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(**) The opinion and analyses herein are the responsibility of the author and, therefore, do not necessarily coincide with those of the Banco de España.

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Abstract

This paper estimates the steady state mark-ups of 23 branches of activity in seven developed countries (USA, Japan, Germany, France, UK, Italy and Spain). The empirical methodology departs from the Hall (1988) seminal approach and incorporates the possibility of non-competitive labour markets. Besides, it is used a time varying parameter (TVP) estimation technique in order to compute the evolution of steady state mark-ups. Looking at the constant parameter estimations, it emerges a clear dichotomy between two groups of countries: USA and UK, with the lowest mark-ups, and Japan and Germany, in the other side of the spectrum; Italy and Spain keep an intermediate position. With respect to the bargaining power of trade unions, the dichotomy between Anglo-Saxon countries, where it is almost inexistent, and Central European countries is even more marked. Allowing these parameters to evolve in time, the results are also interesting: there have been increases in mark-ups in Italy, France and Germany; on the contrary, in USA, Japan, UK and Spain they have diminished. In the case of the bargaining power of the trade unions, all these countries have shown reductions since 1980, with the only exception of Germany. Finally, the paper finds a quite robust inverse relation between productivity growth, mark-ups and the bargaining power of trade unions, although the quantitative effects are moderated.

Keywords: Mark-ups, labour market, productivity.

JEL-Classification: E23, J51, L10.

1 Introduction

The degree of competition existing in the markets is a crucial aspect for the characterization of any economy. As it is well known, perfect competition achieves an efficient allocation of resources (in the absence of market failures). Thus, it can be shown that, in general, departures from this paradigm (monopoly, oligopoly, monopolistic competition, etc.) tend to generate an equilibrium price higher than that of perfect competition, reducing the quantity exchanged in the market and inducing, therefore, a loss in the society welfare. This happens because perfect competition forces prices of goods and services to be equal to its marginal cost of production, as long as firms take the market price as given and their actions do not have any influence on it, avoiding strategic interactions among firms.

However, the departure from perfect competition not only modifies the levels of prices and quantities exchanged in the equilibrium, it can also influence the response of inflation and growth following a shock. Nowadays, most of the dynamic general equilibrium models incorporate any kind of nominal rigidity in order to capture a short-term relation between output and prices, which has been shown to be very robust in the empirical analysis. Usually, these nominal rigidities imply constrains on the part of the companies to modify their selling prices; but, if prices can be determined by firms, the paradigm of perfect competition can not be used in this class of models. However, it has been shown that the size of the deviation from perfect competition has an impact on the inflationary effects of certain shocks and their persistence [Andrés et al. (2008)]. Besides, in recent years there have appeared some theoretical developments, validated by the empirical evidence, showing that productivity growth in developed economies is positively linked to the degree of competition in the product markets. That is, economies that are further from perfect competition tend to have smaller increases of productivity than those that are closer. Three are the mechanisms explaining this result: a) effects on incumbents firms; b) effects on the sectoral composition of firms, and c) innovations of product and process, although this last explanation is more controversial.

The measurement of the competition degree in a market is a complicated task. The literature has proposed different indicators and procedures, which have advantages and disadvantages. Historically, the most popular ones were those that measured the degree of concentration of the production in a relevant market. The idea is that a small number of competitors and/or great dispersion of production suggest a certain lack of competition. This was the approach followed by Núñez and Pérez (2001) for Spain. The disadvantages of these indicators are the data requirements and the difficulty in defining the relevant market. Other indicator of competition is the turnover of firms in a particular sector. In this case, a low turnover would mean that the reduction of aggregate inefficiencies through the firm renewal could not be working [see López-García and Puente (2006) for the Spanish case]. The problems with this indicator are that it does not take into account the size of the firms that enter and leave, it is not clear what is the role played by the threat of entrance and what is its interpretation depending on the tradability of the product considered.

Although there are other (less used) indicators of product market competition, the methodology chosen in this paper is the direct estimation of the mark-ups of prices over marginal costs. As it was highlighted before, the markets displaying perfect competition are characterized by the equality between the price and the marginal cost of production;

thus, the higher the distance of price from marginal cost the higher the departure from perfect competition. The seminal paper initiating this literature was written by Hall (1988), which showed how the Solow Residual not only captured the technological evolution of the economy in the absence of perfect competition, but also information on the mark-ups.

Thus, in the second section of this paper it is presented, from a historical perspective, a short review of the empirical models associated to this approach to estimate the level of mark-ups. This allows not only specifying the equation to be estimated, but also the econometric methodology, that involves Time-Varying Parameter (TVP) techniques. In the third section, the methodology is applied to 23 sectors of Spain and other six developed economies (USA, Japan, Germany, France, UK and Italy). The fourth part of the document provides a flavour of the gains of moving to a more competitive environment; first, by calculating the surplus losses associated to the departure from perfect competition and, second, by testing if this departure has an impact on productivity. To end up, some conclusions and implications are obtained.

2 The empirical model

As it was said before, the direct estimation of steady state mark-ups using (more or less) aggregate information has a long tradition in the economic literature. In fact, the most popular methodology was proposed by Hall (1988), which showed that the calculus of the Solow Residual (SR) could be a non-consistent estimator of Total Factor Productivity (TFP). In particular, departing from a general specification of a differentiable production function $[Y = f(N,K,M,A)]$, it is possible to express the growth rate of the product *(Y)* as a weighted average of the growth rates of the corresponding inputs (labor – *N* –, capital – *K* – and intermediate consumption – *M* –), being the weights the elasticity of the output with respect to the inputs (ε_N, ε_K, ε_M, respectively), plus a term that captures the gains in the production efficiency *(A)*:

$$\Delta y = \varepsilon_N \, \Delta n + \varepsilon_K \, \Delta k + \varepsilon_M \, \Delta m + \Delta a \qquad [2.1]$$

where lower case letters refer to the log of the corresponding variable and Δ is the difference operator. Δa is TFP growth; that is, the increase in the production that is not explained by the rise of the productive factors.

Assuming constant returns to scale in the production function and perfect competition in the product and input markets, it is possible to show that the solution of the optimization problem of the representative firm implies that those elasticities are equal to the income participation of the inputs in production:

$$\varepsilon_I = \alpha_I = \frac{P_I \, I}{P \, Y}; \sum_I \alpha_I = 1 \quad with \; I = N,K,M \qquad [2.2]$$

being P_I the wages *(W)*, user cost of capital *(UC)* and the intermediate input prices (P_M), respectively, and *P* the output price.

Thus, once [2.2] is substituted in [2.1], the only unknown in the new expression is (Δa), that can be obtained by subtracting from the output growth the composed input growth. This calculation of the TFP is called the Solow Residual (SR). However, Hall demonstrated how, by relaxing the hypothesis of perfect competition in the product market, the SR was correlated with the evolution of the productive inputs (and this correlation was higher when larger was the departure from perfect competition), thus being an inconsistent estimator of TFP. As a by-product, Hall estimated the level of the mark-ups for the different industrial branches of the US economy, concluding that mark-ups were, in most of the cases significantly, higher than 1 (perfect competition).

The problem lies in that the existence of imperfect competition in the product market implies the presence of a mark-up (μ) of output prices over marginal costs. Thus, the expressions for the output elasticities derived from the first order conditions of the optimization problem of the producer change to:

$$\varepsilon_I = \mu \alpha_I = \frac{P_I I}{PY}; \sum_I \mu \alpha_I = 1 \quad with\ I = N, K, M \qquad [2.3]$$

If expression [2.3] is substituted into [2.1], it can be shown that the growth rate of production is equal to:

$$\Delta y = \mu \left[\alpha_N \Delta n + \alpha_M \Delta m + (1 - \alpha_N - \alpha_M)\Delta k\right] + \Delta a^* \qquad [2.4]$$
$$with \quad \Delta a^* = (1 - \mu)\Delta k + \Delta a$$

Therefore, if μ is higher than 1, the residual of expression [2.4] not only captures the increase in TFP, but also the evolution of the capital stock. Besides, to correctly identify TFP, it is necessary to estimate the parameter that measures the mark up. Hall also highlighted that in order to consistently do that estimation it is necessary to use instrumental variable techniques, because inputs are correlated with productivity. This raised the question on what instruments to choose. The most obvious option is demand side variables (monetary policy and fiscal shock, external demand, etc.) and exogenous input prices (like oil prices).

However, the empirical evidence showed that estimated mark-ups were very sensitive to the instruments considered, so Roeger (1995) developed a methodology that allowed estimating the mark-up parameter using simple econometric techniques like OLS. In order to do that, this author took advantage of the so called Dual Solow Residual (DSR), which is a similar concept than the SR but derived from the dual perspective of the producer optimization problem. In particular, departing from a generic cost function and relaxing the assumption of perfect competition in the product market, he showed that the increase in producer prices is equal to a weighted average of the growth rates of input costs minus TFP growth:

$$\Delta p = \mu\, \alpha_N \Delta w + \mu\, \alpha_M \Delta p_m + (1 - \mu\, \alpha_N - \mu\, \alpha_M)\Delta uc - \Delta a \qquad [2.5]$$

Now, substituting TFP growth from [2.5] into [2.4], it is obtained the equation estimated by Roeger:

$$\Delta p + \Delta y = \alpha_N (\Delta w + \Delta n) + \alpha_M (\Delta p_m + \Delta m) + (1 - \alpha_N - \alpha_M)(\Delta uc + \Delta k) + \frac{\mu - 1}{\mu}(\Delta p + \Delta y - \Delta uc - \Delta k) \qquad [2.6]$$

It should be noticed that the mark-up parameter is the only coefficient that needs to be estimated in this expression, but that now TFP growth has disappeared from the equation. Thus, this equation can be estimated by OLS because the residual only adds noise and not bias the estimation of the parameter.[1] In any case, there is always the possibility of having measurement errors in the right hand side variables of the regression. In this respect, the traditional suspicious variables are the capital stock (as it is constructed cumulating

1. Oliveira-Martins and Scarpetta (1999) show that this estimation of the mark-up is equivalent to calculate the ratio of nominal production over nominal costs; that is, one plus the ratio of pure profits over nominal costs.

investment) and the user cost of capital (due to the existence of sectoral risk premia). For this reason, the preferred estimations in this paper use instrumental variable techniques.

Other aspect that has begun to be addressed recently is the relaxation of the assumption of perfect competition in the input markets; in particular, in the labour market, where there is more evidence of the existence of imperfections.[2] In this case, the market power tends to be a consequence of the surge of coalitions of workers on the one side and firms on the other, which significantly reduces the number of participants in the market. In this context, the observed wage could be different than productivity, so implying that the labour income share considered in previous expression does not proxy adequately the output elasticity of labour and, therefore, the estimated mark-up is biased. In particular, the gap between observed wage and productivity will be higher when higher the bargaining power of the trade unions. Thus, the size of the bias in the mark-up estimation will increase with the trade union power. The idea is simple: if the firm has market power in the product market and the trade union capture part of these extra-profits through the collective bargaining, the labour income share will include part of the mark-up obtained by the firm in the product market, biasing the traditional estimation.

In order to introduce this aspect in the analysis, it is followed the paper recently published by Dobbelaere and Mairesse (2007). These two authors show that under the assumption of efficient bargaining in the labour market between the trade union and the firm representatives, first order conditions of the optimization problem of the firm provide the following expression for the elasticity of output with respect to labour:

$$\varepsilon_N = \mu\alpha_N + \mu\frac{\phi}{1-\phi}\left(\alpha_N + \alpha_M - 1\right) \qquad [2.7]$$

where ϕ represents the bargaining power of the trade union. Taking into account that the last multiplicative term is negative under constant returns to scale, this expression implies that the elasticity calculated from [2.3] $(\mu\alpha_N)$ is higher than the unbiased one, and the bias will be higher when higher is the mark-up, the bargaining power of the trade union and the capital income share.

Thus, making use of this last expression, it can be shown that it is necessary to add a new term (the ratio of capital income to labour income) to [2.6] to correctly model the growth rate of nominal production:

$$\begin{aligned}\Delta p + \Delta y &= \alpha_N\left(\Delta w + \Delta n\right) + \alpha_M\left(\Delta p_m + \Delta m\right) + \left(1-\alpha_N-\alpha_M\right)\left(\Delta uc + \Delta k\right) \\ &+ \frac{\mu-1}{\mu}\left(\Delta p + \Delta y - \Delta uc - \Delta k\right) + \frac{\phi}{1-\phi}\left(1-\alpha_N-\alpha_M\right)\left(\Delta uc + \Delta k - \Delta w - \Delta n\right)\end{aligned} \qquad [2.8]$$

This new term allows identifying the bargaining power parameter, jointly with the mark-up. Since this additional variable also includes the capital stock and the user cost of capital, this expression should also be estimated by instrumental variable techniques.

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2. To a certain extent, there is an inconsistency in considering imperfect competition in the product markets and not in the intermediate input markets. One possible interpretation is that the market power of firms is only apparent when they sell their products to final consumers as opposed to intermediate buyers.

Although these two parameters are considered structural, they can be affected by different reforms introduced by the governments. For example, the joining of Spain to the European Union should reduce the mark-ups, at least in the manufacturing sectors, as long as some competitive barriers (such as tariffs) were eliminated. Other example can be the Services Directive recently passed by the European Commission, the strengthening of the anti-trust legislation, the creation of regulatory bodies and so on. With respect to the labour market, it also exists that possibility, as long as labour market reforms trying to provide more flexibility to that market have been common during the last decades.

In order to capture the possible effects of these events, the equations are estimated using TVP techniques. The practical difficulty with this approach is to take into account the endogenous nature of the right hand side variables in equations [2.6] and [2.8]. To circumvent that problem, a similar approach than Kim (2006) and Kim and Nelson (2006) is adopted. The idea is to develop a two-step approach (similar to the traditional Heckman approach) but to a TVP regression, taking into account the bias that appears in the first step of the procedure. In particular, the model to be estimated is the following:

$$\begin{aligned} y_t &= x_t \beta_t + e_t \quad with\ e_t \propto N\left(0, \sigma_e^2\right) \\ \beta_t &= \beta_{t-1} + u_t \quad with\ u_t \propto N\left(0, \sigma_u^2\right) \\ x_t &= Z_t \lambda + v_t \quad with\ v_t \propto N\left(0, \sigma_v^2\right) \end{aligned} \qquad [2.9]$$

In this system, the endogeneity is captured by the correlation between e_t and v_t. Thus, the strategy is to estimate by OLS the third expression of the system [2.9] and, then, to use the adjusted values for x_t in the model given by the first two equations of the system, using the maximum likelihood estimation method, based on the prediction error decomposition and the Kalman filter, and taking into account the possible existence of biases.

3 An overview of the results

The estimation of equations [2.6] and [2.8] was performed using information from the data-set elaborated by Eurostat, EU-KLEMS. The main advantage of this source is its wide sectoral coverage and the homogeneity of the definition of the variables among the countries considered. In this data base, the sample period begins in 1970, the frequency of the information is annual and covers more than 100 branches of activity for more than 30 developed countries; besides, for each sector information includes, among others, gross production, intermediate consumption, value added, capital, employment, both quality and non-quality adjusted, in nominal and real terms. However, although there are some drawbacks (for example, contrary to value added or prices, employment is not taken from the National Accounts but from the Labour Force Surveys and there is not information on sectoral specific user cost of capital), this source constitutes a reference for applied research.

In this paper there were selected the seven biggest countries of the world, and the sectoral information was aggregated to 23 branches of activity (that was the widest disaggregation with homogeneous information since 1970). Leaving aside the gaps that were necessary to fulfil, the only variable generated for this paper was the user cost of capital (UC), which was constructed using the following definition:

$$UC_{CS} = P_C^I \left(i_C + \delta_S - LN\left({P_C^I}/{P_{C-1}^I} \right) \right) \qquad [3.1]$$

where P^I_C is the country-time specific investment deflator, i_C is the country-time specific nominal interest rate and δ_S the sectoral specific depreciation rate of the capital stock. As can be noticed, one of the major problems with this variable is that it does not incorporate the sectoral specific risk of every sector.

3.1 Constant parameters estimations

As a first step, the two models were estimated using both Ordinary Least Square (OLS) and Instrumental Variable (IV) techniques. The instruments selected were, for each sector in every country, the contemporaneous real growth rate of the production of the two main demanding branches of activity (taken from input-output tables) and the lagged growth rate of the primal and dual TFP for equation [2.6]. In the case of the model with trade union bargaining power, the lagged growth rates of the capital-labor ratio and the user cost of capital-hourly wage ratio were included as additional instruments. On a priori basis, there is no ground to suspect that the mark-ups or the bargaining power need to be similar for the different sectors or the different countries; thus, the corresponding 161 equations (23 sectors∗7 countries) were estimated separately for both models.

