

10th bi-annual Conference of the  
European Association for  
Comparative Economic Studies - EACES  
(Higher School of Economics, Moscow, August 28-30, 2008)

**Labour Management, corporate governance and productivity: a comparative perspective**

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**ABSTRACT**

*The paper intends to review cross-national differences in labour regulation with the main intent of discovering systematic linkages which contribute to explain different patterns of growth. The hypothesis to be tested is that labour regulation, as well as finance, may be arranged in different ways and that these various dimensions have to be taken into account in comparing national outcomes.*

*Two main issues have animated the debate on corporate governance: the role of ownership and control concentration, on one side, and, on the other side, investor protection and legal institutions. All the debate has been driven by an intense research devoted to examining the distinct or complementary role of these variables in creating firm value and in explaining cross country differentials. But this intense research has left partly unexplored how industrial relations, and thus how the conflict between workers, management and owners, interact with the productivity growth. Conversely, new research (van Ark et al. 2008) sheds some lights on the role of labour intensive sectors, such as services, in explaining different performances recorded in the full varieties of capitalism observed around the world.*

*The present study is a first attempt to examine consequences of labour regulation on productivity growth by taking the opportunity offered by two distinct databases. The first one, elaborated by Botero et al. (2004), is devoted to analyze the regulation of labour markets. The second one is the EU KLEMS Growth and Productivity Accounts which allows a detailed analysis of productivity for the European Union Countries and the US.*

*By merging statistical information made available by these databases, complemented with additional data gathered from EUROSTAT, we explore some potential impacts of labour regulation on productivity performances for a sample of countries of the European Economy for the 1995-2005.*

**Keywords:** labour management, comparative institutions, productivity

(PRELIMINARY VERSION)

## **Introduction**

The paper intends to review cross-national differences in labour regulation with the main intent of discovering systematic linkages that qualify distinct national patterns of productivity growth. The hypothesis which may be tested is that labour regulation, and not only finance, has to be taken into account in comparing national outcomes.

Some main issues have animated the debate on the creation of firm value and of GDP per capita growth: the role of ownership and control concentration, on one side, and, on the other side, investor protection and legal institutions (La Porta et al, 1998, 1999). All the debate has been driven by an intense research devoted to examining the distinct or complementary role of these variables in creating firm value and in explaining cross-country GDP growth differentials. But this intense research has left partly unexplored how industrial and labour relations affect these outcomes. Conversely, new research (van Ark et al. 2008) sheds some lights on the role of *labour intensive* sectors, such as services, in explaining different performances recorded in the full varieties of capitalism observed around the world. In our perspective, these findings appear as a premise for a further inquire on the role of different management rules in explaining successes or failures recorded in different countries.

As well known, two conflicting views of labour regulation have been usually advocated. The first one suggests that free labour markets are imperfect, since employment relationships are sources of rents and their private appropriation by employers justifies political interventions aimed at protecting employees and at limiting abuses and inefficiencies. For instance, the employment stability implemented through industry-level wage bargaining that prevents intra - industry wage differentials and generates low spreads by firm size, may limit expropriation of rents and lower separation rates. Labour protection, thorough collective bargaining and dismissal restrictions, thus may encourage firm specific human capital investments and stimulates growth. Other arrangements, such as legal institutions of codetermination, enhance the efficiency of the firm by permitting the flows of communications between management and workers (Freeman and Lazear, 1995).

The second view advocates the opposite thesis: labour interventions obstruct the free labour market functioning and generate worse labour market outcomes. Benefits of labour regulation are thus weighted by costs. Indeed a recent research of Botero et al. (2004) has considered various aspects of labour rules. The authors offer a key contribution and elaborate new synthetic measures of labour regulation: an index for

those norms that shape the individual employment relationship, a second one for collective rules that discipline unionized actions. Indeed, workers' position inside the firm is dependent on those norms that regulate hiring, working time and dismissal conditions (the Employment Laws Index), but also on employees' contractual strength, empowered by collective actions (the Collective Relations Laws Index)<sup>1</sup>.

The research of Botero et al. (2004) has tested the main impact on these labour regulation indexes on unemployment rates and on the size and employment of the unofficial economy, but has not deserved any space to productivity growth.

The present study is a first attempt at examining consequences of labour regulation on productivity growth by taking the opportunity offered by two distinct databases. The first one, mentioned above and elaborated by Botero et al., is devoted to analyze the regulation of labour markets in 85 countries and to obtain new insights from an overall picture where labour regulations, as well as ownership and investor protection examined in previous investigations by the same authors, are explicitly taken into account.

The second one is the EU KLEMS Growth and Productivity Accounts; it allows a detailed analysis of productivity for the European Countries and explicitly considers important issues such as average skills of labor force, capital services in information and communication technology and their diversities across sectors and countries.

By merging statistical information made available by these databases, complemented with additional data gathered from EUROSTAT, we explore potential impacts of labour regulation on productivity performances for a sample of countries of the European Economy for the period 1995-2005.

## **2. Data Description**

The empirical investigation of this study stems from different databases, EU KLEMS accounts, Botero et al. information, and EUROSTAT. The first step of our research has been their matching in order to achieve a disaggregated analysis at sector and country level.

Firstly, the availability of data and the need to maintain a coherent sector-country profile led us to selecting only 16 countries out of 27 European Union members and to

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<sup>1</sup> Finally, a third indicator that measures various social security provisions has been introduced in the study of Botero et al. (2004).

re-arrange the NACE rev.1 sections in 8 industries. Thus, we have taken into account the following economies: Austria, Belgium, Czech Republic, Denmark, Spain, Finland, France, Germany, Ireland, Italy, Netherlands, Portugal, Slovenia, Sweden and United Kingdom.

The selected sectors consist of 1) Primary Sector (agriculture, mining and quarrying), 2) Industry (manufacturing and energy sectors), 3) Constructions, 4) Wholesale and Retail Trade, 5) Hotels and Restaurants, 6) Transport, Storage and Communications, 7) Financial Intermediation, Real Estate and Business Services, 8) Community, Social and Personal Services.

We have drawn the key observations of the Multi Factor Productivity (MFP) growth, the dependent variable of our estimates shown in Section 3.3, from EU KLEMS database. This database is the outcome of a research project, financed by the European Commission, and aimed at analyzing productivity in the European Union at the industry level (Timmer et al., 2007) and it has been largely used in the study of van Ark et al. (2008). One of the main advantages offered by this database relies in the detailed breakdown of industries and service sectors and in decomposition of labour productivity; it is also worth noting that it has been computed by taking into account differences in labour quality (high skilled, medium-skilled and low-skilled) and a full variety in asset types (distinction between ICT capital and non-ICT capital services). The Multifactor productivity (MFP) growth has been calculated as the real growth of output minus a weighted growth of inputs. Therefore, this residual measure includes pure technological change, organizational improvements and effects from unmeasured output and inputs that could be captured by R&D expenses.

Other variables used in the descriptive analysis performed in Section 3, added value and contribution of inputs to growth, are also obtained by EU KLEMS database.

Some explanatory variables of MFP, in particular those describing unmeasured innovative input and the quantitative dimension of labour market flexibility, are gathered from EUROSTAT database. More precisely: sectoral R&D expenses, standardized to added value, have been used as a proxy of innovation, while the growth rate of employees with fixed-term contracts and with part-time contracts catch the dimension of labour market flexibility. Unfortunately, EUROSTAT data on R&D were not available for all 128 (16 countries time 8 sectors) sector-country observations.

