures scale effects running from product markets to the effects of welfare policies on the employment. Increasing job mobility implies a change in the distortions arising from taxes and social security contributions levied on labour which affects the possibilities perceive in pursuing welfare policies, i.e. public consumption and social security expenses. We show that the effects of economic integration on the impact of welfare policies on employment depend definitely trade-off between intensified competition and better advantage of economies of scale. As increased trade competition crowds out better advantage of economies of scale, it becomes more costly to maintain welfare systems financed by labour taxation.

We structured the econometric model in which the aim is to determine whether European integration has changed the impact of welfare policies on the employment using at a panel of European countries from 1975 to 2004. Our finds provide some support that scale effects of international integration strengthen the negative impact of labour tax rate on the employment. However, scale effects weaken the negative impact of transfers on the employment; although, this negative impact increased over integration. Furthermore, we noted that integration weakens the positive impact of public consumption on the employment. These results provide inconsistent evidence for the hypothesis that that economic integration has contributed the distortion effects of welfare policies on the employment.

Finally, the study points up potentially interesting area for future research. One area for further research would be to extend the integration model to capture the role of international capital flows and, in general, factor substitutions possibilities, i.e. the substitution effects of economic integration to the impact of welfare policies on the employment. Another point that we left out of discussion is the redistributive welfare policies, in particular related to fiscal adjustments with redistributions and fiscal reforms. Our findings have important challenges for policy-making with economic integration implicating concerns the cost of the generous European welfare states.

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