Although in the Appendix 1 can be found the detailed outcomes of these estimations (including the Sargan Test to validate the instruments), an aggregated overview of the sectoral mark-ups estimated for these seven countries is presented in Table 3.1. These estimations are the result of aggregating the corresponding sectoral estimates using constant production weights (the sample mean). For each sector each country it was selected the equation [2.8] when both parameters were significant or equation [2.6] if only the mark-up

parameter was statistically different from unity. Only the IV estimations are considered in this section.

Table 3.1. One minus the steady-state mark-ups
Percentage of marginal costs

	USA	Japan	Germany	France	UK	Italy	*Spain*	Median
Manufacturing	**11.7**	**16.9**	**17.6**	**14.0**	**7.4**	**12.5**	***13.6***	**13.6**
	(3.7)	**(6.1)**	**(1.6)**	**(2.4)**	**(2.9)**	**(2.9)**	***(5.3)***	
Electricity and Gas	**61.4**	**36.5**	**55.0**	**48.9**	**55.1**	**24.0**	***69.4***	**55.0**
	(9.5)	**(6.8)**	**(3.2)**	**(2.7)**	**(2.6)**	**(12.0)**	***(1.5)***	
Construction	**6.7**	**54.9**	**16.3**	**16.7**	**5.5**	**23.7**	***11.9***	**16.3**
	(8.6)	**(2.4)**	**(4.0)**	**(5.3)**	**(1.7)**	**(14.3)**	***(2.0)***	
Services	**21.8**	**59.9**	**50.0**	**16.4**	**12.3**	**30.0**	***34.4***	**30.0**
	(5.7)	**(6.0)**	**(4.0)**	**(3.6)**	**(1.7)**	**(14.2)**	***(2.7)***	
Total	**20.0**	**42.4**	**34.7**	**16.2**	**13.1**	**22.8**	***25.3***	**22.8**
	(5.3)	**(4.8)**	**(2.7)**	**(3.3)**	**(1.8)**	**(7.8)**	***(2.0)***	
Pro-memory								
OECD PMR indicator (2003)	1.0	1.3	1.4	1.7	0.9	1.9	*1.6*	2.0
WB Doing Business (2008)	3	12	20	31	6	53	*38*	23

Notes: between brackets t-ratios.

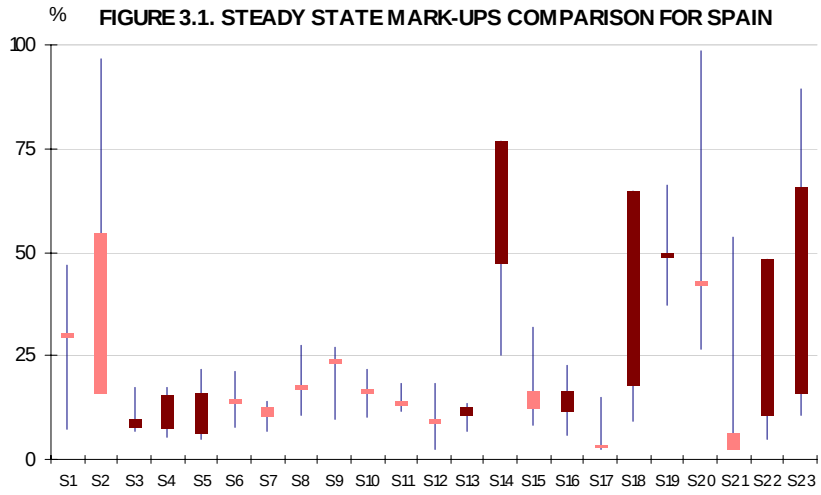
As can be seen, the median mark-up for the whole economy in these countries is around 20%, but there are considerable differences among them. Thus, Japan seems the economy with less competition in their markets (42%), while UK is the economy closest to the perfect competition paradigm. In fact, leaving France apart, Anglo-Saxon countries have lower mark-ups than Continental European countries, with the Spanish economy locating in the upper side of the ranking. In some papers, other qualitative indicators have been used to compare the competition degree of different countries. Probably, the two most widely used are the Product Market Regulation (PMR) an index elaborated by the OECD (coded between 0 – less regulated – to 6 – more regulated –) and the Doing Business ranking of countries of the World Bank. Both of them appear in the two final files of Table 3.1. As can be seen, there are considerable differences among them; in fact, the rank correlation (the Spearman statistic) between the estimated mark-ups and the other two is below 0.2 (although the correlation is close to 0.5 for manufacturing and to 0.4 for services), while the correlation between the PMR and the DB indicators is 0.9.

At a more disaggregate level, there seems to be some relevant commonalities among these countries. First, the manufacturing sector has the lowest mark-ups; this is probably the consequence of the higher tradability of the products of this sector, which allows other countries to compete with domestic production; other indication of higher competition in this sector is that the dispersion of manufacturing mark-ups among countries is the lowest. The second stylized fact is the considerable size of the mark-ups in electricity and gas; this result is repeated for other network industries (telecommunications, for example) and could be the reflection of the fixed costs that have these activities. Third, margins are higher in the service sector than in manufacturing sectors, reflecting the difficulty to introduce internal competition in these sectors.

A carefully comparison of the results obtained for Spain at the maximum level of disaggregation considered (a complete set of detailed charts can be seen in the Appendix 2), could be very interesting from two points of view. First, it will allow identifying the sectors where Spain is farther from the international standards and, therefore, where the potential gains from introducing more competition are higher. Second, it can signal the country that could serve as benchmark when proposing liberalizing recommendations. Thus, in Figure 3.1

it is depicted the level of mark-ups for each of the 23 sectors. The extremes of each vertical line represent the average of the three countries with larger and smaller mark-ups respectively; thus, the length of the line is a measure of country dispersion. The coloured rectangles represent the difference of the Spanish mark-ups with respect to the country median. The light colour means that the Spanish mark-up is lower than the median; the dark colour the opposite.

FIGURE 3.1. STEADY STATE MARK-UPS COMPARISON FOR SPAIN



As can be seen, the Spanish mark-ups are lower than the median in 13 sectors of the economy, although the gaps are almost insignificant. Only in the case of the mining sector (S2) the difference is important, although the weight of this sector in GDP is smaller than 1%. Other remarks to highlight are: 1) the mark-up in the agricultural sector (S1, 30%) is the highest of the countries subject to the Common Agricultural Policy (CAP), apart from UK (55%); 2) the sector of hotels and restaurants is the only one with a practical situation of perfect competition; 3) in the case of business activities (S20) it has been done a correction in order to get rid off imputed rents that can distort the results, and, 4) the educational sector (S21) could be contaminated by the public sector activity.

On the contrary, the Spanish sectors with mark-ups higher than the median of the considered sample are the other ten. However, only four of them should concentrate the primary interest: Electricity and Gas (S14), Transport (S18), Health (S22) and Personal Services (S23). These four sectors not only concentrate 17% of aggregate GDP in Spain, they also represent 12% of total intermediate consumption of Spanish firms and they are probably those with a biggest potential development in the future. Other important result is that in the trading sector (S16) the median is biased upwards by Germany and Japan, thus, Spain does not seem as bad as it is the case, since its steady state mark-ups more than triple the average of the best three countries.

As a by-product of these estimations, the model also allows to calculate the values of the bargaining power of the trade unions in the different sectors of the seven more developed countries of the world in Table 3.2.

Table 3.2. Bargaining power of trade unions

	USA	Japan	Germany	France	UK	Italy	*Spain*	Mean
Manufacturing	3.3 (2.8)	-	23.6 (3.0)	15.3 (2.3)	-	17.8 (2.2)	-	**8.6**
Electricity and Gas	- -		-	28.9 (2.3)	- -		-	**4.1**
Construction -		67.2 (8.1)	- -		-	-	-	**9.6**
Services -		3.8 (2.9)	21.4 (5.8)	12.0 (2.5)	-	8.6 (2.4)	*15.3 (2.3)*	**8.7**
Total	**2.3 (1.8)**	**8.9 (5.4)**	**20.2 (3.5)**	**14.2 (2.6)**	**0.6 (2.7)**	**12.6 (2.5)**	***7.2 (2.4)***	**9.4**
Pro-memory								
OECD PMR indicator (2003)	0.7 1.8		2.5	2.9 1.1 2.4			*3.1*	2.1
WB Doing Business (2008)	5 32		124	155	20	105	*156*	85

Notes: between brackets t-ratios.

As an average, trade unions extract through the collective bargaining about 10% of the pure profits the firms appropriate from the markets they operate. However, this figure is a consequence of very different estimations for European Continental countries and Anglo-Saxon countries. Thus, the floor of the bargaining power of trade unions seems to be in UK, where 0.6% of mark-ups are retained by workers, followed by USA (2.3%). The case of UK is even more remarkable when it is taken into account that all this bargaining power comes from the agricultural sector. In the case of USA, only in two manufacturing sectors (wood and non-metallic minerals) trade unions have an effective bargaining power. On the other side, the country where the worker associations extract more rents from the pure profits is Germany, with an aggregate figure of 20%. This market power is present both in the manufacturing sectors (basic metals and transport equipment) and in services (transport, health and personal services). In the second place appears France, with an aggregate bargaining power of 14%, which basically spreads to all the sectors of the economy. In the case of Italy, the bargaining power of trade unions is quite similar to France, although the sectors where it is present are different; here, the bargaining power is higher in manufacturing sectors (textiles, wood, basic metals and machinery) than in services (hotels and restaurants and personal services). In an intermediate position are Japan and Spain (with a bargaining power of 9% and 7%, respectively). In Japan this bargaining power is concentrated in construction and personal services; in the case of Spain, there is no bargaining power in the manufacturing sectors, but transport services, health and personal services workers are able to actively participate in the pure profits that firms obtain.

As in the case of the regulation of the product markets, different international organizations elaborate indicators of the rigidity degree of the labour market. In particular, the OECD obtains a qualitatively index (coded between 0 – less strict – and 6 – very strict –) denominated Employment Protection Legislation (EPL) and the World Bank, in the context of the Doing Business report, elaborates a ranking of countries with the so called Rigidity of Employment Index (REI). Both indicators try to measure the degree of protection of the labour market implicit in the legislation. Since protection should be related with the bargaining power of the trade unions, it should be expected a positive correlation between the estimations in this paper and these indicators. Using again the Spearman rank correlation, the coefficient is around 0.6 in both cases.

Finally, it is also interesting to notice that the simple correlation between the mark-ups and the bargaining power estimated in this paper is positive and very close to 0.5. This could have important implications for the implementation of political reforms in the countries. In particular, it should be more successful to introduce in the first place reforms

reducing the mark-ups of the different sectors of the economy and, once there are no pure profits to barga in on, to introduce the flexibility that needs th e labour marke t to be able to absorb the shocks hitting the economy.

3.2 Time varying parameters estimates

In order to estimate the equations [2.6] and [2.8] using TVP techniques, a certain number of observations are n eeded to initiate th e algorithm. Th us, the two parameters of in terest are obtained on ly from 1980. Besides, sin ce the correlation between the two righ t h and side variables in equation [2.8] is very high, it was decided to estimate th is equation only for the same sectors than in the previous section.[3]

At an aggrega te level, th e exercise provide s in teresting resu lts (see F igure 3.2). On the one hand, the reduction of mark-ups in the last two and a hal f decades has not been a generalized p henomena; in fact, there has been increases in Italy (10 percentage points), France (8.1 pp.) and Germany (1.8 pp.); on t he contrary, the biggest reduction has bee n recorded in USA (5.6 pp.), f ollowed by Japan (4.9 pp.), UK (3.3 pp.) a nd Spain (1.6 pp.). This has made th at some cou ntries departin g from g ood positi ons with respect to competition at the beginning of the eighties, such as Italy or France, have been overtaken not only by UK or USA but also by Spain. On their side, Japan and Germany continue staying in the u pper side of th e ran k. However, both the increases in mark-ups would be smaller and the decl ines higher, in cas e the structure of the economy would have remained stable; this implies the activity has b een real located to the sectors where mark-ups are higher (usually services). For example, using the 1995 sectoral structure of the economy, the biggest decline in mark-ups had been observed in Ja pan (13.8 pp.) followed by G ermany (9.3 pp.). On the contrary, France and Italy, even controlling by the sectoral composition, had recorded an increase i n mark-ups, although of reduc ed size (7 pp. and 4.4 pp., respectively). In the Spanish case , the reduction of mark-ups i n the absence of sectoral reallocations would have been 4.6 pp.

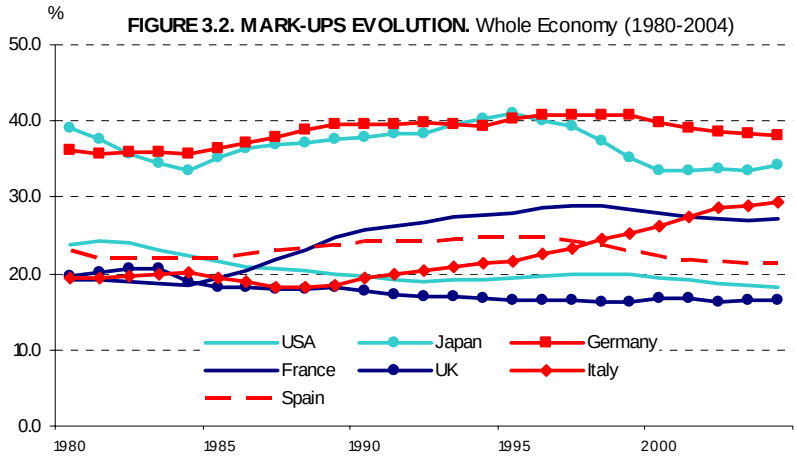


FIGURE 3.2. MARK-UPS EVOLUTION. Whole Economy (1980-2004)

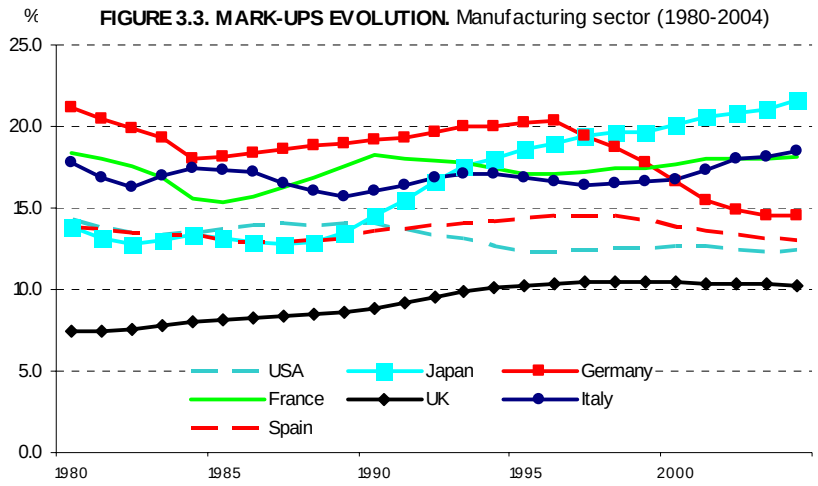
Other important aspect to re mark is that the process of mark-ups reductions has been more generalized from mid-nineties. T hus, in the last decade on ly Italy has recorded an increase in mark-ups (7.7 pp. and 5.3 pp. controlling by the sectoral structure). Among the

3. Confidence intervals were ob tained for all t he parameters estimated in this section, although they are no t presented in the charts to facilitate the visual inspection. They are available for the interested reader upon request (jointly with the Gauss program used).

other countries, the leader in cutting mark-ups has been Japan (6.8 pp.), followed by Spain (3.4 pp.) and Germany (2.2 pp). From this perspective, the Anglo-Saxon led the other countries in introducing reforms to cut mark-ups.

As can be seen in Figure 3.3, the evolution of mark-ups in the manufacturing sector has been more stable than for the whole economy. Thus, leaving apart the opposite behaviours of Japan (that increased the manufacturing mark-ups between 1980 and 2004 by 7.8 pp.) and Germany (where declined by 6.7 pp.), the other five developed countries have not shown major changes, with a minor decline in Spain of 0.8 pp. Similar global patterns are observed since 1995, although in the Spanish case a decline of 1.4 was recorded. Perhaps, it can surprise that a phenomena like globalization had not affected the manufacturing mark-ups in the developed countries, but this could be explained by a composition effect, retaining these countries the less labour intensive part of the industry. For example, one of the sectors mostly affected by globalization is textiles; in this sector the mark-ups in USA have remained stable in the last five years at 8.7% and in Japan they have increased from 20% to 28%; however, this sector represented 3.5% of manufacturing production in USA in 2000 and 2.5% in 2004; in Japan there has been also a decline in the weight of this sector, from 2.8% to 1.9%.

FIGURE 3.3. MARK-UPS EVOLUTION. Manufacturing sector (1980-2004)



Contrary to the manufacturing sector, in the service sector most of these countries have been able to substantially cut the mark-ups in the last two and a half decades. In particular, Spain has headed the ranking with a decline of 12.9 pp., more than Japan (11.8 pp.) or USA (1.2 pp.). On the contrary, both Italy and France have increased their mark-ups (by 18.1 pp. and 13.1 pp., respectively). Again, the behaviour of mark-ups has been more homogeneous among countries since 1995. Thus, all the countries, except Italy, have moderated services mark-ups, being Spain among the most active, with a reduction of 4.1 pp., only below Germany (5.7 pp.).