We have also gathered from EUROSTAT other important data to implement our estimation strategy (Section 3.3). These variables allow us to measure the importance at a sectoral level of specific labour protection measures. These indicators are: i) the share of employees on total employment; ii) the share of employees with fixed term and part time contracts on total employment; iii) the growth rate of weekly hours worked; iv) the share of employees involved in industrial disputes.

Other explanatory variables of MFP are related to different aspects of regulation of labour markets. We have selected some indexes from the large dataset elaborated by Botero *et al.* (2004). More precisely, we have selected two distinct areas of labour regulation: employment laws and collective relations laws. As far as the employment laws are concerned, we have considered the existence and cost of alternative arrangements to standard employment contracts, such as part-time and fixed term contracts (extensive margin flexibility), and the cost of increasing the number of hours worked<sup>2</sup> (intensive margin flexibility).

Additionally, we have considered the protection of fixed-term contracts<sup>3</sup>. Further, from the collective relations laws we have selected two indicators: the labour union power, that measures the statutory protection and bargaining power of unions<sup>4</sup>.

Moreover, we have considered a collective disputes index, which refers to protection of workers during collective disputes<sup>5</sup>.

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<sup>2</sup> Botero *et al.* (2004) have computed the maximum number of “normal” hours of work per year in each country (excluding overtime, vacations, holidays, etc.). When the hours worked exceed this maximum, a firm uses overtime. The cost of increasing hours worked is computed as the ratio of the final total wage bill to the initial one.

<sup>3</sup> More precisely, the existence and cost of part-time contracts is computed as the average of 1) a dummy variable equals to one if fixed-term contracts are only allowed for fixed-term tasks and 2) the normalized maximum duration of fixed-term contracts. The part-time contracts regulation, instead, is computed as the average of 1) a dummy variable equals to one if part-time workers enjoy the mandatory benefits of full-time workers, 2) a dummy variable equals to one if terminating part-time workers is at least as costly as terminating full-time workers.

<sup>4</sup> It is computed as the average of the following seven dummy variables which equal to one: 1) if employees have the right to unionize, 2) if employees have the right to collective bargaining, 3) if employees have the legal duty to bargain with unions, 4) if collective contracts are extended to third parties by law, 5) if the law allows closed shops, 6) if workers, or unions, or both have a right to appoint members to the Boards of Directors, and 7) if workers’ councils are mandated by law.

<sup>5</sup> This indicator is computed as the average of the following eight dummy variables which equal to one: 1) if employer lockouts are illegal, 2) if workers have the right to industrial action, 3) if wildcat, political, and sympathy/solidarity/ secondary strikes are legal, 4) if there is no mandatory waiting period or notification requirement before strikes can occur, 5) if

This database, recently elaborated by Botero et al. (2004), takes into account criticisms about the effectiveness of considering formal rules (Autor, 2003; Krueger, 1991) and its controls for law enforcement.

The availability of different components of labour market regulation permits to take into account the “independent” effect of labour market policies, typically defined at country level. However, we intend to evaluate their role on productivity growth component, disaggregated at sector-country level. The approach here adopted for implementing our empirical analysis, is based on the assumption that the effect of particular policies on productivity is greater in industries where political interventions are more likely to be binding (see also OECD, 2007; and Bassanini and Venn, 2007). Thus, in our case we have assumed that the protection of part-time and fixed-term contracts is more binding in those sectors where, respectively, the shares of part-time and of fixed-term employees on total employees are higher. Along similar lines, we have considered that the higher is the increase of weekly hours worked in a given sector, the more important is the impact of the cost of increasing the number of hours worked.

As far as the labour union power and collective disputes indicators are concerned, we have weighted these indicators at sectoral level, by considering, respectively, the component of dependent employees out total employment, and the share of employees involved in collective disputes.

### **3. Labour regulation and productivity growth**

#### **3.1 Growth accounting in the European Economy: 1995-2005**

Growth in GDP per capita is one of the main objectives of economic policies and for its evaluation some preliminary assessments in growth accounting must be recalled. The preliminary step is the decomposition of the GDP growth into the two components: hours worked and labour productivity.

$$\textit{Growth Rate of GDP} = \textit{Hours Worked Growth} + \textit{Labor Productivity Growth}$$

The second step is the decomposition of labor productivity. Following the Solow approach, and by taking into account the heterogeneity of labor force, as well as the distinction between ICT and non ICT capital per hour, one can write the following:

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striking is legal even if there is a collective agreement in force, 6) if laws do not mandate conciliation procedures before a strike, 7) if third-party arbitration during a labour dispute is mandated by law, and 8) if it is illegal to fire or replace striking workers.

$$\text{Labor Productivity} = \text{Labor Composition} + \text{ICT capital per Hour} + \text{Non-ICT capital per hour} + \text{MFP}$$

where the last component, MFP, is the multifactor productivity, the share of output growth not attributable to inputs. MFP, as recalled by van Ak et al (2008, p. 32),

*“indicates the efficiency with which inputs are being used in the production process, and includes pure technical change, along with changes in returns to scale and in the mark up. Multifactor productivity, as a residual measure, also includes measurement errors and the effects from unmeasured outputs and inputs, such as research and other intangible investments, including organizational improvements”.*

The MFP growth is calculated as the real growth of output minus a weighted growth of inputs as follows:

$$\Delta \ln A_{ij} = \Delta \ln Y_{ijt} - \bar{v}_{ijt}^X \Delta \ln X_{ijt} - \bar{v}_{ijt}^K \Delta \ln K_{ijt} - \bar{v}_{ijt}^L \Delta \ln L_{ijt}$$

where  $\Delta \ln Y_{ijt}$ ,  $\Delta \ln X_{ijt}$ , denote, respectively, the change of output (Y) and of intermediate inputs (X) in country  $i$  and sector  $j$ , between  $t-1$  and  $t$ , while  $\bar{v}_{ijt}^L \Delta \ln L_{ijt}$  and  $\bar{v}_{ijt}^K \Delta \ln K_{ijt}$  are period averages, more precisely the two period average share of the input in the nominal value of output.

Recent studies (van Ark et al., 2008; Inklaar, 2008), by adopting these accounting rules and by using the new EU KLEMS database, have identified a number of crucial issues. Namely, these investigations have detected since 1995 a reverse trend in patterns of convergence of Europe and a slower productivity growth with respect to the United States. Additionally, they have found that a significant component of the productivity gap is attributable to the services sector.

Indeed, since the mid Nineties the 15 European Union countries recorded a decline of productivity growth from an average annual value of 2.4 percent, experienced during the previous years 1973-1995, to 1.5 during the period 1995-2006. The slowdown seems even more remarkable in comparison with the American experience, where a reverse trend of acceleration was observable: in the US the average annual labour productivity passed from a figure of 1.2 percent in the 1973-1995 years to 2.3 percent from 1995 to 2006 (van Ark et al.2008). The productivity gap is explained by two complementary reasons: the lower levels of investments in information and communication technology and the slower multifactor productivity growth.

**Table 1: Labor productivity in the Market economy: EU economies and the US, 1995-2004**

	<i>Labor Productivity</i>	<i>Labor composition</i>	<i>ICT cap. per hour</i>	<i>Non ICT capit. per hour</i>	<i>Multifactor productivity</i>
	<i>1=2+3+4+5</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
European Union	1.5	0.2	0.5	0.5	0.3
US	3.0	0.3	0.8	0.4	1.4
Standard Dev.	1.0	0.1	0.3	0.2	1.0

Source: EU KLEMS data base, van Ark et al. (2008, Table 4)

As one can see from Table 1, nor a worsening effect in skills of labor force (component 2) or a capital deepening decline effect (component 4) may be considered as responsible for the slowdown of the European productivity growth; on the contrary, the major contributions to the disappointing performances of the European countries are attributable to a lower growth of ICT investments and to that mysterious component called multifactor productivity.