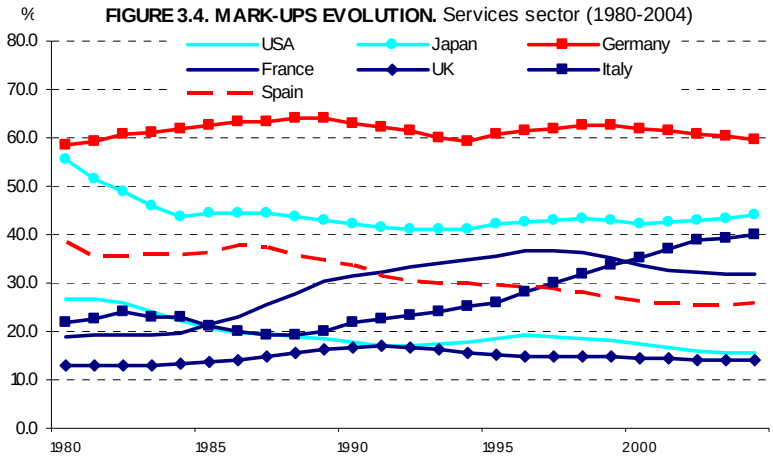
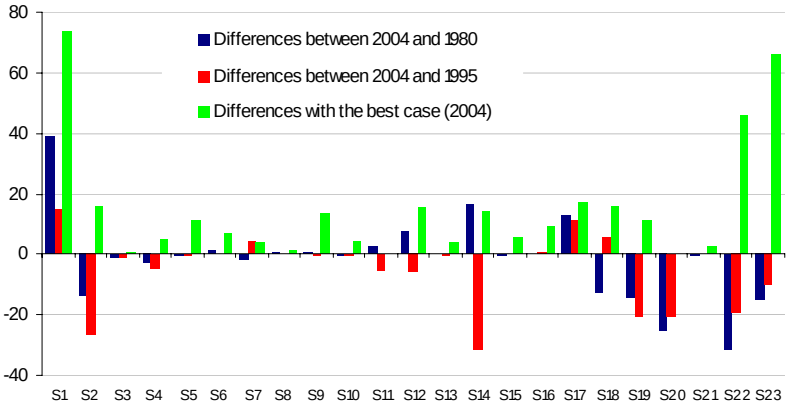


FIGURE 3.4. MARK-UPS EVOLUTION. Services sector (1980-2004)

Turning the attention to the Spanish economy, only in four sectors there has been increases in the mark-ups since 1980 (see Figure 3.5); these sectors are: agriculture, electricity and gas, hotels and restaurants and transport equipment. However, in two of them (transport equipment and electricity and gas) it has been observed a reversion in this trend in the last decade. In the other two sectors the actual situation is worrying as long as in agriculture Spain is the country with the largest mark-ups among those subject to the Common Agricultural Policy (CAP) and in hotels and restaurants, which departing from a situation of perfect competition, now it is the second country with largest mark-ups. The sectors that have reduced the most their mark-ups are concentrated in the service sector; in particular health, business activities, personal services, communications and transport services. This reduction has been more noticeable in the last decade; however, they continue being the sectors which are far away from the best case country. Only in business activities the situation by mid-two-thousand is one with more competition of the developed world.

FIGURE 3.5. MARK-UPS EVOLUTION IN SPAIN AND DIFFFERENCE WITH THE BEST CASE (1980-2004)



To end up with this section, in Figure 3.6 it appears the evolution of the bargaining power of the trade unions for every country since 1980. As can be seen, all the countries have shown reductions since 1980 with only one exception: Germany, which has increased its market power by 6 pp. since 1980. Among the other countries, Japan and Spain should be highlighted as they have been the ones that have made the bigger efforts with reductions of 1.7 pp. and 1.8 pp., respectively. The other interesting remark is that the efforts to reduce the bargaining power of the trade unions has been permanent during the whole period; that is, with the only exception of Italy (and Germany, as it was said before), the remaining countries have also diminished this variable in the

last decade. This last period has been precisely when Spain and Japan have concentrated their efforts to reduce the rigidities in the labour market.

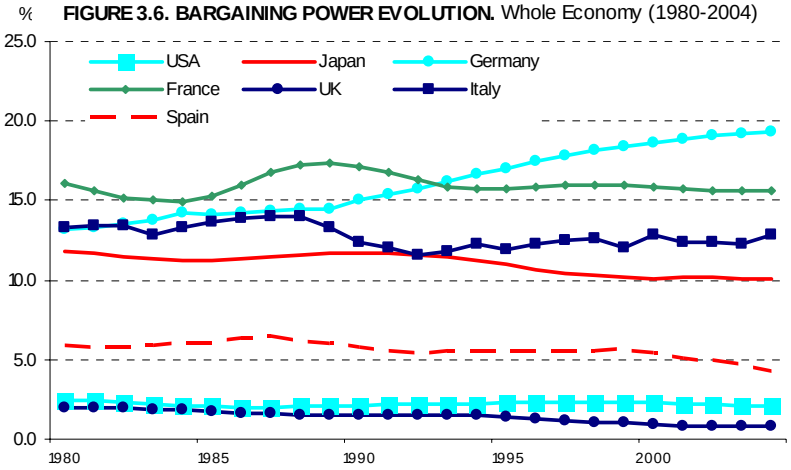


FIGURE 3.6. BARGAINING POWER EVOLUTION. Whole Economy (1980-2004)

An interesting exercise consists on interpreting the evolution of the labour income share on the light of these estimations. In order to do that, it is necessary to recover the expression [2.7] from the previous section, which related the labour income share (α_N) with the elasticity of the output with respect to the labour (ε_N), the mark-up (μ), the bargaining power (ϕ) and the intermediate inputs cost share (α_M). Operating this expression, it can be shown that the labour income share can be expressed as:

$$\alpha_N = \frac{(1-\phi)\varepsilon_N}{\mu} + \phi(1-\alpha_M) \qquad [3.2]$$

Thus, totally differentiating this equation it is obtained:

$$d\alpha_N = \left[(1-\alpha_M) - \frac{\varepsilon_N}{\mu}\right] d\phi - \frac{(1-\phi)\varepsilon_N}{\mu^2} d\mu + \frac{(1-\phi)}{\mu} d\varepsilon_N - \phi\, d\alpha_M \qquad [3.3]$$

Thus, changes in the labour income share are negatively related to the changes in the mark-ups (this relation is closer when lower is the bargaining power of the trade unions and more labour intensive is the sector) and to the changes in the intermediate income share and positively related to the changes in the labour intensity of the sector. However, the relation of the labour income share with the bargaining power of the trade unions has not a definite sign. On the one hand, the effect would be positive as long as there is a value added to be shared with the firm, but, on the other, the labour intensity of the firm operates in the opposite direction. Fortunately, only in very extreme cases the sign turns to be negative.

In the Table 3.3 appear the four elements of the expression [3.3]. Besides, the third term, the change in the elasticity of output with respect to labour, has been disaggregated between a "pure" component (the weighted change in that elasticity at sectoral level) and the reallocation effect, that captures if the production has been reallocated to sectors more or less labour intensive.

Table 3.3. Evolution of the labor income share

Contribution to the change 2004-1995

		USA	Japan	Germany	France	UK	Italy	*Spain*	Mean
Bargaining power		-0.04	-0.20	0.49	-0.02	-0.08	0.18	*-0.25*	**0.01**
Mark-ups		0.33	1.31	0.43	0.14	0.03	-1.66	*0.77*	**0.19**
Output Elasticity	**Total**	-0.72	-2.51	-3.21	-1.43	0.80	-1.60	*-1.52*	**-1.46**
	Pure	-1.22	-0.85	-0.79	-1.08	-1.25	-0.96	*-1.08*	**-1.03**
	Reallocation	0.50	-1.66	-2.42	-0.35	2.05	-0.64	*-0.44*	**-0.42**
Intermediate Inputs		0.02	-0.10	-0.40	-0.26	0.01	-0.22	*-0.04*	**-0.14**
Labor income share		**-0.41**	**-1.56**	**-2.72**	**-1.58**	**0.76**	**-3.09**	***-1.07***	**-1.38**

The first interesting aspect to notice is that the decline in the labour income share has not been common to all these countries in the last decade; in fact, in UK there has been an increase, mainly associated to an increase in the elasticity of output with respect to labour. This has been a consequence of the displacement of activities to sectors more labour intensive, while the sectors themselves have become less labour intensive. Something similar has happened in USA, although in this case the reallocation effect has been smaller. Thus, even although the decline in mark-ups has had a positive contribution, the labour income share has diminished. The next country with smaller losses in the labour income share has been Spain, where the reduction in the bargaining power of trade unions has been more than counteracted by the narrowing of the market power of firms. Thus, it has been the change in the output elasticity what explains that evolution, with a negative reallocation effect, contrary to the Anglo-Saxon countries. The cases of Japan and France are very similar to that of Spain, although the reallocation effect dominates the pure effect in Japan, and, in France, the intermediate inputs effect is more important than in the other countries due to the higher degree of bargaining power. In the German case, the labour income share has declined even although there has been an increase in the bargaining power of trade unions and a reduction in the mark-ups. The intermediate income share has increased in the period, but this has not been enough to counteract the other variables; thus, the conclusion is there has been an aggregate reduction in the elasticity of the output with respect to the labour. A closer look to the numbers reveals that this "shock" has been more a reallocation of production to less labour intensive sectors than a pure reduction in the elasticity. The Italian case is slightly different, because although the decline in the labour income share from 1995 has been similar to that of Germany and the bargaining power of the trade unions has increased, the mark-ups have expanded and this effect should have reduced the labour income share. Thus, the needed change in the elasticity of the output with respect to labour to accommodate the reduction in the labour income share is smaller than in the German case. However, in this country the pure effect of the elasticity is more important than the reallocation effect.

4 The relevance of mark-ups

This section tries to illustrate why reducing mark-ups can improve the standards of living of the society. Thus, in the first place it is calculated the inefficiency gap associated to the existence of non-competitive product market structures. Then, in the second place, an empirical model is estimated to test if, as other papers find, the lack of competition in the product markets explains the bad productivity performance of some countries, once it is controlled by other relevant TFP determinants.

4.1 The inefficiency gap associated to non-competitive product markets

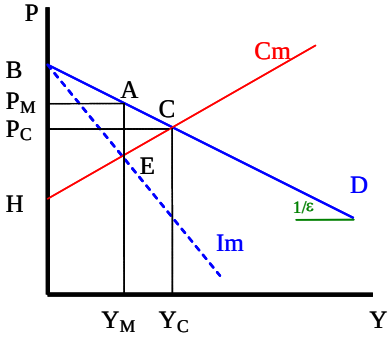
The mark-ups estimated in this paper have a direct relation with the price elasticity of the demand. For example, it is usual to assume, in a context of imperfect competition, that the representative firm confronts a typical demand curve like: $Y = P^{-\varepsilon}$, where *Y* is the quantity of the good or service demanded, *P* the price and ε the price elasticity. Solving the optimization problem of the firm for a generic production function, it is obtained that the first order condition with respect to labour is the following:

$$\varepsilon_N = \frac{\partial Y}{\partial L}\frac{L}{Y} = \left(\frac{\varepsilon}{\varepsilon - 1}\right)\frac{W\,L}{P\,Y} = \mu\,\alpha_N \qquad [4.1]$$

This expression implies that the mark-up estimated in this paper is precisely the ratio between the price and the marginal cost. In fact, the numerical values appearing, for example, in Table 3.1, are not this mark-ups but one minus the mark-up, that is: $\left(\frac{P - Cm}{Cm}\right)$, being *Cm* the marginal cost. Thus, the figures presented there are the ratio $\left(\frac{1}{\varepsilon - 1}\right)$. However, microeconomists usually calculate another ratio to assess the monopoly power, the Lerner Index: $\left(\frac{P - Cm}{P}\right)$, where the denominator is the price, as opposed to the marginal cost considered in this paper. Operating in this ratio, it corresponds to the inverse of the demand elasticity: $\left(\frac{1}{\varepsilon}\right)$.

This last ratio is very informative. As can be seen in Figure 4.1, the Lerner index is a proxy for the surplus that the society losses when there is not perfect competition in that market.

Figure 4.1. The equilibrium in a monopoly and in perfect competition



In such a case, the equilibrium (point *E* in the figure) is given by the intersection between the marginal cost *(Cm*, the supply curve) and the marginal income *(Im,* the derivative of the demand curve). This implies that the price in equilibrium is P_M and the quantity exchanged Y_M. In that situation, the consumer surplus would be the area limited by the points AP_MB and that of the producer HP_MAE. However, the competitive equilibrium is achieved in the intersection between the demand and the supply curves *(C* in the figure), implying a lower equilibrium price (P_C) and a higher quantity exchanged (Y_C). Obviously, the surpluses of consumers and producers are different than in the previous situation; in particular, the consumers' surplus would be the triangle CP_CB and that of the producer CP_CH. Comparing both equilibria, in the monopoly situation the producer appropriates of a certain part of the surplus that consumers obtained in perfect competition. But, more important, for the whole society, there is a net loss of surplus that is given by the triangle *ECA*. A gross approximation to the area of this triangle (as a percentage over production) is given by the inverse of the demand elasticity (the Lerner Index) divided by two.

Thus, in Table 4.1 it has been calculated the inefficiency gap calculated for each country given the estimations of the previous section. In order to do that, we consider the mark-up obtained for the last year of the sample. To avoid problems with differences in technology, sectoral perfect competition is defined as the lowest mark-up among all these countries; that is, the results are normalized by the best case country.

Table 4.1. Contributions to the monopoly inefficiency gap

Percentage of production

	USA	Japan	Germany	France	UK	Italy	*Spain*	Mean
Agriculture	0.7 0.4		0.1 0.1		0.3	0.0	*0.8*	**0.3**
Manufacturing 0.7		2.2 1.5		1.7	0.4	1.6	*0.9*	**1.3**
Electricity and Gas	0.6 0.3		0.2	1.3 0.7		0.1	*0.2*	**0.5**
Construction 0.1		0.8 0.3		0.2	0.0	0.4	*0.4*	**0.3**
Services 1.6		5.0	7.2 3.1		1.4	5.5	*3.0*	3.8
Total	**3.8**	**8.6**	**9.4**	**6.5**	**2.8**	**7.7**	***5.3***	**6.3**

As it can be seen in the table, the sector which contributes the most to the losses is services, although this is only a consequence of its weight, because both the agricultural and the electrical sectors present higher inefficiency gaps (15% and 10%, respectively). As an average, the inefficiency in manufacturing and construction is similar (3.5%-3.8%), but the higher relevance of manufacturing makes its contribution higher. By countries, UK and USA present the lowest inefficiency gaps (2.8% and 3.8%, respectively), while Japan and Germany are in the opposite side, with welfare losses of around 9% of GDP. Looking at the sectoral contributions, it seems that the countries that are in the better position s it is not due to a specific sector; thus, the contribution of the service sectors to the aggregate inefficiency gap in the Anglo-Saxon countries is almost 5 times lower than in Germany and Japan. Italy and France have an aggregate inefficiency gap over 5% of GDP, being especially remarkable the contribution of the electrical sector in France, which is very close to the manufacturing sector, even although its weight is 4 times lower. Spain is ranked in an intermediate position, with an inefficiency gap of 5%. In this country, it is remarkable the contribution of the agricultural and the construction sectors; on the contrary, Spain determines the perfect competition frontier in two sectors: electronics and services to firms.

4.2 The impact of mark-ups on TFP growth

In the last few years, there have appeared some theoretical developments, validated by the empirical evidence, showing that the degree of competition influences the productivity growth, that is, the long-run growth. In fact, there exist, at least, three channels that could explain that relation: a) effects on the incumbent firms; b) sectoral compositional effects, and c) product and process innovations.

Beginning with the incumbent firms, higher competition encourages these firms to move to the technological frontier, through the incorporation of more productive technologies, organizational changes and so on, thus reducing the X inefficiency. This is a consequence of the increase in the demand elasticity, which makes profits more sensitive to changes in prices; besides, lower profits make more relevant the cost control to avoid bankruptcy situations, and, furthermore, there is a reduction in the agency costs, as long as, firm proprietors have more companies to compare the performance of their firm. The sectoral compositional effects derive from the fact that, the existence of competition makes the most efficient companies to grow, shifting the least efficient, being substituted by new, more efficient incomings. Finally, competition can also encourage the firm attitude to research and development, although this last effect is more controversial [Arnold et al. (2008)]. On the one hand, higher competition makes more profitable R&D+i investment; but, on the other, R&D+i usually implies fixed costs and time to build, so only firms with monopolistic rents could have the financial resources needed to undertake these investments.

The aim of this section is to test if the estimated mark-ups have an impact of TFP growth. This is done in the context of an empirical model of international diffusion of knowledge, in line with the proposal of Jones (2002), but as it was implemented by de la Fuente and Domenech (2000) or Nicolleti and Scarpetta (2003). Thus, the empirical model to be estimated is the following:

$$\Delta tfp_{ijt} = \delta \, \Delta tfp_{Ljt-1} - \varphi \left(tfp_{ijt-1} - tfp_{Ljt-1} \right) \qquad [4.2]$$

meaning that total factor productivity growth in the country i for the sector j at time t, increases with the displacement of the TFP world frontier plus an additional factor that captures the convergence to that frontier. In this model, it is introduced the mark-up estimated previously, testing if it is statistically significant. Besides, the robustness of the results is checked by introducing additional variables in the regression that the literature has found relevant to explain the evolution of the productivity, such as labour market rigidities, labour and capital quality, infrastructures and intangible capital.

The TFP frontier is obtained (for each sector and each 8 years) as the average of the three countries with the highest level of TFP. An average of three countries is used to control for outliers and an average of 8 periods is selected to eliminate the influence of the business cycle. The growth rates of TFP are calculated using the equation [2.1] and the elasticities estimated in the previous section. The level of the TFP in the base year (1995) is obtained using the sectoral purchasing power parities obtained by Timmer et al. (2007).

As can be seen in the first column of Table 4.2, the model of technological diffusion is not rejected by the data, as long as it is estimated a negative and significant parameter for convergence in a regression that includes sectoral, country and time dummies.

However, the estimated coefficient is low compared with other papers [0.01 vs. 0.07-0.09 de la Fuente and Domenech (2000)]. This can be justified, first, because this paper only considers a more restricted group of countries than the whole OECD, and, supposedly, these countries are closer to the frontier; and, second, because it is estimated the same parameter for all the sectors, and there is evidence that the technological diffusion is faster in some sectors than in others. The parameter estimated for the technological growth of the frontier has the expected sign (positive), although it is non-significant. This variable has been introduced lagged one period, to avoid endogeneity problems.

Table 4.2. The effect of mark-ups on TFP growth
Estimation Method: OLS; Sample Period: 1975-2004

	Convergence Model	Mark-ups		Bargain. Power	Inputs Quality	Infrastruc-tures	Intangible Capital
Technological frontier growth	0.021 (0.79)	0.018 (0.71)	0.113 (4.67)	0.018 (0.70)	0.017 (0.67)	0.017 (0.67)	0.017 (0.66)
Distance to the frontier	-0.014 (-6.12)	-0.016 (-6.94)	-0.013 (-5.91)	-0.018 (-7.74)	-0.021 (-8.55)	-0.020 (-8.38)	-0.020 (-8.16)
Mark-ups	-	-0.015 (-4.38)	-0.010 (-3.48)	-0.008 (-2.02)	-0.008 (-2.07)	-0.008 (-2.14)	-0.008 (-2.02)
Bargaining power	-	-	-	-0.015 (-4.01)	-0.016 (-4.77)	-0.016 (-4.45)	-0.016 (-4.44)
Labor quality	-	-	-	-	0.044 (3.92)	0.043 (3.89)	0.045 (4.01)
Capital quality	-	-	-	-	-0.016 (-1.93)	-0.015 (-1.80)	-0.012 (-1.34)
Infrastructures	-	-	-	-	-	0.019 (6.01)	0.021 (6.35)
Public intangible	-	-	-	-	-	-	0.001 (1.62)
Private intangible	-	-	-	-	-	-	0.013 (3.14)
International intangible	-	-	-	-	-	-	0.018 (5.32)
Sectoral dummies	Yes	Yes	No	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	No	Yes	Yes	Yes	Yes
Annual dummies	Yes	Yes	No	Yes	Yes	Yes	Yes
Adjusted R2	**5.98%**	**6.31%**	**1.10%**	**6.58%**	**6.88%**	**7.51%**	**7.94%**

*Between brackets robust t-ratios; all the right hand side variables are lagged one period.

The first variable to be added to this basic specification was the level of mark-ups estimated previously. As it can be seen in the second and third columns of Table 4.2, the estimated coefficient was negative and highly significant (both with and without sectoral, country and time dummies). This implies that lower mark-ups increase productivity growth, although the quantitative impact is reduced (less than 1% of the observed increase of TFP in the last decade). In the fourth column, it was added as a regressor the lagged evolution of the bargaining power of trade unions generated in the previous section. The estimated parameter is negative and statistically significant, as it has been encountered in other papers [see, for example, Scarpetta (2002)]. This means that less rigid labour markets enhance TFP growth. In any case, the mark-up parameter remained negative and significant, although it losses part of its relevance.

A second group of variables introduced in the regression was the quality of inputs; in particular, labour and capital (see fifth column). The quality of labour was proxied by the share of workers with tertiary education and that of capital with the share of ICT capital in total capital stock (both variables were taken from the EU-KLEMS database). As it can be seen, it is estimated a positive (and significant) parameter for the labour quality and negative (although, in the limit of the significance) for the capital quality. However, in order to properly understand these results it should be taken into account that both the labour

and the capital series used in estimating TFP were corrected for quality, so the estimated effects are on top of that. Thus, the results imply that the correction for input quality in the TFP calculations underestimates the effect of labour quality and overestimate the capital quality. As in the previous case, the effect of mark-ups continue being negative and significant.

In the third place, the stock of infrastructures over the total number of hours worked was introduced in the regression. This variable was also taken from the EU-KLEMS database by identifying infrastructures with the capital stock of the sector Public Administration, Defence and Compulsory Social Security. The stock of infrastructures has, as expected, a positive and significant effect on TFP; in fact, it is notorious the jump in the adjusted R-square of the regression. It is also very important to highlight there is no change in the parameter estimated for the mark-ups that continue to be significant at standard levels.

The final group of variables considered was the intangible capital stock, which was proxied by the accumulation of the R&D investment. In this paper, three of such stocks were introduced (divided on total hours worked). In the first place, the aggregate public intangible capital, that is derived from the R&D accumulation executed by the public sector; second, the sectoral private intangible capital, obtained from the R&D accumulation executed by the business sector and, finally, the sectoral external intangible capital that is obtained, for each country, as a weighted average of the sectoral private intangible capital of the other six countries, using the corresponding imports as shares. As can be seen, the three capital stocks have a positive impact on total factor productivity growth, although it is almost non-significant in the case of the public R&D and quite relevant in the private case. This is probably due to the more basic nature of public research as compared to the applicability of private. Besides, external R&D investment generates positive spillover effects in the countries with which they have commercial links. More importantly, the negative effect and the significance of mark-ups on TFP growth continue being present.

5 CONCLUSION

This paper estimates product market mark-ups of seven developed countries (USA, Japan, Germany, France, UK, Italy and Spain) with a certain degree of sectoral disaggregation. In order to do that, a recently elaborated data base has been used (EU-KLEMS) that guaranties the homogeneity of the variable definition and the sectoral coverage. The empirical methodology departs from the Hall (1988) seminal approach but incorporates the possibility of non-competitive labour markets. Besides, it has been used a time varying parameter (TVP) technique to estimate the evolution of steady state mark-ups and to obtain the most recent picture in terms of the competition in the markets.

Looking at the constant parameter estimations, it emerges a clear dichotomy between two groups of countries: USA and UK with the lowest mark-ups for the whole economy (below 20%) and Japan and Germany (over 35%) on the other side of the ranking. Italy and Spain keep an intermediate position. As it was expected, the mark-ups in services are higher than in the manufactures, probably due to the different tradability of these two products. Besides, the mark-ups are quite high in electricity and gas; this is associated to the high fixed costs that characterize this technology. As a by-product, the paper also estimates the bargaining power of trade unions, finding again a dichotomy between Anglo-Saxon countries, where it is almost inexistent, and Central European countries. Japan and Spain keep now the intermediate position.

Allowing these parameters to evolve in time, the results are also quite informative. From the beginning of the eighties there have been increases in the mark-ups in Italy, France and Germany; on the contrary, in USA, Japan, UK and Spain they have diminished. Thus, Italy or France that departed from a very good situation in terms of competition, have been overtaken not only by UK or USA but also by Spain. In the particular case of Spain, the sectors that should concentrate the liberalization efforts are: agriculture, personal services, health, hotels and restaurants, transport, electricity and gas and trade. It is also interesting to highlight that in all the countries the activity has reallocated to those sectors where mark-ups are higher (usually services). In the case of the bargaining power of the trade unions, all the countries have shown reductions since 1980 with one exception, Germany, which has increased the bargaining power of their trade unions.

The paper also shows that the inefficiency gap associated to this monopoly power is quite high in Germany and Japan and almost inexistent in UK and USA Finally, the paper finds a quite robust inverse relation between productivity growth, mark-ups and the bargaining power of trade unions, although the quantitative effect is reduced.

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APPENDIX 1. DETAILED RESULTS OF THE CONSTANT PARAMETER REGRESSIONS

TABLE A.1.1. RESULTS FOR EQUATION [2.6]. USA

	Ordinary Least Square			Instrumental Variable			
	μ	σ	*DW*	μ	σ	*DW*	*ST*
Agriculture, etc.	0.36 (93.54)	2.42	1.94	0.30 (4.63)	2.52	1.91	3.20 [0.36]
Mining	0.76 (23.91)	1.39	2.04	0.82 (10.59)	1.43	2.04	2.03 [0.57]
Food	0.09 (8.90)	0.98	1.90	0.11 (3.25)	1.11	1.56	0.53 [0.91]
Textiles	0.09 (9.84)	0.74	2.39	0.07 (4.05)	0.76	2.47	3.22 [0.36]
Wood	0.14 (9.72)	1.26	1.99	0.10 (3.16)	1.44	1.75	5.06 [0.17]
Paper	0.14 (16.60)	0.68	1.83	0.15 (9.24)	0.70	1.84	3.62 [0.31]
Chemical	0.14 (17.55)	0.70	1.98	0.13 (8.98)	0.71	2.11	6.69 [0.08]
Non-Metallic Mineral	0.13 (6.92)	1.51	2.31	0.09 (2.19)	1.62	2.22	3.02 [0.39]
Basic Metal	0.11 (11.45)	0.94	2.16	0.09 (5.83)	0.93	2.26	2.61 [0.46]
Machinery	0.13 (8.03)	1.33	1.68	0.14 (5.44)	1.36	1.65	2.50 [0.48]
Electrical Equipment	0.09 (6.85)	1.14	2.09	0.10 (3.76)	1.16	2.07	5.15 [0.16]
Transport Equipment	0.04 (1.75)	1.61	2.00	0.03 (0.59)	1.64	2.01	6.54 [0.09]
Other Manufacturing	0.09 (6.95)	0.98	1.93	0.05 (2.05)	1.11	1.79	2.86 [0.41]
Electricity and Gas	0.41 (13.97)	1.55	1.57	0.47 (8.26)	1.68	1.48	3.05 [0.38]
Construction	0.06 (13.37)	0.47	1.63	0.07 (8.56)	0.49	1.74	7.45 [0.06]
Trade	0.14 (17.57)	0.89	1.82	0.12 (3.98)	0.99	2.13	1.14 [0.77]
Hotels and Restaurants	0.09 (13.65)	0.81	1.49	0.09 (4.15)	0.82	1.48	5.30 [0.15]
Transport	0.22 (18.72)	1.18	2.11	0.18 (8.77)	1.36	2.21	0.17 [0.98]
Communications	0.39 (15.66)	1.03	1.57	0.40 (7.73)	1.03	1.64	0.42 [0.94]
Business Activities	0.44 (29.90)	1.34	1.78	0.42 (15.09)	1.39	1.80	4.76 [0.19]
Education	0.17 (3.05)	4.38	2.05	0.29 (2.36)	4.70	1.72	0.73 [0.87]
Health	0.11 (7.60)	1.18	1.81	0.04 (1.29)	1.07	1.67	0.43 [0.93]
Personal Services	0.08 (10.69)	0.62	2.18	0.07 (2.89)	0.63	2.18	1.58 [0.66]

Notes: μ, mark-up; σ. residual standard deviation; *DW*, Durbin-Watson test; *ST* Sargan test; between brackets t-ratio; between square brackets p-value; the instruments in the second column are the main first and second branches demanding the production of the targeted sector and the first lag of the primal and dual Solow Residual.

TABLE A.1.2. RESULTS FOR EQUATION [2.8]. USA

	Ordinary Least Square				Instrumental Variable				
	μ	ϕ	σ	*DW*	μ	ϕ	σ	*DW*	*ST*
Agriculture, etc.	0.55 (5.95)	0.35 (4.04)	2.22	1.96	0.51 (2.07)	0.45 (1.97)	2.62	1.83	6.85 [0.14]
Mining	0.93 (12.84)	0.13 (3.32)	1.24	1.61	0.87 (6.24)	0.10 (1.22)	1.25	1.69	5.04 [0.28]
Food	0.10 (4.09)	0.13 (0.70)	1.01	1.68	0.11 (2.04)	0.09 (0.17)	1.04	1.58	1.17 [0.88]
Textiles	0.09 (2.46)	0.02 (0.05)	0.75	2.38	0.22 (1.47)	0.61 (2.87)	0.91	2.17	1.40 [0.84]
Wood	0.31 (5.67)	0.53 (7.76)	1.08	1.97	0.32 (2.07)	0.61 (4.61)	1.41	2.05	2.26 [0.69]
Paper	0.20 (3.76)	0.24 (1.51)	0.69	1.86	0.10 (1.14)	-0.43 (-0.37)	0.75	1.81	3.20 [0.53]
Chemical	0.11 (4.41)	-0.30 (-1.15)	0.69	2.09	0.00 (0.03)	-15.41 (-0.11)	0.90	2.20	1.18 [0.88]
Non-Metallic Mineral	0.60 (6.15)	0.69 (22.64)	0.96	1.53	0.40 (2.91)	0.62 (7.88)	1.09	1.83	3.21 [0.52]
Basic Metal	0.11 (2.63)	0.03 (0.08)	0.95	2.15	0.25 (1.74)	0.57 (2.81)	1.08	2.00	1.34 [0.85]
Machinery	0.34 (3.39)	0.53 (5.52)	1.23	1.90	0.18 (0.83)	0.18 (0.22)	1.34	1.69	2.81 [0.59]
Electrical Equipment	0.17 (2.99)	0.37 (2.54)	1.11	2.27	0.08 (0.55)	-0.21 (-0.12)	1.20	2.02	5.43 [0.25]
Transport Equipment	0.09 (1.76)	0.38 (1.97)	1.60	1.90	-0.07 (-0.60)	6.76 (0.13)	1.94	2.10	4.36 [0.36]
Other Manufacturing	0.23 (3.18)	0.44 (3.61)	0.95	2.05	0.32 (1.59)	0.58 (3.73)	1.05	1.51	2.34 [0.67]
Electricity and Gas	0.45 (5.58)	0.07 (0.65)	1.57	1.46	0.32 (1.88)	-0.45 (-0.56)	1.99	1.92	1.84 [0.77]
Construction	0.07 (2.55)	0.09 (0.29)	0.48	1.62	0.15 (2.07)	0.52 (2.62)	0.54	1.66	5.10 [0.28]
Trade	0.34 (3.00)	0.56 (4.83)	0.85	1.49	0.47 (1.42)	0.67 (4.49)	1.07	1.55	0.64 [0.96]
Hotels and Restaurants	0.16 (4.00)	0.35 (2.96)	0.78	1.46	0.45 (0.81)	0.66 (2.54)	1.26	1.21	1.73 [0.79]
Transport	0.36 (3.11)	0.35 (2.18)	1.16	2.00	0.23 (0.97)	0.16 (0.24)	1.35	2.19	0.40 [0.98]
Communications	0.84 (5.42)	0.40 (6.71)	0.85	1.71	0.83 (1.48)	0.41 (1.97)	0.88	1.80	6.05 [0.20]
Business Activities	0.85 (4.02)	0.23 (2.60)	1.28	1.79	0.40 (1.19)	-0.04 (-0.09)	1.40	1.78	6.39 [0.17]
Education	0.37 (1.49)	0.29 (1.40)	4.39	2.19	0.48 (0.95)	0.25 (0.67)	4.68	1.76	0.73 [0.96]
Health	0.95 (5.12)	0.76 (35.21)	0.68	1.59	0.48 (1.18)	0.68 (4.63)	0.79	1.77	0.59 [0.83]
Personal Services	0.14 (3.16)	0.40 (2.40)	0.61	2.10	0.05 (0.43)	-0.41 (-0.15)	0.66	2.20	2.00 [0.74]

Notes: ϕ trade union bargaining power; additional instruments first lags of the capital-labour ratio and the user cost-wages ratio; see previous table.