At a sectoral level of analysis, the service sector, which now represents nearly half of the market economy, explains a large portion of the productivity gap between Europe and the US.

**Table 2: Major sector contribution to Average Annual Labour productivity growth: market economy, 1995-2004**

	Market economy	ICT production	Goods production	Market services	Reallocation
European Union	1.5	0.5	0.8	0.5	-0.2
US	3.0	0.9	0.7	1.8	-0.3

Source: EU KLEMS data base, van Ark et al. (2008, Table 5)

But is the European scenario homogenous or there are large variations between countries? The following table offers some answers. It shows the first results in growth accounting: i) the growth rate of GDP and its decomposition in hours and productivity growth; ii) and the decomposition of productivity growth into its main contributions.

As one can see from Table 3, the slow productivity growth of the Old Member States of the European Union, below the 2 percent, is a wide spread phenomenon, with some leading exceptions, two in the Nordic Continental Europe, Finland and Sweden, and two in the Anglo Saxon Economies, Ireland and the UK.

**Table 3: Contributions to Growth of Real Added Value: European Economy, 1995-2005**

	Growth rate of Value Added (1=2+3)	Output contribution from		Labour productivity contributions from				LP contributions from knowledge economy
		Hours Worked (2)	Labour Productivity (3= 4+5+6+7)	Labour Composition (4)	ICT capital per Hour (5)	Non-ICT capital per our (6)	MFP (7)	
13 Old Member States								
Austria	2.19	0.45	1.74	0.25	0.47	0.42	0.60	1.31
Belgium	2.04	0.58	1.46	0.21	0.79	0.72	-0.26	0.74
Denmark	1.81	0.52	1.28	0.23	0.84	0.37	-0.17	0.90
Finland	3.42	0.79	2.63	0.22	0.52	0.46	1.43	2.17
France	2.09	0.24	1.84	0.37	0.30	0.57	0.60	1.27
Germany	1.32	-0.23	1.55	0.01	0.40	0.69	0.46	0.86
Ireland	7.26	1.94	5.31	0.55	0.46	3.47	0.82	1.84
Italy	1.18	0.55	0.64	0.17	0.25	0.68	-0.46	-0.04
Netherlands	2.51	0.64	1.87	0.35	0.55	0.51	0.45	1.36
Portugal	2.18	0.45	1.72	0.22	0.73	1.57	-0.80	0.15
Spain	3.44	1.96	1.48	0.43	0.42	1.42	-0.78	0.07
Sweden	2.87	0.19	2.67	0.27	0.44	1.04	0.91	1.62
United Kingdom	2.72	0.57	2.15	0.44	0.77	0.62	0.31	1.52
UE13	2.69	0.67	2.03	0.29	0.54	0.96	0.24	1.06
UE15*	2.03	0.50	1.53	0.19	0.45	0.69	0.21	0.84
3 New Member States								
Czech Republic	2.09	-0.33	2.41	0.28	0.62	1.42	0.10	1.00
Hungary	4.21	0.27	3.92	0.68	0.27	0.30	2.67	3.62
Slovenia	3.88	-0.27	4.13	0.71	0.45	2.14	0.82	1.99

Source: our elaborations on EU KLEMS data base; \* the UE15 average is calculated by van Ark et al. (2008) by using PPP standardization

The relative contributions to labour productivity are shown in Table 4:

**Table 4: Contributions to labour productivity growth in European Economy, 1995-2005**

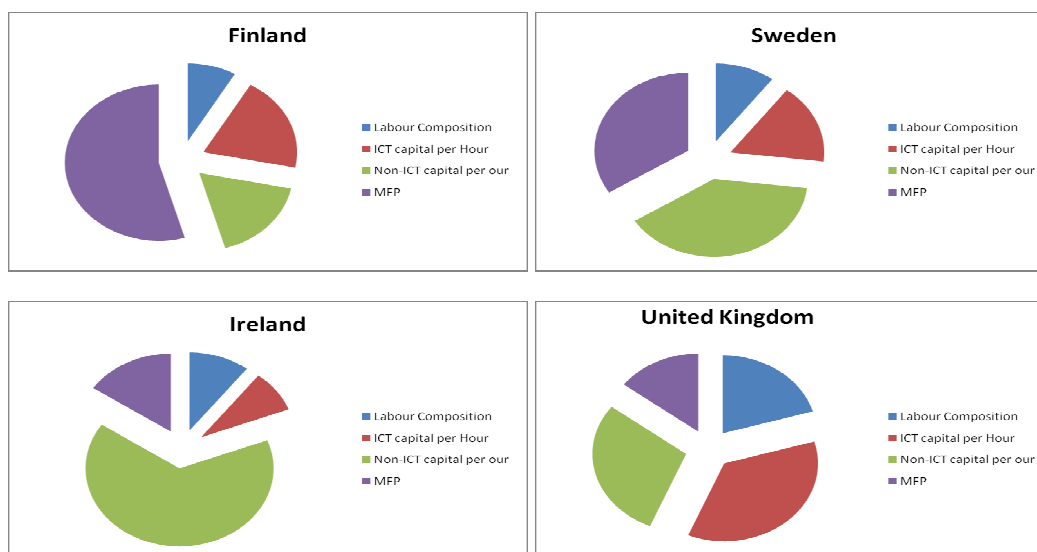
	Labour Composition	ICT capital per Hour	Non-ICT capital per our	MFP
13 Old Member States				
Austria	14.44	26.80	24.24	34.51
Belgium	14.27	54.57	49.28	-18.12
Denmark	18.29	66.03	29.13	-13.45
Finland	8.38	19.83	17.35	54.45
France	20.17	16.33	30.88	32.62
Germany	0.36	25.82	44.33	29.49
Ireland	10.44	8.68	65.35	15.52
Italy	26.26	39.70	106.42	-72.37
Netherlands	18.94	29.61	27.40	24.04
Portugal	12.82	42.64	91.02	-46.47
Spain	29.25	28.00	95.43	-52.68
Sweden	10.27	16.58	39.14	34.02
United Kingdom	20.45	35.84	29.07	14.64
EU13	14.18	26.41	47.60	11.81
EU15	12.12	29.52	44.80	13.56
ST DEV EU13	7.71	16.11	29.99	39.65

Source: our elaborations on EU KLEMS database

Our findings clearly show that a big amount of large variations in growth between European economies is caused by deep differentials in multifactor productivity growth, as recorded by standard deviations between EU13 countries. Further, for the

same group of the four successful cases, the differentials in contribution to growth are impressive. By focussing on these four countries and by considering the importance of the different components, one gets Figure 1:

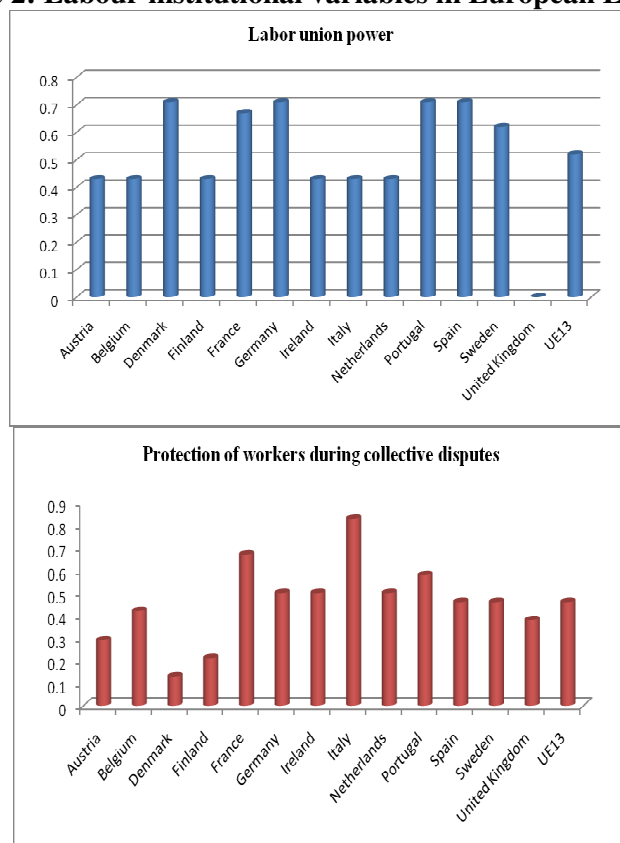
**Figure 1: Contributions to labour productivity growth, 1995-2005**



Source: our elaborations on EU KLEMS database

The four successful cases tell different stories. In Ireland, a significant increase in substitution of capital for labour and processes of deepening in (non ICT) capital intensity are recorded. This path is quite similar to the catching up process that, on average, European countries experienced from the mid Seventies to the end of Eighties. For the other Anglo Saxon country, the UK, the contributions of knowledge economy (high quality of labour workforce and capital ICT services) are important. Finally, the Nordic countries, and particularly Finland, are the only ones in the European scenario that exhibit a decisive incidence of multifactor productivity growth. In our perspective, one must ask whether better labour institutions, by improving the functioning of labour markets, end by favouring productivity growth. From the collective relations laws we have selected, as mentioned in Section 2, two indicators: the labour union power and a collective disputes index, which refers to protection of workers during collective conflicts. The results as shown in Figure 2.

**Figure 2: Labour institutional variables in European Economy**



Source: our elaborations on Botero et al. (2004) database

As one can see, in Europe, the polarization between opposite situations clearly reflects some well-known differences between distinct regimes of corporate governance, which a huge literature has compared in many surveys. Our findings confirm that European capitalism is quite heterogeneous in terms of labour regulation, as well in terms of contributions to labour productivity growth. We will try to estimate the existence of some systematic linkages.

But what about sectoral differentials in MFP?

### 3.2 MFP: national and sectoral differentials

Multifactor productivity growth measures the efficiency improvements in the use of inputs, or in other terms, it measures the reduction in input costs to produce a given amount of output. This measure reflects disembodied technical changes, i.e. those changes not embodied in the quality of inputs.

As well clarified in Inklaar et al. (2008, p. 148-149), many factors may cause such changes. In addition to technical innovation, one has to mention i) the effects coming

from organizational and institutional changes, ii) the shifts in returns to scale, iii) any other deviations from competitive assumptions of equalities between prices and marginal costs; iv) all the effects due to the existence of unmeasured inputs.

Indeed, MFP is obtained as a residual measure, and research and development and other intangible assets are the more prominent examples for statistical errors in computing inputs.

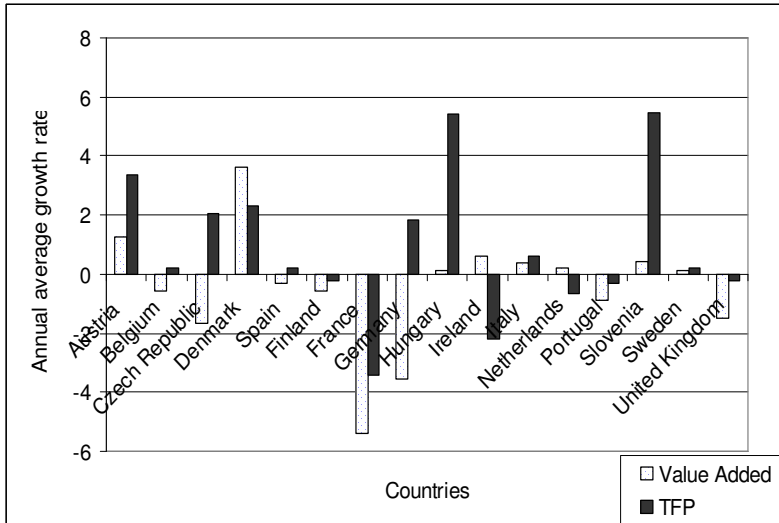
All these effects may have different impacts at country and sectoral level. A first glance is offered by Figure 3.

The first result obtained is that the main difference that arises in the EU-US comparison and attributable to multifactor productivity in van Ark et al. (2008), is confirmed in the intra European context.

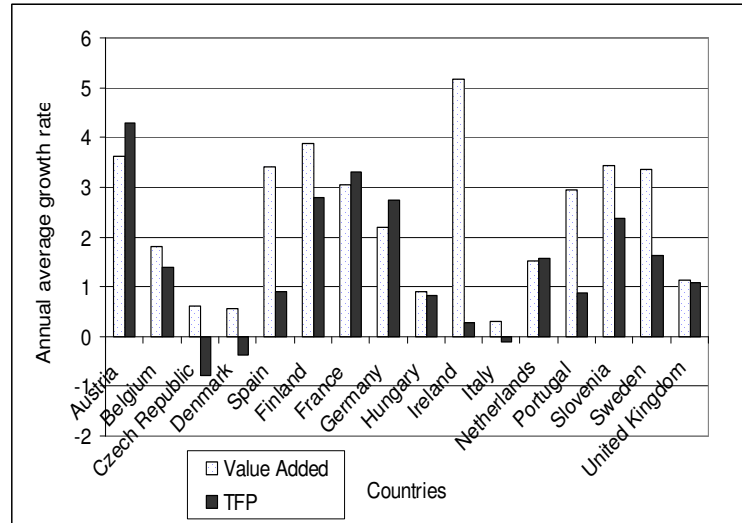
Moreover, important differentials arise at sectoral level. As Figure 3 and 4 show, in the industrial sector the MFP component plays a significant impact in nearly all the countries, a result which can be attributable, among others, to the increasing importance of unmeasured inputs (R&D expenses).

**FIGURE 3: Contributions of MFP to growth of sectoral added value  
European Economy 1995-2005**

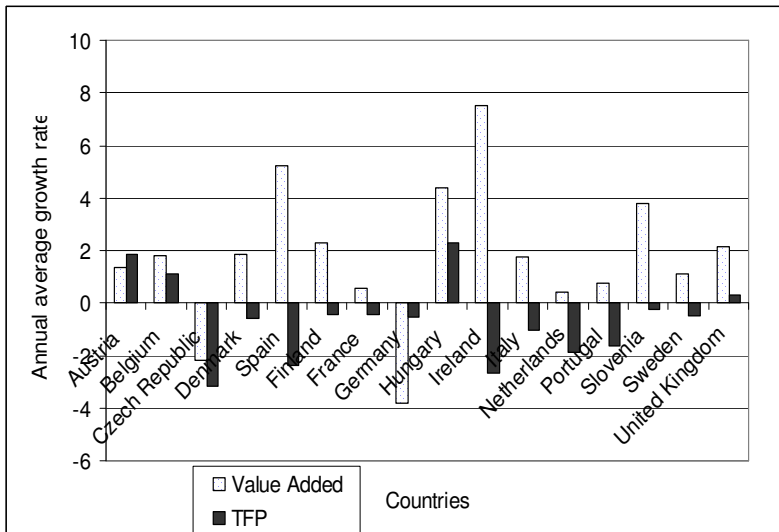
Primary Sectors (Agriculture and Mining)