TABLE A.1.3. RESULTS FOR EQUATION [2.6]. JAPAN

	Ordinary Least Square			Instrumental Variable			
	μ	σ	*DW*	μ	σ	*DW*	*ST*
Agriculture, etc.	0.15 (6.26)	3.13	1.75	0.13 (3.88)	3.22	1.80	1.87 [0.60]
Mining	0.38 (15.22)	2.49	1.77	0.40 (11.28)	2.39	1.91	6.81 [0.08]
Food	0.28 (27.13)	1.07	1.48	0.31 (10.23)	1.11	1.32	4.88 [0.18]
Textiles	0.20 (12.81)	1.90	2.04	0.19 (4.19)	1.91	2.04	0.52 [0.92]
Wood	0.04 (6.34)	1.16	2.07	0.06 (0.84)	1.19	2.10	1.51 [0.68]
Paper	0.08 (11.30)	1.19	1.94	0.07 (7.24)	1.17	2.04	1.37 [0.71]
Chemical	0.12 (9.50)	1.83	1.55	0.13 (4.56)	1.64	1.90	5.02 [0.17]
Non-Metallic Mineral	0.23 (16.85)	1.61	2.19	0.24 (13.01)	1.60	2.30	4.20 [0.24]
Basic Metal	0.16 (15.92)	1.52	1.85	0.12 (5.01)	1.91	1.63	4.89 [0.18]
Machinery	0.21 (21.89)	1.16	1.48	0.22 (15.99)	1.17	1.35	6.88 [0.08]
Electrical Equipment	0.17 (25.02)	0.91	1.59	0.19 (13.10)	1.02	1.60	5.54 [0.14]
Transport Equipment	0.10 (5.11)	1.95	1.81	0.15 (3.54)	2.15	1.56	1.39 [0.71]
Other Manufacturing	0.10 (14.58)	1.10	1.86	0.10 (8.94)	1.13	1.80	0.77 [0.86]
Electricity and Gas	0.35 (14.16)	2.36	1.60	0.36 (6.73)	2.30	1.68	0.38 [0.94]
Construction	0.13 (9.58)	2.15	2.03	0.13 (3.39)	2.19	2.00	5.78 [0.12]
Trade	0.28 (19.18)	2.17	1.35	0.26 (12.51)	1.79	1.71	4.49 [0.21]
Hotels and Restaurants	0.18 (11.78)	2.26	1.74	0.13 (4.28)	2.51	1.20	1.84 [0.61]
Transport	0.19 (26.23)	1.38	1.82	0.18 (17.14)	1.48	1.60	7.02 [0.07]
Communications	0.70 (10.14)	3.38	1.55	0.80 (4.60)	3.43	1.45	0.71 [0.87]
Business Activities	1.32 (44.16)	1.86	2.10	1.32 (32.39)	1.86	2.13	6.03 [0.11]
Education	0.10 (9.87)	1.07	1.97	0.11 (9.08)	0.98	2.22	4.76 [0.19]
Health	0.10 (10.89)	1.01	2.02	0.11 (7.48)	0.94	2.22	5.15 [0.16]
Personal Services	0.49 (16.68)	2.11	1.88	0.49 (10.06)	2.14	1.92	2.59 [0.46]

Notes: See previous tables.

TABLE A.1.4. RESULTS FOR EQUATION [2.8]. JAPAN

	Ordinary Least Square				Instrumental Variable				
	μ	ϕ	σ	*DW*	μ	ϕ	σ	*DW*	*ST*
Agriculture, etc.	0.49 (5.96)	0.59 (14.05)	2.18	1.47	0.35 (2.68)	0.51 (4.11)	2.35	1.68	3.04 [0.55]
Mining	0.62 (7.98)	0.39 (6.37)	2.04	2.11	0.48 (3.51)	0.27 (1.28)	2.21	1.98	7.91 [0.10]
Food	0.43 (4.17)	0.26 (2.18)	1.04	1.53	0.17 (1.15)	-0.54 (-0.50)	1.18	1.46	4.19 [0.38]
Textiles	0.22 (3.94)	0.06 (0.23)	1.93	2.07	0.11 (0.69)	-1.09 (-0.21)	1.86	2.05	0.58 [0.97]
Wood	0.05 (5.95)	-0.14 (-0.67)	1.17	2.09	0.06 (0.96)	-0.09 (-0.37)	1.20	2.15	1.60 [0.81]
Paper	0.15 (5.47)	0.42 (4.55)	1.09	2.09	0.10 (1.34)	0.25 (0.52)	1.13	2.07	2.51 [0.64]
Chemical	0.02 (0.41)	-1.84 (-0.80)	1.72	1.56	0.12 (0.76)	-0.18 (-0.15)	1.56	1.91	6.74 [0.15]
Non-Metallic Mineral	0.37 (4.21)	0.33 (2.57)	1.56	2.20	-0.08 (-0.39)	2.14 (0.95)	2.31	2.21	4.28 [0.37]
Basic Metal	0.23 (4.29)	0.30 (1.97)	1.49	1.81	0.32 (1.47)	0.49 (1.62)	1.59	1.67	7.39 [0.12]
Machinery	0.49 (8.74)	0.52 (13.55)	1.19	1.47	0.72 (3.82)	0.64 (11.22)	1.24	0.81	3.33 [0.50]
Electrical Equipment	0.29 (6.57)	0.20 (0.52)	0.80	1.75	0.66 (2.39)	0.69 (7.99)	1.13	1.57	2.03 [0.73]
Transport Equipment	0.15 (1.22)	0.40 (5.09)	1.98	1.84	0.03 (0.17)	-1.22 (-0.22)	2.08	1.69	3.52 [0.47]
Other Manufacturing	0.23 (5.77)	0.57 (8.90)	0.92	1.72	0.17 (1.95)	0.44 (1.56)	0.98	1.71	0.55 [0.97]
Electricity and Gas	0.25 (2.24)	-0.24 (-0.71)	2.37	1.59	-0.02 (-0.06)	-5.08 (-0.17)	2.76	1.58	2.63 [0.62]
Construction	0.60 (4.48)	0.67 (14.89)	1.61	1.88	0.55 (2.42)	0.67 (8.08)	1.82	1.51	3.44 [0.49]
Trade	0.21 (1.34)	-0.31 (-0.30)	2.20	1.39	0.06 (0.25)	-5.30 (-0.11)	2.06	1.69	3.09 [0.54]
Hotels and Restaurants	0.29 (2.91)	0.34 (1.96)	2.24	1.66	0.21 (1.73)	0.28 (0.95)	2.45	1.24	5.01 [0.29]
Transport	0.19 (5.82)	0.00 (0.01)	1.40	1.82	0.08 (1.05)	-2.52 (-0.34)	1.48	1.63	8.34 [0.08]
Communications	1.35 (3.60)	0.30 (3.62)	3.11	1.15	0.84 (2.07)	0.02 (0.06)	3.49	1.42	1.70 [0.79]
Business Activities	1.64 (4.69)	0.05 (0.76)	1.88	2.05	3.86 (1.71)	0.19 (2.06)	1.90	1.96	6.25 [0.18]
Education	0.19 (5.19)	0.47 (5.04)	0.96	2.22	0.17 (1.00)	0.38 (0.59)	0.98	2.23	4.90 [0.30]
Health	0.17 (5.60)	0.41 (4.20)	0.93	2.26	0.42 (1.19)	0.73 (4.22)	1.16	2.07	2.50 [0.64]
Personal Services	1.71 (7.17)	0.51 (19.24)	1.06	1.62	1.59 (3.13)	0.49 (6.91)	1.05	1.64	6.60 [0.16]

Notes: See previous tables.

TABLE A.1.5. RESULTS FOR EQUATION [2.6]. GERMANY

	Ordinary Least Square			Instrumental Variable			
	μ	σ	*DW*	μ	σ	*DW*	*ST*
Agriculture, etc.	0.02 (0.55)	3.40	2.18	0.12 (0.42)	3.44	2.21	3.22 [0.36]
Mining	0.32 (5.91)	3.72	1.81	0.55 (1.77)	4.19	1.70	4.15 [0.25]
Food	0.10 (11.13)	0.86	2.37	0.07 (2.26)	0.89	2.25	2.65 [0.45]
Textiles	0.12 (10.83)	0.97	2.00	0.18 (3.47)	1.17	2.13	2.06 [0.56]
Wood	0.01 (0.80)	1.01	1.93	0.06 (1.98)	1.00	2.09	2.67 [0.45]
Paper	0.17 (14.16)	1.03	2.16	0.19 (5.14)	1.06	2.28	1.21 [0.75]
Chemical	0.18 (11.51)	1.22	2.20	0.15 (2.64)	1.31	2.32	5.23 [0.16]
Non-Metallic Mineral	0.18 (16.98)	0.70	1.72	0.17 (4.38)	0.73	1.61	5.96 [0.11]
Basic Metal	0.12 (11.62)	1.04	2.12	0.11 (2.54)	1.05	2.11	7.36 [0.06]
Machinery	0.11 (10.01)	0.91	1.99	0.10 (3.14)	0.92	1.93	6.02 [0.11]
Electrical Equipment	0.19 (10.89)	1.35	2.08	0.04 (3.94)	1.35	1.98	6.12 [0.11]
Transport Equipment	0.17 (5.86)	1.66	2.33	0.07 (1.47)	1.77	2.37	7.56 [0.06]
Other Manufacturing	0.06 (6.72)	0.97	1.72	0.05 (1.93)	0.98	1.66	1.08 [0.78]
Electricity and Gas	0.69 (10.70)	2.46	1.42	0.55 (3.31)	2.32	1.40	5.34 [0.15]
Construction	0.13 (11.18)	0.89	2.45	0.16 (4.02)	0.94	2.71	5.52 [0.14]
Trade	0.22 (13.22)	1.64	1.85	0.26 (3.80)	1.74	1.99	6.86 [0.08]
Hotels and Restaurants	-0.01 (-0.58)	1.50	2.20	0.03 (0.32)	1.54	2.22	0.92 [0.82]
Transport	0.08 (10.11)	1.02	1.81	0.06 (2.20)	1.03	1.64	6.23 [0.10]
Communications	0.83 (14.85)	1.48	2.16	0.69 (5.39)	1.42	1.95	4.56 [0.21]
Business Activities	0.97 (46.90)	1.35	1.62	0.86 (9.07)	1.19	1.70	3.65 [0.30]
Education	0.08 (11.15)	0.51	1.62	0.05 (2.68)	0.47	1.77	5.58 [0.13]
Health	0.16 (6.34)	1.39	1.48	0.19 (2.28)	1.43	1.56	5.51 [0.14]
Personal Services	0.33 (17.08)	0.89	1.59	0.41 (4.56)	1.01	1.68	1.84 [0.61]

Notes: See previous tables.

TABLE A.1.6. RESULTS FOR EQUATION [2.8]. GERMANY

	Ordinary Least Square				Instrumental Variable				
	μ	ϕ	σ	*DW*	μ	ϕ	σ	*DW*	*ST*
Agriculture, etc.	0.00 (0.01)	1.10 (21.78)	3.20	2.33	-0.03 (-0.35)	1.07 (16.86)	3.31	2.26	2.76 [0.60]
Mining	0.32 (2.61)	-0.01 (-0.03)	3.78	1.82	0.60 (1.31)	0.46 (1.54)	3.96	1.77	9.45 [0.05]
Food	0.12 (2.45)	0.18 (0.53)	0.87	2.37	0.16 (1.26)	0.48 (1.49)	0.90	2.22	2.08 [0.72]
Textiles	0.05 (1.39)	-2.19 (-0.60)	0.93	2.09	-0.03 (-0.29)	1.66 (2.30)	1.06	2.42	1.64 [0.80]
Wood	0.00 (0.34)	-0.36 (-0.27)	1.03	1.91	0.05 (1.20)	0.25 (0.18)	0.99	2.13	6.05 [0.20]
Paper	0.30 (3.50)	0.40 (2.89)	1.00	2.39	0.14 (1.06)	-0.32 (-0.21)	1.11	2.11	3.03 [0.55]
Chemical	0.24 (4.86)	0.27 (1.92)	1.21	2.09	0.18 (1.71)	-0.14 (-0.15)	1.24	2.07	9.50 [0.05]
Non-Metallic Mineral	0.20 (5.54)	0.12 (0.87)	0.71	1.67	0.09 (1.20)	-0.99 (-0.54)	0.82	1.80	3.62 [0.46]
Basic Metal	0.13 (3.64)	0.15 (0.54)	1.05	2.13	0.48 (1.18)	0.78 (5.69)	1.52	2.17	2.21 [0.70]
Machinery	0.17 (3.79)	0.35 (2.30)	0.89	2.00	0.06 (0.54)	-0.55 (-0.19)	1.01	1.87	6.92 [0.14]
Electrical Equipment	0.25 (3.15)	0.22 (1.03)	1.36	2.16	0.05 (0.33)	-11.99 (-0.06)	1.59	1.81	5.27 [0.26]
Transport Equipment	0.29 (3.19)	0.40 (2.56)	1.63	2.09	0.59 (1.51)	0.70 (5.86)	1.79	1.58	7.60 [0.11]
Other Manufacturing	0.08 (2.37)	0.16 (0.49)	0.98	1.76	0.08 (1.44)	0.37 (0.92)	0.98	1.78	2.29 [0.68]
Electricity and Gas	0.89 (2.14)	0.15 (0.65)	2.48	1.40	-3.47 (-0.78)	0.71 (4.87)	4.56	1.43	0.78 [0.94]
Construction	0.15 (3.26)	0.12 (0.53)	0.90	2.48	0.12 (0.82)	-0.76 (-0.18)	1.01	2.82	6.43 [0.17]
Trade	0.14 (2.33)	-0.52 (-0.86)	1.63	1.79	0.14 (0.95)	-1.12 (-0.31)	1.69	1.93	8.48 [0.08]
Hotels and Restaurants	0.15 (3.18)	1.00 (8985.23)	1.24	1.90	-0.05 (-0.54)	1.00 (318.80)	1.74	2.21	2.27 [0.69]
Transport	0.22 (3.47)	0.65 (6.89)	0.95	2.03	0.35 (1.69)	0.82 (10.31)	1.15	1.64	2.51 [0.64]
Communications	0.77 (4.49)	-0.05 (-0.33)	1.50	2.19	0.66 (3.40)	-0.06 (-0.28)	1.45	1.99	5.36 [0.25]
Business Activities	0.86 (2.75)	-0.04 (-0.26)	1.37	1.61	1.64 (1.26)	0.18 (0.83)	1.25	1.72	4.09 [0.39]
Education	0.02 (0.70)	-1.93 (-0.52)	0.50	1.96	-0.22 (-0.94)	1.33 (2.63)	1.03	2.28	0.38 [0.98]
Health	0.58 (4.02)	0.70 (22.29)	0.92	2.42	0.56 (1.81)	0.70 (9.48)	0.92	2.45	5.70 [0.22]
Personal Services	0.54 (4.21)	0.55 (10.16)	0.70	2.12	0.44 (2.30)	0.50 (4.22)	0.71	2.04	4.75 [0.31]

Notes: See previous tables.

TABLE A.1.7. RESULTS FOR EQUATION [2.6]. FRANCE

	Ordinary Least Square			Instrumental Variable			
	μ	σ	*DW*	μ	σ	*DW*	*ST*
Agriculture, etc.	0.03 (1.43)	2.59	1.86	0.01 (0.45)	2.66	1.79	4.26 [0.23]
Mining	0.27 (3.80)	5.51	2.32	0.23 (1.67)	5.63	1.99	4.00 [0.26]
Food	0.08 (12.92)	0.60	2.42	0.06 (1.91)	0.68	2.44	2.85 [0.41]
Textiles	0.06 (8.13)	0.71	1.36	0.04 (1.90)	0.77	1.54	0.84 [0.84]
Wood	0.03 (3.03)	1.21	1.96	0.03 (0.90)	1.23	1.97	5.19 [0.16]
Paper	0.11 (16.42)	0.69	1.69	0.01 (12.10)	0.70	1.66	1.39 [0.71]
Chemical	0.14 (21.77)	0.61	2.02	0.14 (7.90)	0.63	2.00	0.11 [0.99]
Non-Metallic Mineral	0.05 (4.66)	0.98	1.64	0.03 (2.16)	1.03	1.70	1.79 [0.62]
Basic Metal	0.09 (10.16)	1.00	2.30	0.10 (5.74)	1.03	2.32	1.08 [0.78]
Machinery	0.22 (16.23)	1.07	1.65	0.24 (8.41)	1.12	1.79	2.29 [0.51]
Electrical Equipment	0.17 (13.23)	1.06	1.98	0.20 (7.29)	1.15	2.21	2.41 [0.49]
Transport Equipment	0.08 (4.85)	0.96	2.02	0.03 (1.68)	1.11	1.62	1.87 [0.60]
Other Manufacturing	0.14 (20.45)	0.68	1.77	0.15 (6.45)	0.70	1.68	5.75 [0.12]
Electricity and Gas	0.29 (19.93)	0.98	1.96	0.35 (3.77)	1.19	1.60	3.10 [0.38]
Construction	0.19 (28.71)	0.66	2.54	0.17 (5.31)	0.80	2.27	0.05 [0.99]
Trade	0.01 (1.52)	1.44	2.57	0.00 (0.05)	1.51	2.58	3.47 [0.32]
Hotels and Restaurants	0.01 (1.38)	0.97	1.75	0.03 (1.44)	1.13	1.93	0.54 [0.91]
Transport	0.19 (25.20)	1.08	2.23	0.19 (19.30)	1.10	2.24	2.18 [0.54]
Communications	0.62 (10.47)	2.00	1.78	0.41 (2.09)	2.50	2.12	2.61 [0.46]
Business Activities	0.26 (52.10)	1.19	2.00	0.26 (27.45)	1.22	2.00	1.15 [0.76]
Education	-0.01 (-0.72)	1.18	2.25	-0.05 (-0.94)	1.55	2.48	3.58 [0.31]
Health	0.03 (2.28)	1.26	2.48	0.06 (0.87)	1.38	2.44	4.42 [0.22]
Personal Services	0.12 (9.53)	1.11	2.18	2.98 (4.56)	1.14	2.25	0.76 [0.86]

Notes: See previous tables.