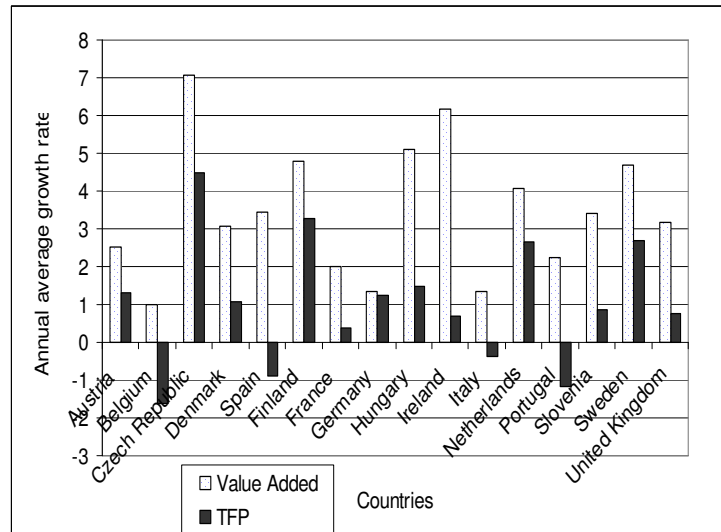
Industry (Manufacturing and Energy sectors)



Constructions

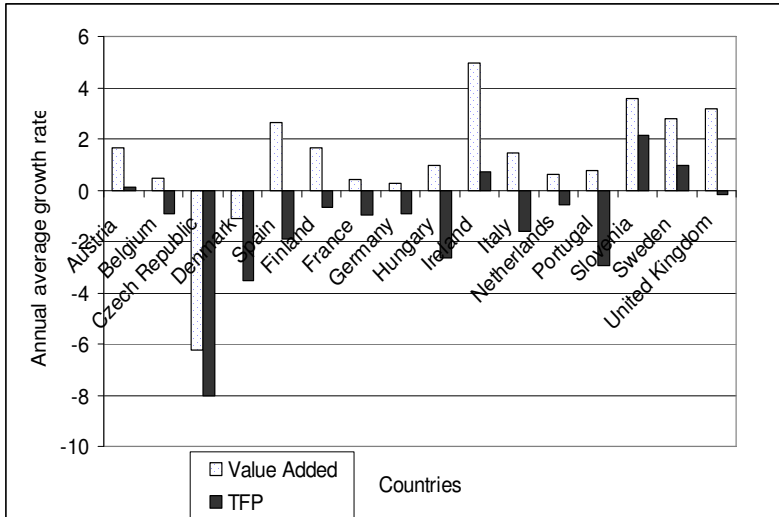


Wholesale and Retail trade

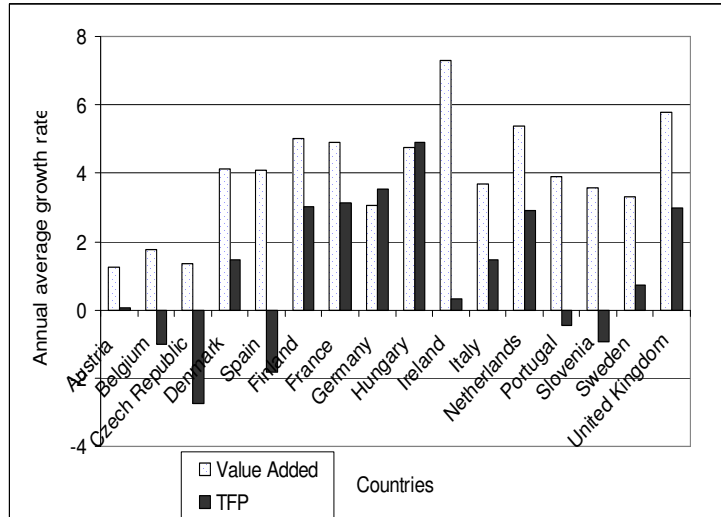


**FIGURE 3: Contributions of MFP to growth of sectoral added value  
European Economy 1995-2005 (continued)**

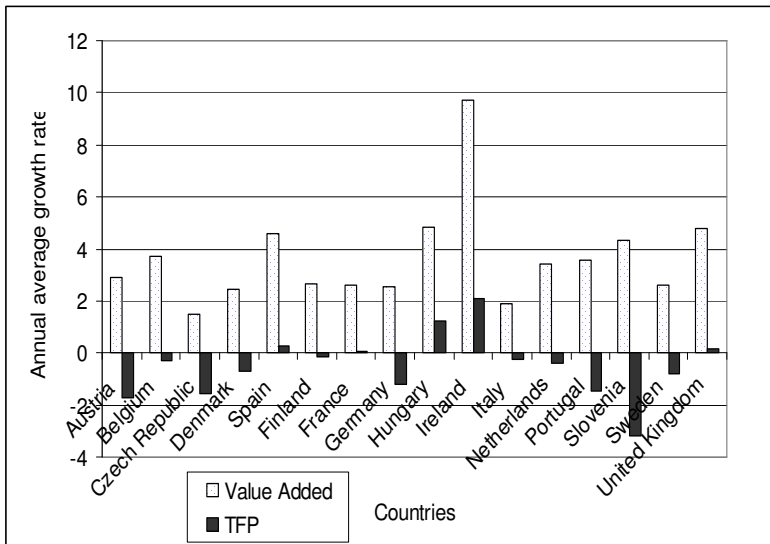
Hotels and Restaurants



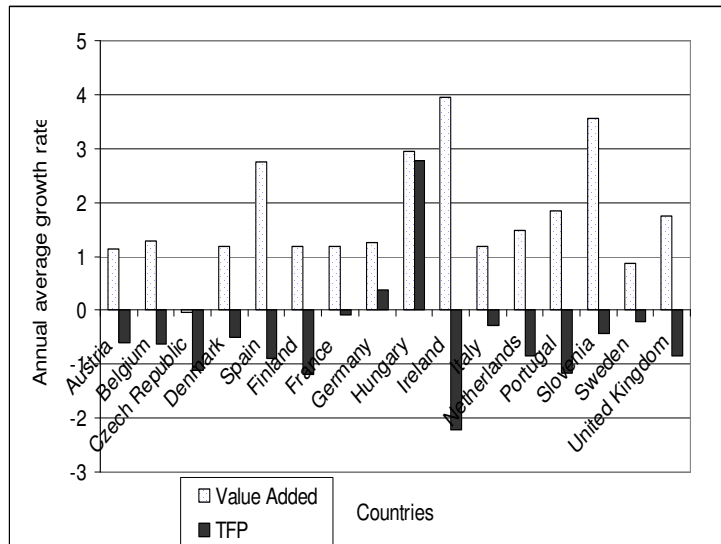
Transport, Storage and Communications



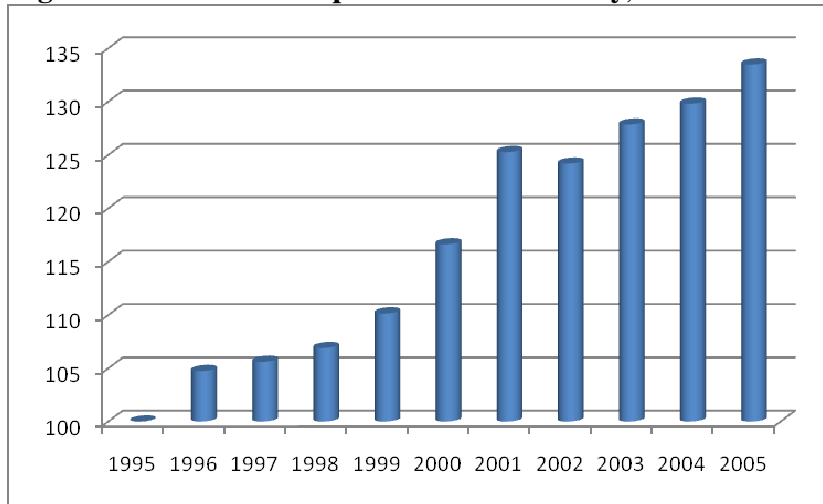
Financial Intermediation, Real Estate and Business Services



Community Social and Personal Services



**Figure 4: Unmeasured inputs: R&D in Industry, 1995=100**

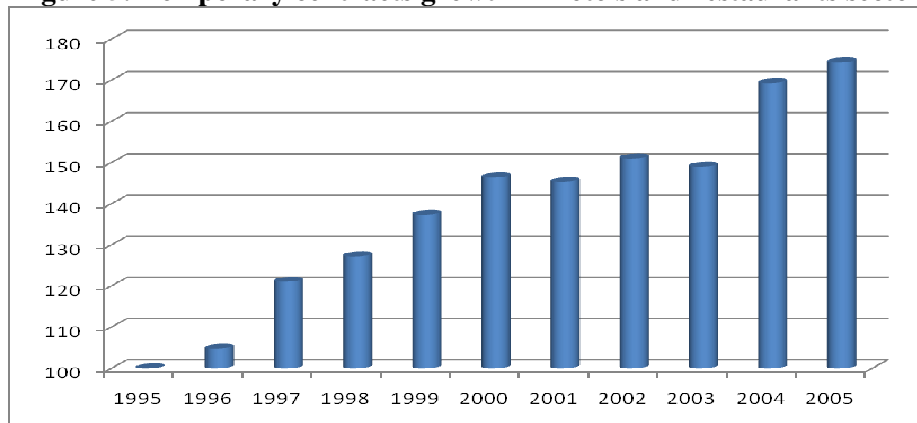


Source: our elaborations on EUROSTAT

A second finding concerns the positive contribution of MFP to productivity growth in wholesale and retail sectors. The wide diffusion of chain stores and the inventory systems applied to the trade sector are prominent examples of returns to scale, as already observed for the American economy (Foster et al., 2006 ).

The performances recorded in other services, such as hotels and restaurants or financial sectors, are more disappointing. In these cases some failures driven by the increasing utilisation of fixed terms contracts, could be conceived as some of those organizational and institutional changes behind the MFP patterns.

**Figure 5: Temporary contracts growth in hotels and restaurants sector**



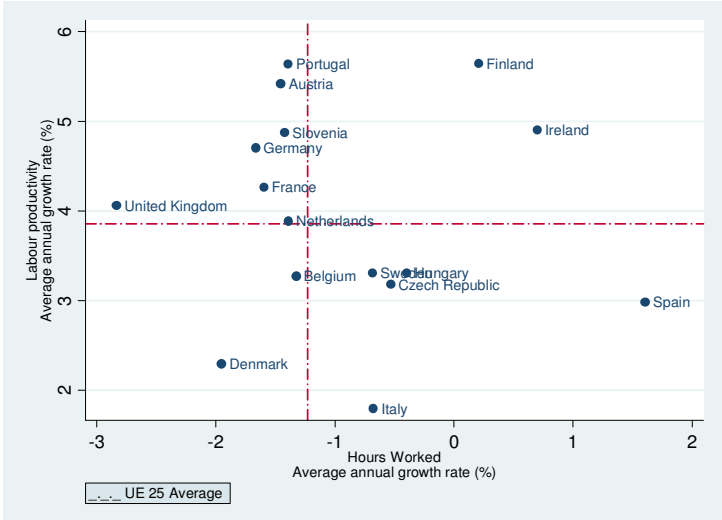
Source: our elaborations on EUROSTAT

One related explanation is the existence of a negative correlation between the growth rates of labour utilisation and labour productivity, as highlighted in OECD (2007). For instance the higher growth of hours worked, as well as the raising rates of temporary

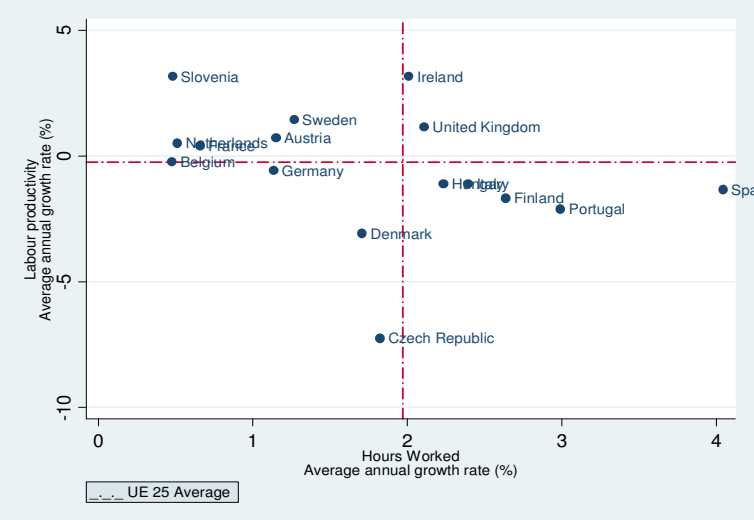
employees, as recorded in Spain, could explain the bad performances experienced in this country. Further, a comparison by sectors, confirms the impact of higher labour utilisation, and of increases of working hours, in terms of low productivity performances (See Appendix Figure A1). By considering the two polar cases mentioned above, one has that the successful sector, manufacturing and energy, where MFP has recorded better performances, has exhibited a slower growth in labour utilisation, with respect to the unsuccessful case (hotels and restaurants).

**Figure 6: Labour productivity and hours worked by sectors, Average annual growth rate 1995-2005**

Manufacturing and energy sectors



Hotels and Restaurants



These results call for an econometric analysis, where these preliminary intuitions are tested at country and sectoral level and where the extensive margin utilisation (fixed term contracts) and the intensive margin (hours worked), are both considered with additional determinants of productivity.

### **3.3 Econometric results**

The present section is devoted to estimate the main determinants of MFP growth over the period 1995-2005, and to explain sectoral-countries differentials. As briefly recalled before, in addition to technical innovation, other explanatory variables must to be taken into account: organizational and institutional changes, returns to scale, deviations from competitive assumptions, unmeasured inputs.

The focus of the following investigation is distinguishing, among these variables, three different sets which can capture the role of some of these driving forces.

The first group refers to organizational variables in labour relationship measured by the growth rates of fixed term contracts, of part time contracts, and of costs of increasing hours worked (extensive and intensive margin labour utilisation). The second group concerns institutional variables related to labour protection of these arrangements and to collective relations, such as union power and protection of workers during collective disputes (see Section 2 for a full description of this database). The third determinant of MFP, captured by a single explanatory variable, refers to one of the main components of unmeasured inputs, i.e. R& expenses.

The hypotheses which can be tested are that employment stability, implemented through long term employment relationships, and therefore a limited use of temporary contracts or a higher protection of these arrangements, may favour an innovative environment and growth. A parallel dimension of industrial relations climate concerns bargaining governability, as measured by our collective relation indexes. It can be assumed that in coordinate market economies, extensive relational and long terms contracts entail more reliance on collaborative relationship and on the exchange of private information. In sum, labour regulation may favour and amplify the potentialities and fruitful effects of investments in intangibles assets and of R&D efforts.