TABLE A.1.8. RESULTS FOR EQUATION [2.8]. FRANCE

	Ordinary Least Square				Instrumental Variable				
	μ	ϕ	σ	*DW*	μ	ϕ	σ	*DW*	*ST*
Agriculture, etc.	0.06 (2.07)	0.66 (4.93)	2.52	2.15	0.04 (0.64)	0.64 (2.33)	2.59	2.05	3.88 [0.42]
Mining	0.59 (3.78)	0.50 (6.60)	4.84	2.43	0.31 (0.65)	0.20 (0.24)	5.38	2.09	4.61 [0.33]
Food	0.04 (1.20)	-1.12 (-0.65)	0.60	2.31	0.06 (0.74)	-0.34 (-0.22)	0.61	2.41	4.03 [0.72]
Textiles	0.02 (0.95)	-1.94 (-0.64)	0.68	1.34	0.00 (0.03)	3.90 (79.11)	0.83	1.76	3.16 [0.53]
Wood	0.01 (0.64)	-3.61 (-0.47)	1.14	1.68	0.02 (0.51)	30.15 (0.04)	1.21	1.60	4.68 [0.32]
Paper	0.16 (3.36)	0.27 (1.40)	0.69	1.80	0.30 (2.25)	0.56 (3.75)	0.77	2.11	1.00 [0.91]
Chemical	0.13 (5.63)	-0.07 (-0.39)	0.62	2.04	0.12 (2.15)	-0.17 (-0.32)	0.63	2.06	1.39 [0.85]
Non-Metallic Mineral	0.03 (1.63)	-0.65 (-0.82)	0.97	1.67	0.07 (2.30)	0.45 (2.25)	1.25	1.87	1.34 [0.86]
Basic Metal	0.31 (6.18)	0.68 (16.58)	0.74	2.15	0.27 (2.18)	0.65 (4.70)	0.76	2.24	1.96 [0.74]
Machinery	0.18 (3.19)	-0.23 (-0.67)	1.11	1.34	0.24 (2.74)	0.39 (2.00)	1.34	1.89	2.60 [0.63]
Electrical Equipment	0.12 (3.00)	-0.35 (-0.77)	1.05	1.86	0.22 (1.70)	0.14 (0.27)	1.19	2.23	3.28 [0.51]
Transport Equipment	0.11 (3.48)	0.39 (2.13)	0.95	2.15	0.08 (2.11)	0.59 (2.26)	1.27	1.88	1.53 [0.82]
Other Manufacturing	0.07 (1.64)	-0.98 (-0.78)	0.67	1.83	0.07 (0.96)	-0.82 (-0.40)	0.68	1.85	9.16 [0.06]
Electricity and Gas	0.51 (9.00)	0.32 (7.00)	0.75	2.31	0.51 (2.83)	0.31 (2.44)	0.78	2.20	7.86 [0.10]
Construction	0.28 (5.36)	0.28 (2.56)	0.64	2.59	0.20 (2.45)	0.10 (0.34)	0.70	2.43	0.22 [0.99]
Trade	0.01 (0.78)	-1.00 (-0.88)	1.40	2.43	0.00 (0.16)	-1.81 (-0.39)	1.43	2.39	2.80 [0.59]
Hotels and Restaurants	0.00 (0.37)	-1.07 (-0.80)	0.94	1.71	0.04 (2.48)	0.43 (2.25)	1.26	1.95	3.45 [0.48]
Transport	0.30 (2.86)	0.30 (1.61)	1.07	2.16	0.39 (2.41)	0.42 (2.50)	1.10	2.11	2.15 [0.71]
Communications	1.21 (3.08)	0.33 (3.20)	1.89	1.32	0.81 (0.94)	0.31 (0.74)	2.37	1.95	2.30 [0.56]
Business Activities	0.14 (1.97)	-0.34 (-1.02)	1.18	1.78	-0.01 (-0.04)	-1.91 (-0.44)	1.28	1.39	2.34 [0.67]
Education	0.00 (0.14)	0.42 (1.60)	1.17	2.41	0.01 (0.26)	0.73 (5.80)	1.33	2.67	4.04 [0.40]
Health	0.01 (0.95)	-1.03 (-1.09)	1.19	2.09	0.01 (0.39)	-0.76 (-0.61)	1.20	2.18	5.26 [0.26]
Personal Services	0.09 (2.69)	-0.34 (-0.86)	1.10	2.00	0.16 (3.01)	0.10 (1.36)	1.20	2.33	0.98 [0.91]

Notes: See previous tables.

TABLE A.1.9. RESULTS FOR EQUATION [2.6]. UK.

	Ordinary Least Square			Instrumental Variable			
	μ	σ	*DW*	μ	σ	*DW*	*ST*
Agriculture, etc.	0.23 (10.60)	2.19	2.28	0.23 (2.41)	2.22	2.27	1.72 [0.63]
Mining	1.82 (5.21)	6.35	1.92	1.00 (2.62)	7.44	1.77	3.80 [0.28]
Food	0.07 (11.95)	0.86	2.05	0.08 (4.92)	0.88	2.02	0.56 [0.91]
Textiles	0.06 (6.95)	1.08	2.24	0.07 (5.05)	1.17	2.35	6.40 [0.09]
Wood	0.13 (9.71)	1.82	2.00	0.17 (5.99)	1.96	1.96	3.17 [0.37]
Paper	0.10 (9.63)	1.31	1.69	0.07 (3.75)	1.38	1.97	2.98 [0.40]
Chemical	0.08 (7.09)	1.57	1.63	0.06 (2.00)	1.64	1.65	3.55 [0.31]
Non-Metallic Mineral	0.12 (7.55)	2.06	1.89	0.07 (2.07)	2.44	1.98	0.57 [0.90]
Basic Metal	0.07 (8.19)	1.29	1.57	0.08 (5.02)	1.34	1.68	5.05 [0.17]
Machinery	0.06 (6.00)	1.27	1.38	0.07 (3.47)	1.28	1.36	6.95 [0.07]
Electrical Equipment	0.13 (9.02)	1.61	2.11	0.13 (4.10)	1.63	2.14	3.53 [0.32]
Transport Equipment	0.01 (0.52)	2.02	1.76	0.02 (0.57)	2.07	1.75	2.06 [0.56]
Other Manufacturing	0.13 (12.63)	1.47	1.93	0.13 (8.46)	1.47	2.03	3.95 [0.27]
Electricity and Gas	0.27 (15.09)	1.77	1.50	0.26 (6.43)	1.71	1.68	4.82 [0.19]
Construction	0.07 (6.46)	1.68	1.60	0.05 (1.66)	1.75	1.41	1.62 [0.66]
Trade	0.12 (8.18)	2.40	1.74	0.08 (2.27)	2.44	2.26	6.31 [0.10]
Hotels and Restaurants	0.28 (15.81)	2.11	1.49	0.23 (5.22)	2.36	1.84	4.17 [0.24]
Transport	0.07 (12.44)	1.01	2.03	0.07 (5.33)	1.02	1.98	1.58 [0.66]
Communications	0.23 (6.38)	2.93	1.43	0.49 (0.84)	4.32	1.54	4.24 [0.24]
Business Activities	0.15 (11.03)	3.03	2.30	0.12 (4.09)	3.24	2.37	2.44 [0.49]
Education	0.11 (6.30)	2.09	1.92	0.14 (3.73)	2.25	1.88	3.28 [0.35]
Health	0.04 (4.80)	1.13	1.43	0.05 (1.94)	1.13	1.49	2.09 [0.55]
Personal Services	0.16 (14.36)	1.24	1.70	0.12 (4.36)	1.39	2.09	5.16 [0.16]

Notes: See previous tables.

TABLE A.1.10. RESULTS FOR EQUATION [2.8]. UK.

	Ordinary Least Square				Instrumental Variable				
	μ	ϕ	σ	*DW*	μ	ϕ	σ	*DW*	*ST*
Agriculture, etc.	0.50 (5.41)	0.48 (7.16)	1.86	2.13	0.55 (2.93)	0.49 (4.05)	1.92	2.05	2.68 [0.61]
Mining	2.42 (5.00)	0.15 (4.18)	5.44	2.28	1.18 (2.13)	-0.26 (-0.38)	9.51	1.90	2.11 [0.71]
Food	0.09 (3.63)	0.12 (0.63)	0.87	2.07	0.12 (1.83)	0.35 (1.08)	0.91	2.19	2.43 [0.66]
Textiles	0.10 (3.06)	0.41 (2.38)	1.06	2.33	0.12 (2.02)	0.47 (1.64)	1.11	2.37	1.12 [0.89]
Wood	0.12 (2.65)	-0.13 (-0.31)	1.85	2.01	0.13 (1.21)	-0.35 (-0.23)	2.02	2.01	0.49 [0.97]
Paper	0.17 (3.30)	0.36 (2.44)	1.28	1.52	0.10 (0.71)	0.11 (0.12)	1.29	1.89	2.87 [0.58]
Chemical	0.04 (2.48)	-0.96 (-1.10)	1.49	1.56	-0.01 (-0.12)	3.49 (0.39)	1.86	1.66	4.02 [0.40]
Non-Metallic Mineral	0.20 (3.85)	0.40 (2.81)	2.00	1.77	0.11 (1.36)	0.24 (0.62)	2.32	1.84	2.04 [0.73]
Basic Metal	0.07 (3.01)	-0.03 (-0.08)	1.32	1.57	0.26 (1.17)	0.71 (3.22)	2.27	2.24	1.09 [0.90]
Machinery	0.10 (3.58)	0.37 (2.54)	1.24	1.43	0.04 (0.48)	-11.77 (-0.04)	1.80	1.47	4.73 [0.32]
Electrical Equipment	0.21 (3.67)	0.36 (2.62)	1.56	2.25	0.28 (0.73)	0.52 (0.95)	1.65	2.33	3.24 [0.52]
Transport Equipment	-0.00 (-0.22)	8.89 (0.21)	1.97	1.79	-0.00 (-0.11)	1.55 (1.13)	2.23	1.74	4.37 [0.36]
Other Manufacturing	0.18 (4.92)	0.28 (2.12)	2.44	1.93	0.20 (1.96)	0.37 (1.22)	1.42	2.12	4.37 [0.36]
Electricity and Gas	0.17 (3.82)	-0.40 (-1.51)	1.68	1.59	0.34 (1.59)	0.13 (0.36)	1.89	1.46	4.97 [0.29]
Construction	0.04 (1.25)	-0.83 (-0.67)	1.67	1.60	0.07 (1.14)	-0.15 (-0.13)	1.73	1.59	2.10 [0.72]
Trade	0.09 (2.49)	-0.24 (-0.52)	2.42	1.63	0.10 (1.67)	-0.41 (-0.35)	2.36	1.53	14.72 [0.01]
Hotels and Restaurants	0.13 (4.18)	-0.88 (-2.28)	1.70	1.56	0.04 (0.46)	-8.16 (-0.22)	2.16	1.65	3.39 [0.50]
Transport	0.05 (4.35)	-0.26 (-1.20)	0.99	2.02	0.04 (2.10)	-0.56 (-0.83)	1.01	2.02	6.71 [0.15]
Communications	0.56 (6.67)	0.43 (10.09)	2.08	2.04	1.13 (1.24)	0.45 (2.97)	3.99	1.97	0.85 [0.93]
Business Activities	0.42 (3.70)	0.33 (3.70)	2.81	2.32	0.33 (1.21)	0.29 (1.04)	2.94	2.50	6.73 [0.15]
Education	0.02 (0.86)	-4.63 (-0.55)	1.86	1.55	0.15 (1.42)	0.06 (0.08)	2.34	1.90	2.26 [0.69]
Health	0.00 (0.16)	-283.90 (-0.02)	0.75	1.32	0.00 (0.18)	-4.24 (-0.67)	0.78	1.38	5.97 [0.20]
Personal Services	0.18 (3.52)	0.09 (0.41)	1.25	1.65	0.17 (1.45)	0.15 (0.29)	1.28	1.91	11.32 [0.02]

Notes: See previous tables.

TABLE A.1.11. RESULTS FOR EQUATION [2.6]. ITALY

	Ordinary Least Square			Instrumental Variable			
	μ	σ	*DW*	μ	σ	*DW*	*ST*
Agriculture, etc.	0.02 (0.98)	3.54	1.42	-0.04 (-1.01)	4.03	1.84	1.72 [0.63]
Mining	1.07 (22.06)	2.33	2.16	1.07 (14.40)	2.32	2.26	3.80 [0.28]
Food	0.06 (22.68)	0.54	2.08	0.06 (8.06)	0.56	2.07	0.56 [0.91]
Textiles	0.02 (2.82)	1.43	1.79	0.00 (0.24)	1.46	1.76	6.40 [0.09]
Wood	0.04 (4.41)	1.86	1.97	0.03 (1.12)	1.81	2.07	3.17 [0.37]
Paper	0.08 (9.51)	1.65	1.87	0.09 (7.34)	1.66	2.07	2.98 [0.40]
Chemical	0.06 (8.91)	1.31	1.95	0.03 (1.92)	1.36	1.66	3.55 [0.31]
Non-Metallic Mineral	0.19 (16.65)	1.59	2.01	0.19 (13.79)	1.55	1.80	0.57 [0.90]
Basic Metal	0.13 (23.45)	0.97	1.60	0.15 (8.46)	1.18	1.89	5.05 [0.17]
Machinery	0.14 (22.94)	0.97	1.82	0.14 (1.59)	0.98	1.83	6.95 [0.07]
Electrical Equipment	0.12 (21.17)	0.90	1.95	0.12 (15.56)	0.86	2.15	3.53 [0.32]
Transport Equipment	0.09 (7.17)	1.56	1.69	0.11 (4.74)	1.57	2.05	2.06 [0.56]
Other Manufacturing	0.14 (19.95)	1.00	2.02	0.10 (13.57)	0.93	2.33	3.95 [0.27]
Electricity and Gas	0.15 (9.87)	2.73	1.71	0.13 (6.51)	2.78	1.90	4.82 [0.19]
Construction	0.23 (39.23)	0.98	2.00	0.24 (14.34)	0.99	1.92	1.62 [0.66]
Trade	0.10 (16.57)	1.41	1.88	0.09 (7.07)	1.46	1.76	6.31 [0.10]
Hotels and Restaurants	-0.01 (-0.84)	2.57	1.68	0.01 (0.38)	2.52	2.02	4.17 [0.24]
Transport	0.01 (1.94)	2.15	2.36	0.03 (2.55)	2.27	1.92	1.58 [0.66]
Communications	0.23 (8.50)	3.17	2.36	0.31 (4.99)	3.64	1.80	4.24 [0.24]
Business Activities	0.81 (100.33)	1.05	1.86	0.78 (47.11)	1.19	1.68	2.44 [0.49]
Education	0.06 (11.79)	0.84	1.48	0.06 (2.96)	0.89	1.54	3.28 [0.35]
Health	0.13 (19.02)	1.11	1.81	0.17 (6.07)	1.54	2.24	2.09 [0.55]
Personal Services	0.08 (5.38)	2.52	1.92	0.06 (1.76)	2.58	1.88	5.16 [0.16]

Notes: See previous tables.

TABLE A.1.12. RESULTS FOR EQUATION [2.8]. ITALY

	Ordinary Least Square				Instrumental Variable				
	μ	ϕ	σ	*DW*	μ	ϕ	σ	*DW*	*ST*
Agriculture, etc.	0.03 (1.58)	0.73 (5.14)	3.49	1.37	0.06 (0.84)	0.91 (18.61)	4.20	1.29	2.25 [0.69]
Mining	1.57 (4.36)	0.15 (2.07)	2.26	1.82	1.53 (2.38)	0.14 (1.00)	2.22	1.98	2.95 [0.57]
Food	0.06 (2.97)	-0.01 (-0.02)	0.55	2.08	0.08 (1.68)	0.24 (0.60)	0.59	2.10	1.54 [0.82]
Textiles	-0.01 (-0.63)	-16.00 (-0.11)	1.37	1.75	0.05 (0.88)	0.51 (1.47)	1.70	1.76	5.79 [0.22]
Wood	0.07 (1.85)	0.44 (1.71)	1.86	1.88	0.06 (0.78)	0.61 (2.12)	2.44	1.86	2.76 [0.60]
Paper	0.03 (0.76)	-1.77 (-0.43)	1.64	1.94	-0.34 (-1.23)	1.14 (6.72)	4.33	1.87	1.59 [0.81]
Chemical	0.03 (1.30)	-0.65 (-0.59)	1.31	2.01	0.02 (0.17)	-0.84 (-0.13)	1.34	1.77	8.26 [0.08]
Non-Metallic Mineral	0.20 (1.99)	0.04 (0.10)	1.61	1.99	0.02 (0.14)	-5.18 (-0.17)	1.67	2.07	4.31 [0.37]
Basic Metal	0.23 (7.73)	0.41 (6.37)	0.81	2.19	0.30 (5.12)	0.51 (7.03)	0.91	2.21	3.51 [0.48]
Machinery	0.22 (5.27)	0.31 (2.87)	0.93	1.78	0.20 (2.71)	0.24 (1.05)	0.93	1.85	7.77 [0.10]
Electrical Equipment	0.15 (3.39)	0.13 (0.63)	0.91	1.98	0.09 (0.98)	-0.30 (-0.27)	0.89	2.10	5.13 [0.27]
Transport Equipment	0.27 (5.32)	0.58 (10.37)	1.21	1.63	0.17 (2.07)	0.29 (0.93)	1.53	2.04	4.50 [0.34]
Other Manufacturing	0.19 (4.56)	0.40 (3.77)	0.94	1.85	0.05 (0.50)	-0.78 (-0.27)	1.06	2.40	3.92 [0.42]
Electricity and Gas	0.09 (2.04)	-0.69 (-0.93)	2.67	1.70	0.17 (1.72)	0.18 (0.49)	2.93	1.85	4.10 [0.39]
Construction	0.21 (2.99)	-0.10 (-0.31)	0.99	1.99	0.21 (1.83)	-0.15 (-0.25)	1.01	1.86	1.85 [0.76]
Trade	0.08 (1.79)	-0.20 (-0.38)	1.43	1.96	-0.05 (-0.45)	4.62 (0.32)	1.73	1.97	4.02 [0.40]
Hotels and Restaurants	-0.01 (-0.68)	-0.01 (-0.01)	2.61	1.68	0.02 (0.45)	0.86 (8.31)	2.65	2.05	4.92 [0.30]
Transport	0.01 (1.19)	-0.36 (-0.25)	2.18	2.38	0.03 (1.37)	0.34 (0.34)	2.35	1.87	2.38 [0.67]
Communications	0.46 (3.51)	0.45 (3.98)	3.00	2.26	0.44 (2.08)	0.31 (1.08)	3.46	1.78	4.34 [0.36]
Business Activities	0.77 (5.55)	-0.02 (-0.20)	1.06	1.86	0.65 (1.93)	-0.06 (-0.26)	1.16	1.69	3.31 [0.51]
Education	-0.01 (-0.25)	9.54 (0.23)	0.81	1.31	0.03 (0.53)	-1.01 (-0.24)	0.87	1.45	3.70 [0.45]
Health	0.25 (3.43)	0.42 (3.11)	1.07	1.89	0.21 (1.15)	0.21 (0.28)	1.41	2.19	3.18 [0.53]
Personal Services	0.07 (1.77)	-0.10 (-0.21)	2.56	1.91	0.12 (1.41)	0.41 (1.61)	2.78	1.92	4.04 [0.40]

Notes: See previous tables.

TABLE A.1.13. RESULTS FOR EQUATION [2.6]. SPAIN

	Ordinary Least Square			Instrumental Variable			
	μ	σ	*DW*	μ	σ	*DW*	*ST*
Agriculture, etc.	0.36 (10.63)	2.65	2.12	0.30 (2.03)	2.82	2.16	1.44 [0.70]
Mining	0.19 (7.94)	1.88	2.10	0.16 (2.71)	1.94	2.08	3.65 [0.30]
Food	0.09 (17.67)	0.49	1.61	0.10 (8.74)	0.50	1.61	3.31 [0.35]
Textiles	0.14 (18.30)	0.65	1.83	0.15 (5.64)	0.69	1.92	7.48 [0.06]
Wood	0.15 (16.84)	0.82	1.95	0.16 (9.53)	0.83	1.95	2.36 [0.50]
Paper	0.14 (34.89)	0.55	2.20	0.14 (21.39)	0.57	2.10	1.39 [0.71]
Chemical	0.13 (15.41)	0.72	1.82	0.10 (3.85)	0.90	2.13	1.57 [0.67]
Non-Metallic Mineral	0.16 (14.39)	0.89	2.68	0.18 (5.93)	0.91	2.58	2.67 [0.44]
Basic Metal	0.21 (17.07)	1.04	2.28	0.24 (8.21)	1.11	2.20	1.04 [0.79]
Machinery	0.14 (12.57)	0.77	1.98	0.16 (5.24)	0.82	1.84	5.47 [0.14]
Electrical Equipment	0.08 (5.65)	1.68	2.13	0.14 (3.43)	2.00	1.86	2.33 [0.51]
Transport Equipment	0.09 (6.40)	1.41	1.70	0.09 (2.52)	1.42	1.71	1.56 [0.67]
Other Manufacturing	0.14 (21.47)	0.59	1.93	0.12 (6.36)	0.64	2.11	2.90 [0.41]
Electricity and Gas	0.20 (5.86)	2.37	2.13	0.77 (0.52)	5.40	2.23	0.42 [0.94]
Construction	0.12 (20.63)	0.74	1.57	0.12 (6.85)	0.76	1.57	0.83 [0.84]
Trade	0.16 (29.91)	0.77	2.00	0.16 (12.78)	0.78	2.14	4.38 [0.22]
Hotels and Restaurants	0.04 (6.84)	0.86	1.90	0.03 (1.80)	0.93	1.86	4.84 [0.30]
Transport	0.20 (37.89)	0.88	1.37	0.19 (12.51)	0.89	1.38	1.96 [0.58]
Communications	0.55 (14.30)	2.22	1.90	0.50 (5.12)	2.33	1.96	2.85 [0.41]
Business Activities	0.44 (74.42)	1.75	1.54	0.43 (32.65)	1.82	1.58	2.39 [0.50]
Education	0.04 (4.81)	0.77	2.19	0.02 (1.09)	0.81	2.15	2.49 [0.65]
Health	0.28 (19.75)	0.89	1.82	0.21 (2.28)	1.17	1.64	1.95 [0.58]
Personal Services	0.30 (16.96)	1.17	2.71	0.24 (4.76)	1.39	2.26	4.34 [0.23]

Notes: See previous tables.

TABLE A.1.14. RESULTS FOR EQUATION [2.8]. ESPAÑA

	Ordinary Least Square				Instrumental Variable				
	μ	ϕ	σ	*DW*	μ	ϕ	σ	*DW*	*ST*
Agriculture, etc.	1.60 (3.51)	0.58 (12.74)	1.96	2.60	1.16 (1.19)	0.53 (3.47)	2.06	2.58	1.06 [0.90]
Mining	0.19 (2.35)	0.02 (0.07)	1.91	2.11	0.13 (0.90)	-0.33 (-0.29)	1.96	1.97	4.07 [0.40]
Food	0.09 (2.57)	-0.01 (-0.03)	0.50	1.61	0.29 (0.94)	0.60 (1.85)	0.65	1.81	1.55 [0.82]
Textiles	0.12 (3.54)	-0.09 (-0.34)	0.66	1.74	0.37 (1.67)	0.51 (2.41)	0.97	2.64	2.45 [0.65]
Wood	0.12 (2.73)	-0.24 (-0.61)	0.82	1.84	0.09 (0.42)	-0.52 (-0.17)	0.84	1.78	5.53 [0.24]
Paper	0.14 (7.19)	-0.01 (-0.11)	0.56	2.18	0.13 (1.76)	-0.11 (-0.19)	0.60	1.90	4.06 [0.40]
Chemical	0.10 (4.66)	-0.37 (-1.23)	0.70	1.85	0.02 (0.35)	-3.12 (-0.31)	0.91	1.90	0.99 [0.91]
Non-Metallic Mineral	0.15 (3.00)	-0.09 (-0.28)	0.90	2.68	0.13 (1.25)	-0.59 (-0.39)	1.09	2.35	7.43 [0.11]
Basic Metal	0.23 (4.61)	0.06 (0.30)	1.06	2.28	0.18 (1.51)	-0.26 (-0.28)	1.12	2.21	1.94 [0.75]
Machinery	0.21 (3.81)	0.28 (1.83)	0.76	2.15	0.24 (2.25)	0.36 (1.55)	0.78	2.24	6.07 [0.19]
Electrical Equipment	0.08 (1.78)	-0.05 (-0.13)	1.71	2.10	0.21 (1.61)	0.37 (1.04)	2.06	2.05	2.53 [0.64]
Transport Equipment	0.16 (4.03)	0.54 (4.47)	1.33	2.02	0.05 (0.53)	-583.80 (-0.00)	1.67	1.67	1.26 [0.87]
Other Manufacturing	0.11 (3.26)	-0.23 (-0.67)	0.59	2.00	0.07 (1.10)	-0.97 (-0.55)	0.61	2.11	3.68 [0.45]
Electricity and Gas	0.05 (1.05)	-2.23 (-1.10)	2.04	2.21	0.16 (0.66)	0.09 (0.12)	2.66	2.14	4.12 [0.39]
Construction	0.15 (3.41)	0.21 (1.04)	0.75	1.71	0.15 (1.26)	0.14 (0.22)	0.81	1.87	3.53 [0.47]
Trade	0.14 (3.08)	-0.09 (-0.29)	0.79	2.04	0.41 (0.97)	0.54 (1.59)	1.00	2.26	2.39 [0.66]
Hotels and Restaurants	0.03 (2.61)	-0.33 (-0.72)	0.86	1.89	0.06 (1.24)	0.45 (1.07)	1.17	1.81	3.31 [0.51]
Transport	0.39 (3.49)	0.42 (3.56)	0.84	1.68	0.65 (2.01)	0.59 (4.58)	0.89	2.02	3.62 [0.46]
Communications	1.00 (3.42)	0.28 (2.78)	2.14	1.58	-0.10 (-0.20)	5.67 (0.16)	3.88	2.34	2.01 [0.73]
Business Activities	0.25 (2.36)	-0.18 (-0.92)	1.75	1.45	1.22 (0.91)	0.27 (0.90)	2.13	1.81	4.23 [0.38]
Education	0.05 (1.88)	0.29 (0.86)	0.77	2.19	0.16 (0.87)	0.75 (3.46)	0.94	2.18	1.37 [0.85]
Health	0.26 (4.59)	-0.04 (-0.23)	0.84	2.10	0.48 (2.44)	0.36 (1.93)	1.01	2.44	1.39 [0.85]
Personal Services	0.50 (6.08)	0.33 (4.29)	1.06	2.86	0.66 (3.20)	0.49 (5.38)	1.30	2.77	2.60 [0.63]

Notes: See previous tables.

APPENDIX 2. DETAILED CONSTANT PARAMETERS SECTORAL CHARTS

FIGURE A.2.1. STEADY STATE MARK-UPS. AGRICULTURE
IV estimation of equation [2.6] and [2.8]

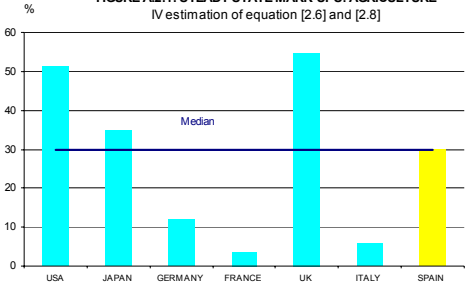


FIGURE A.2.2. STEADY STATE MARK-UPS. MINING
IV estimation of equation [2.6] and [2.8]

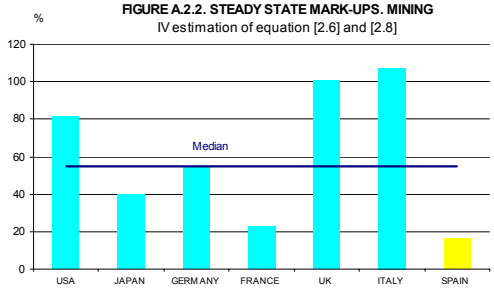


FIGURE A.2.3. STEADY STATE MARK-UPS. FOOD
IV estimation of equation [2.6] and [2.8]

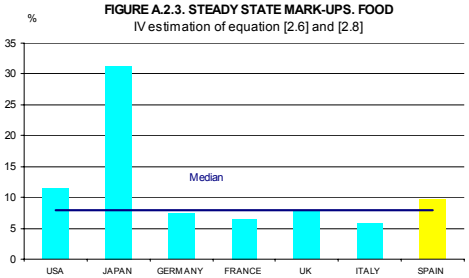


FIGURE A.2.4. STEADY STATE MARK-UPS. TEXTILES
IV estimation of equation [2.6] and [2.8]

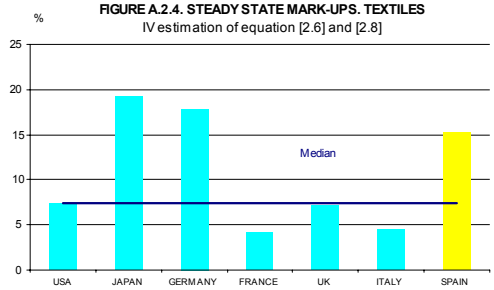


FIGURE A.2.5. STEADY STATE MARK-UPS. WOOD
IV estimation of equation [2.6] and [2.8]

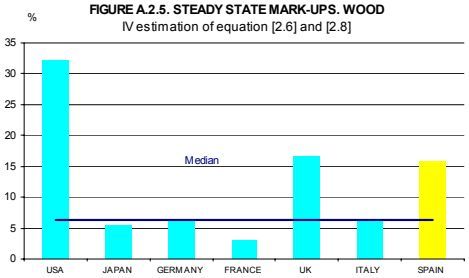


FIGURE A.2.6. STEADY STATE MARK-UPS. PAPER
IV estimation of equation [2.6] and [2.8]

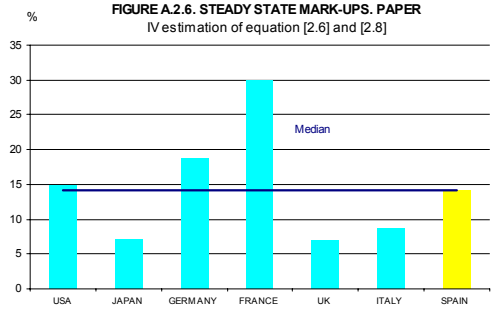


FIGURE A.2.7. STEADY STATE MARK-UPS. CHEMICAL
IV estimation of equation [2.6] and [2.8]

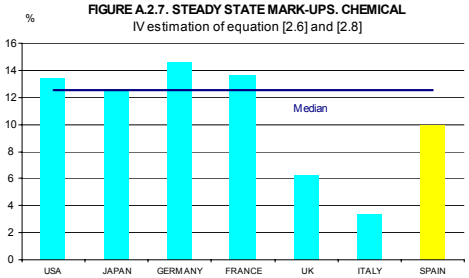


FIGURE A.2.8. STEADY STATE MARK-UPS. NON-METALLIC MINERAL
IV estimation of equation [2.6] and [2.8]

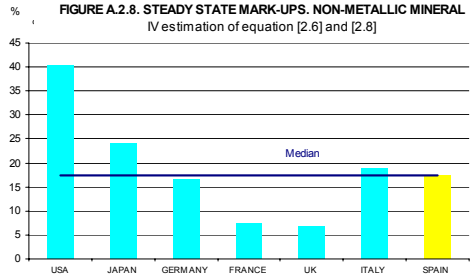


FIGURE A.2.9. STEADY STATE MARK-UPS. BASIC METAL
IV estimation of equation [2.6] and [2.8]

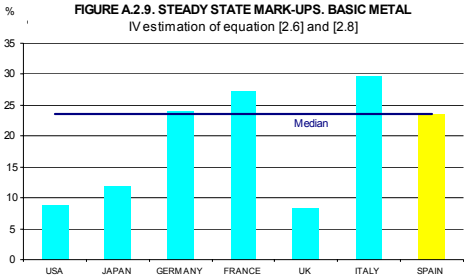


FIGURE A.2.10. STEADY STATE MARK-UPS. MACHINERY
IV estimation of equation [2.6] and [2.8]

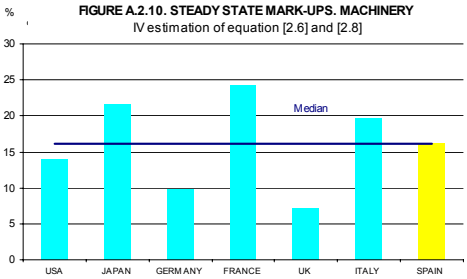


FIGURE A.2.11. STEADY STATE MARK-UPS. ELECTRICAL EQUIPMENT
IV estimation of equation [2.6] and [2.8]