In order to analyze the impact on multi-factor productivity of new labor organizational arrangements (fixed-term and part-time contracts), of labor protection laws and other unmeasured innovative inputs (captured by R&D), we have performed a panel data econometric analysis. More precisely we have estimated the following model:

$$MFP_{zt} = f(FTC_{zt}, PTC_{zt}, R \& D_{zt}, PFTC_{zt}, PPTC_{zt}, COVER_{zt}, UP_{zt}, PDISP_{zt})$$

Where z= 16 countries; X= 8 sectors; 128 sector-country units

t = 1995,...2005

MFP is the growth rate of multifactor productivity

FTC is the growth rate of fixed-term contracts

PTC is the growth rate of part-time contracts respect to 1995

R&D are the normalized expenses on research and development to sectoral GDP

PFTC is the measure of protection of fixed-term contracts (Botero et al., 2004) weighted by the share of fixed-term contracts out total employees in each sector-country

PPTC is the measure of protection of part-time contracts (Botero et al., 2004) weighted by the share of part-time contracts out total employees in each sector-country

COVER is the measure of cost of overtime work (Botero et al., 2004) weighted by the growth rate of annual average of the actual weekly hours worked in each sector-country

UP is a measure of Union Power (Botero et al., 2004) weighted by the share of employees out total employment in each sector-country

PDISP is the measure of protection of workers during collective disputes (Botero et al., 2004) weighted by the share of workers involved in industrial disputes in each sector-country

As discussed in Section 2, it is worth noting that by applying the above mentioned interactions, we have transformed country-variables, representing labor regulation for each economy, into sectoral-country measures of labour protection, differently affecting the MFP across sectors and countries. In other terms, the presence in each sector of different typologies of protected employees, makes national norms less or more binding at sectoral level.

As far as the econometric specification is concerned, it must be remarked that specific tests stressed both hetero-skedasticity across panels and autocorrelation within panels. For that reason we fitted panel-data linear model by using the feasible generalized least squares<sup>6</sup>.

The results obtained are shown in Table 5.

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<sup>6</sup> All estimations are performed by means of STATA 10. Routines adopted, preliminary and post-estimation tests are available upon request.

**Table 5: Labour market protection and MFP at sector-countries level  
(panel data fitted with feasible generalised least squares)**

Obs	924	924	924	924	924
Groups	84	84	84	84	84
<b>Dependent Variable: TFP (growth rate)</b>					
<b>Explanatory variables</b>					
<b>Organizational variables</b>					
Fixed Term contracts (FTC)	-0.008*** (0.004)	-0.021*** (0.005)	-0.021*** (0.005)	-0.023*** (0.005)	-0.026*** (0.005)
Part-Time contracts (PTC)	0,002 (0.005)	-0.004 (0.005)	-0.005 (0.005)	-0.003 (0.005)	-0.005 (0.006)
Cost of Overtime * growth of weekly hours worked (COVER)			-0,014 (0,019)	-0,018 (0,019)	-0,025 (0,022)
<b>Institutional variables</b>					
Protection of Fixed term Contracts (FTC * FTC share)		0.525*** (0,098)	0.488*** (0,102)	0.516*** (0,108)	0.614*** (0,103)
Protection pf part time workers (PTC * PTC share)		0.108* (0,058)	0.103* (0,058)	0.092 (0,058)	0.142* (0,077)
Union Power * %employees out total employment (UP)				0.281*** (0,129)	-0.125 (0,129)
Collective disputes* % employees involved in disputes (PDISP)					0.000 (0,004)
<b>Unmeasured inputs</b>					
R&D	1.501*** (0.342)	1.588*** (0.339)	1.599*** (0.342)	1.590*** (0.339)	1.313*** (0.335)
<b>Year dummies</b>	Yes	Yes	Yes	Yes	Yes
<b>Sector-country dummies</b>	Yes	Yes	Yes	Yes	Yes
<b>Constant</b>	87.917*** (4.398)	67.600*** (5.324)	64.321*** (6.104)	51,115*** (10.144)	99.379*** (2.128)
Wald chi2	821,8	984,64	971,98	1158,9	921,21
Prob > chi2	0.00	0.00	0.00	0.00	0.00
<i>Standard errors in parentheses</i>					
*** significant at 1% level; ** significant at 5% level; *significant at 10% level					

The results obtained confirm not only the positive strategical role of R&D, but also the negative impact of fixed term arrangements which can discourage training and acquisitions of firm specific skills. On the other hand, labour provisions for protection of temporary workers may offset these negative effects and reverse the slow pattern of accumulation of job related training due to short term positions. By contrast, no

significant effects are obtained for part-time occupations, while their protection resulted only partially having a positive and significant effect.

The role of regulation of collective relations seems more ambiguous. The impact of defensive clauses in confrontational environments, as measured by protection of workers during collective disputes, is not significant, while union power, an index that sums up various institutional devices, play some significant and positive role in encouraging pro-productivity practices, but only in some specifications. A result which calls for a deeper inquiry and for a better distinction between payoffs rights (wage bargaining) and decision rights (codetermination and workers councils) and of their impacts in productivity performances.

#### **4. Conclusions**

Many cross-national diversities, and thus *varieties of capitalism*, are still prevailing, notwithstanding the indisputable converging trends in a 'market' direction. How deep are their differentials in terms of growth and are the so called "market reliant countries" more successful in terms of productivity performances?

Although more research is needed to explore this issue, some preliminary findings have been obtained. First of all, there is a large variation in labour productivity and its components across European economies. A major portion of these differentials are found in multifactor productivity, while labour composition has played a minor role (as shown in Table 4).

Between-sector gaps are also crucial and the worst performances of multifactor productivity are recorded in some service sectors (see Figure 3). As recalled by van Ark (2008), it was originally pointed out by Baumol, who assumed the "cost disease of the service sector", a sector which is inherently labor-intensive. But are the cost and the magnitude of this disease uniform all over the countries? Which labour institutions are better performing?

Our empirical estimates offer some preliminary answers: shorter term jobs and lower employment tenures may discourage investing in skills, while labour regulation and wage setting rules, which sustain long term relationship, may present some advantages and could outperform short term oriented arrangements on the grounds of collaborative relations and bargaining governability (see Table 5).

These preliminary findings, which appear as a confirmation of other studies, such as Freeman, 2007, call for additional support, but point to incentives for further research.

It should be fruitfully enriched by a more dimensional perspective. After all, the four better performers of our sample (Ireland, UK, Finland and Sweden) belong to different varieties of capitalism, featuring not the same market-reliant arrangements. Indeed, cross-national differences in both labour and investor and regulation should be taken into account with the main intent of discovering systematic linkages that qualify distinct patterns of corporate governance and their impact on growth. The present study is only a first step in this direction.

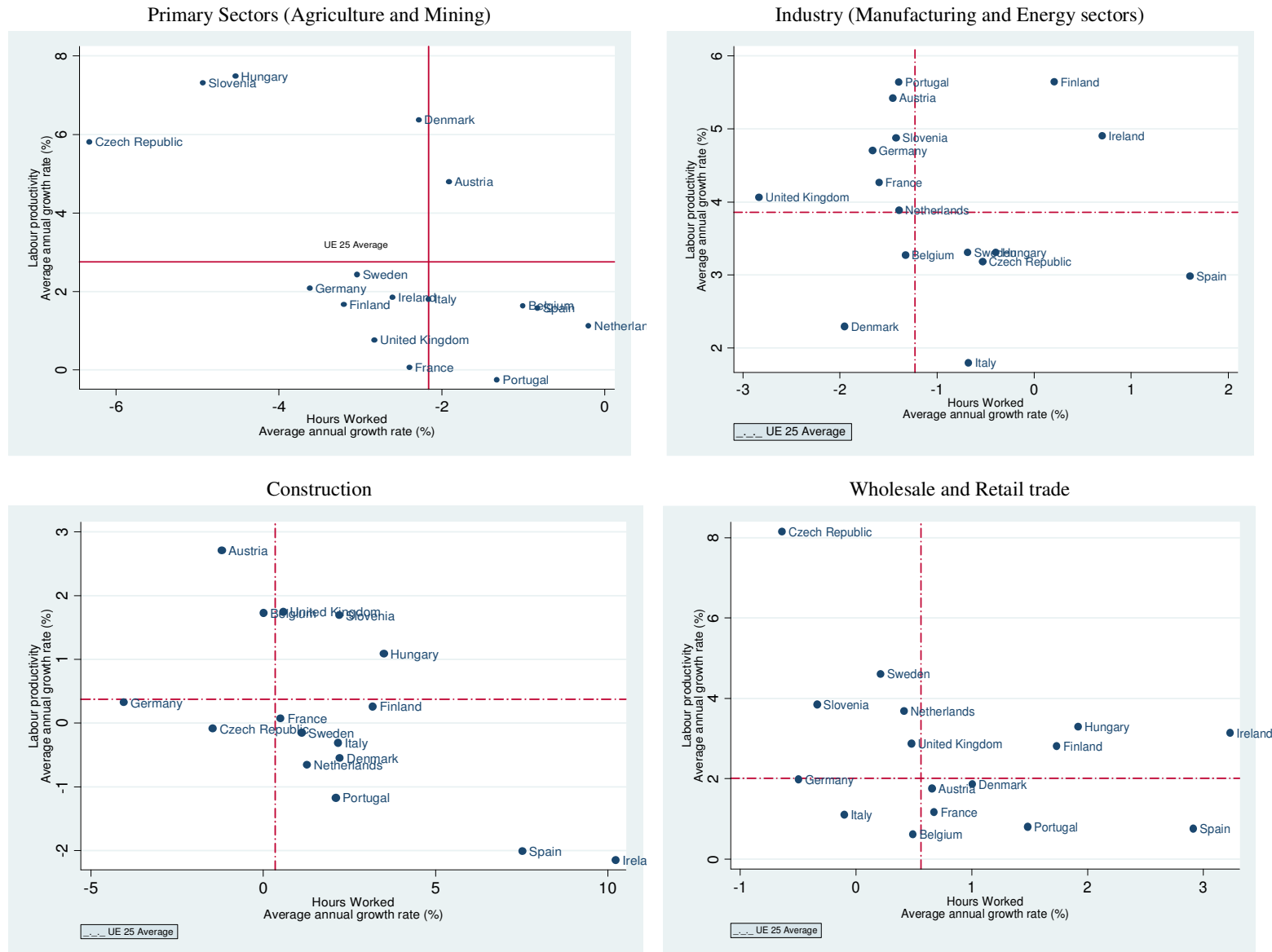
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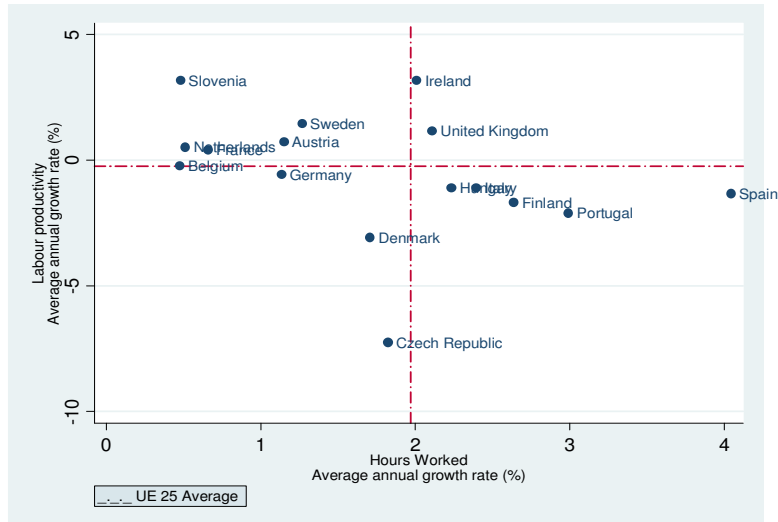
## APPENDIX

**FIGURE A.1: Labour productivity (hourly) and hours worked by sectors (Average annual growth rate 1995-2005)**

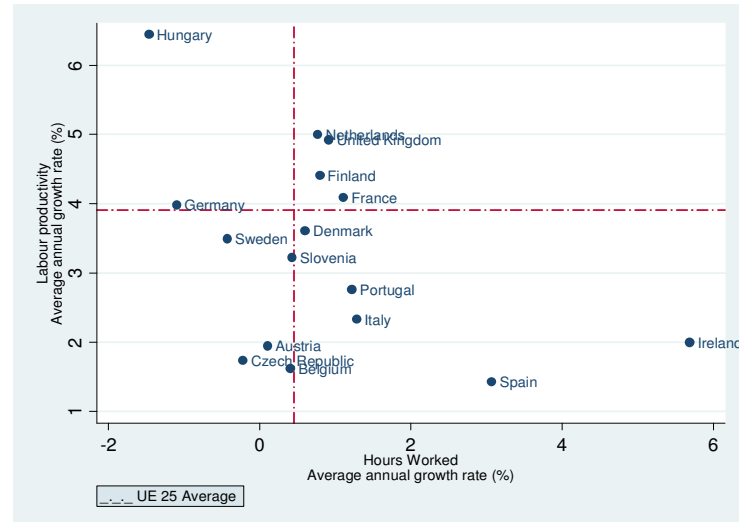


**FIGURE A.1: Labour productivity (hourly) and hours worked by sectors (Average annual growth rate 1995-2005) (continued)**

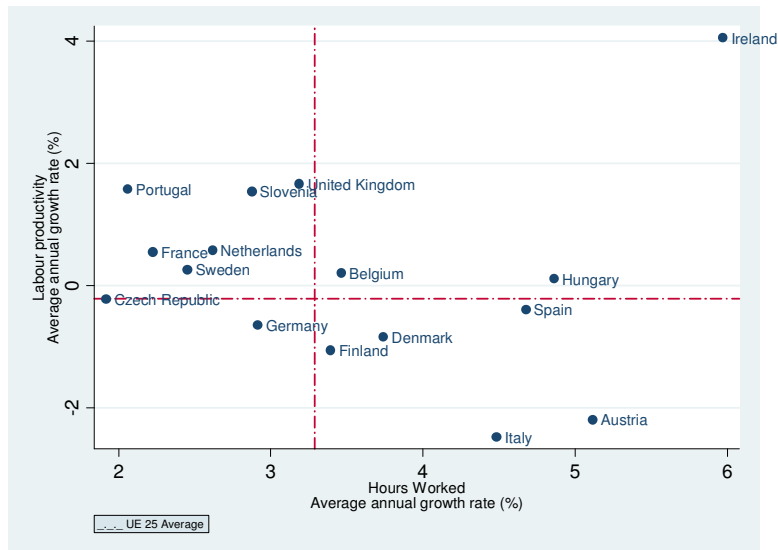
Hotels and Restaurants



Transport, Storage and Communications



Financial Intermediation, Real Estate and Business Services



Community Social and Personal Services