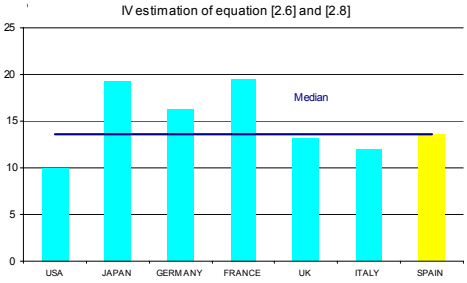


FIGURE A.2.12. STEADY STATE MARK-UPS. TRANSPORT EQUIPMENT
IV estimation of equation [2.6] and [2.8]

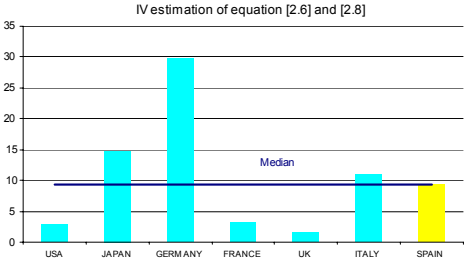


FIGURE A.2.13. STEADY STATE MARK-UPS. OTHER MANUFACTURING
IV estimation of equation [2.6] and [2.8]

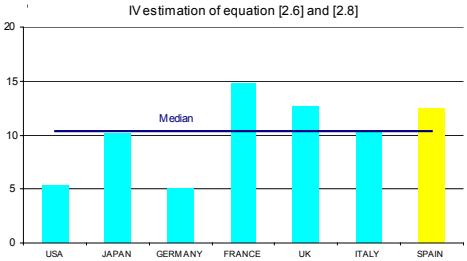


FIGURE A.2.14. STEADY STATE MARK-UPS. ELECTRICITY AND GAS
IV estimation of equation [2.6] and [2.8]

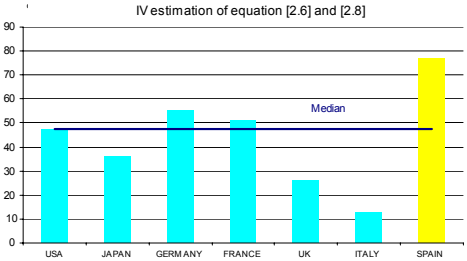


FIGURE A.2.15. STEADY STATE MARK-UPS. CONSTRUCTION
IV estimation of equation [2.6] and [2.8]

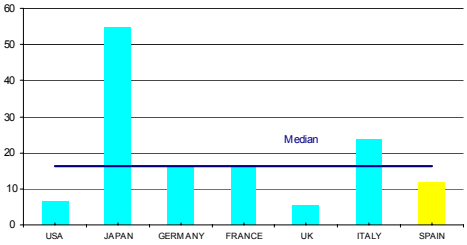


FIGURE A.2.16. STEADY STATE MARK-UPS. TRADE
IV estimation of equation [2.6] and [2.8]

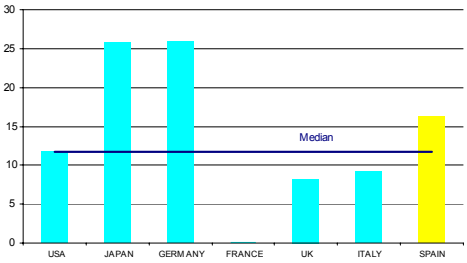


FIGURE A.2.17. STEADY STATE MARK-UPS. HOTELS AND RESTAURANTS
IV estimation of equation [2.6] and [2.8]

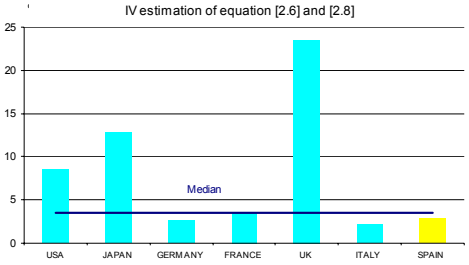


FIGURE A.2.18. STEADY STATE MARK-UPS. TRANSPORT
IV estimation of equation [2.6] and [2.8]

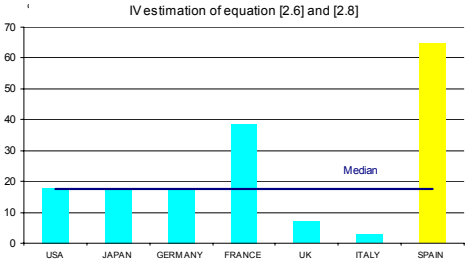


FIGURE A.2.19. STEADY STATE MARK-UPS. COMMUNICATIONS
IV estimation of equation [2.6] and [2.8]

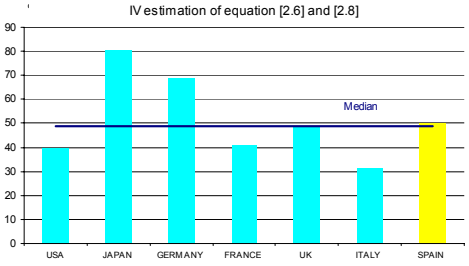


FIGURE A.2.20. STEADY STATE MARK-UPS. BUSINESS ACTIVITIES
IV estimation of equation [2.6] and [2.8]

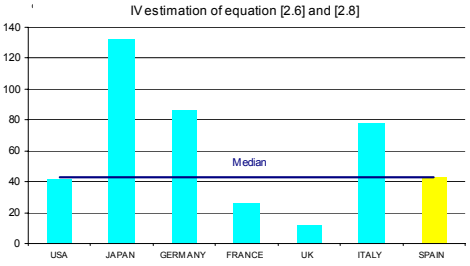


FIGURE A.2.21. STEADY STATE MARK-UPS. EDUCATION
IV estimation of equation [2.6] and [2.8]

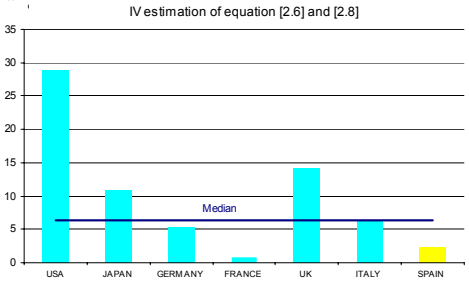


FIGURE A.2.22. STEADY STATE MARK-UPS. HEALTH
IV estimation of equation [2.6] and [2.8]

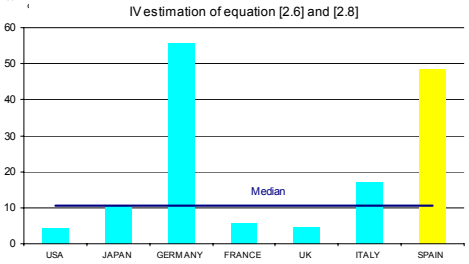


FIGURE A.2.23. STEADY STATE MARK-UPS. PERSONAL SERVICES
IV estimation of equation [2.6] and [2.8]

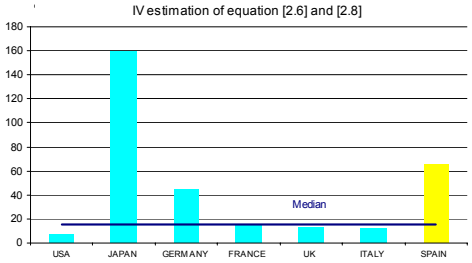


FIGURE A.2.24. STEADY STATE BARGAINING POWER. AGRICULTURE.
IV estimation of equation [2.8]

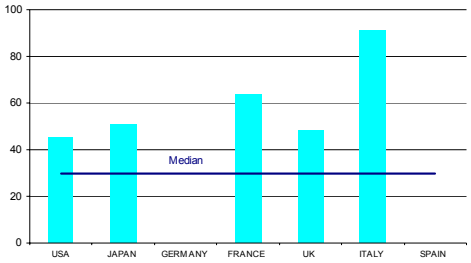


FIGURE A.2.25. STEADY STATE BARGAINING POWER. TEXTILES.
IV estimation of equation [2.8]

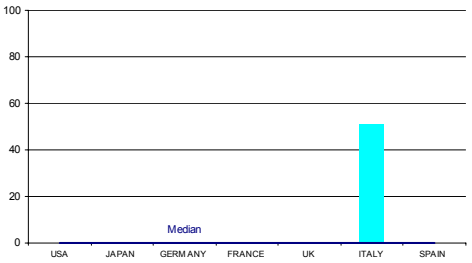


FIGURE A.2.26. STEADY STATE BARGAINING POWER. WOOD.
IV estimation of equation [2.8]

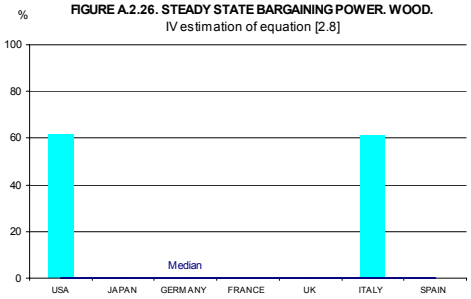


FIGURE A.2.27. STEADY STATE BARGAINING POWER. PAPER.
IV estimation of equation [2.8]

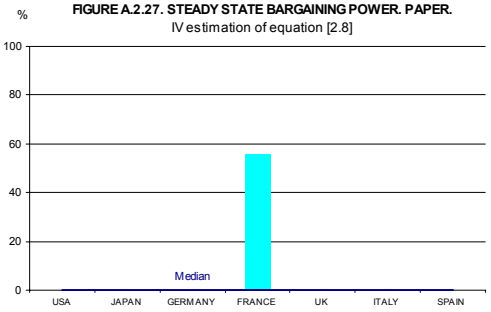


FIGURE A.2.28. STEADY STATE BARGAINING POWER. NON-METALLIC MINERALS. IV estimation of equation [2.8]

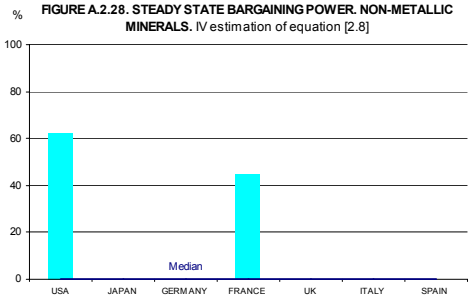


FIGURE A.2.29. STEADY STATE BARGAINING POWER. METALS.
IV estimation of equation [2.8]

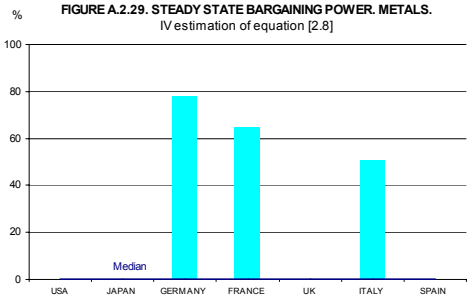


FIGURE A.2.30. STEADY STATE BARGAINING POWER. MACHINERY.
IV estimation of equation [2.8]

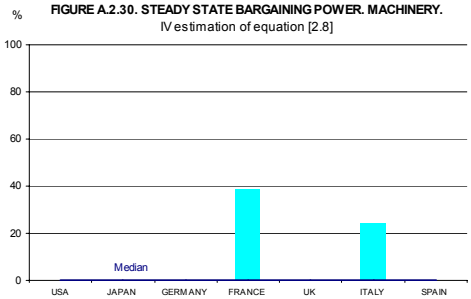


FIGURE A.2.31. STEADY STATE BARGAINING POWER. TRANSPORT EQUIPMENT. IV estimation of equation [2.8]

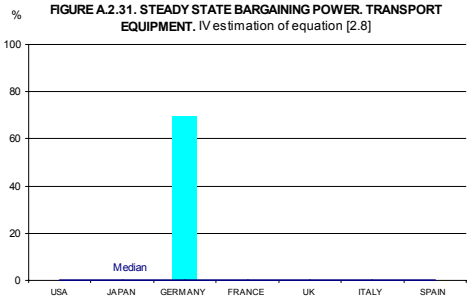


FIGURE A.2.32. STEADY STATE BARGAINING POWER. ELECTRICITY AND GAS. IV estimation of equation [2.8]

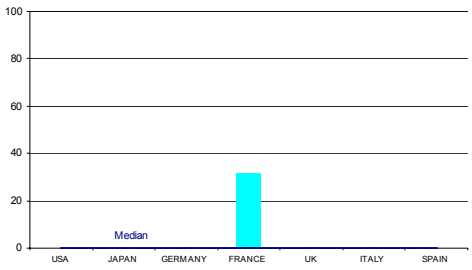


FIGURE A.2.33. STEADY STATE BARGAINING POWER. CONSTRUCTION. IV estimation of equation [2.8]

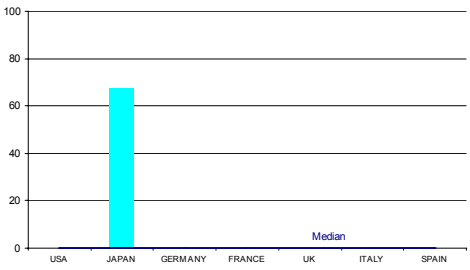


FIGURE A.2.34. STEADY STATE BARGAINING POWER. HOTELS AND RESTAURANTS. IV estimation of equation [2.8]

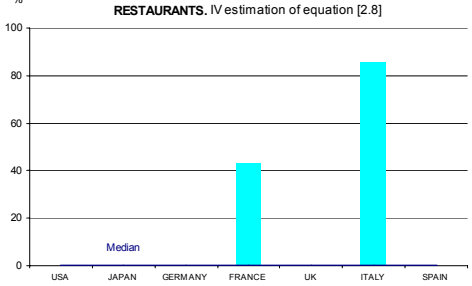


FIGURE A.2.36. STEADY STATE BARGAINING POWER. TRANSPORT. IV estimation of equation [2.8]

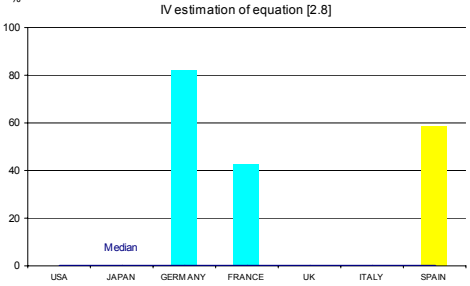


FIGURE A.2.37. STEADY STATE BARGAINING POWER. EDUCATION. IV estimation of equation [2.8]

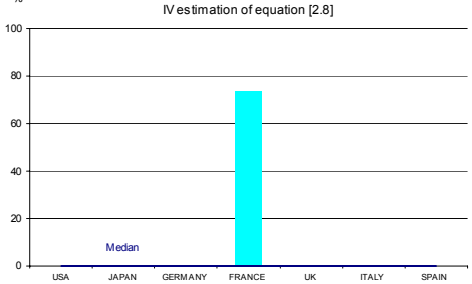


FIGURE A.2.38. STEADY STATE BARGAINING POWER. HEALTH. IV estimation of equation [2.8]

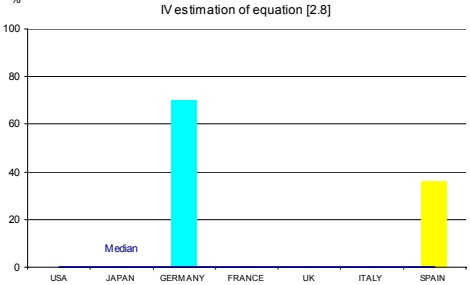
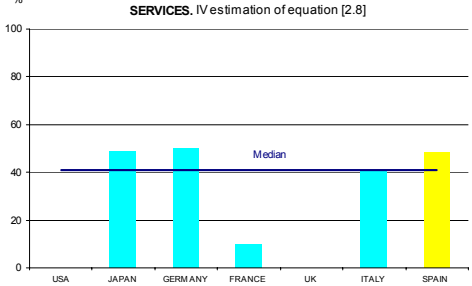


FIGURE A.2.39. STEADY STATE BARGAINING POWER. PERSONAL SERVICES. IV estimation of equation [2.8]



APPENDIX 3. DETAILED TIME VARYING PARAMETERS SECTORAL CHARTS

FIGURE A.3.1. MARK-UPS EVOLUTION. AGRICULTURE

IV and Time Varying estimation of equations [2.6] and [2.8]

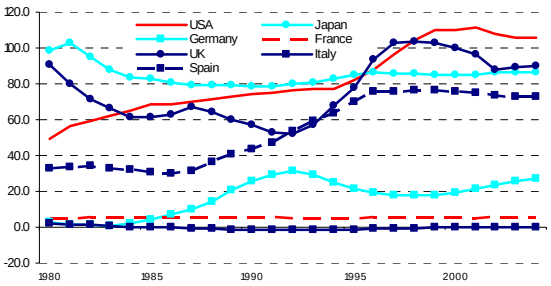


FIGURE A.3.2. MARK-UPS EVOLUTION. MINING

IV and Time Varying estimation of equations [2.6] and [2.8]

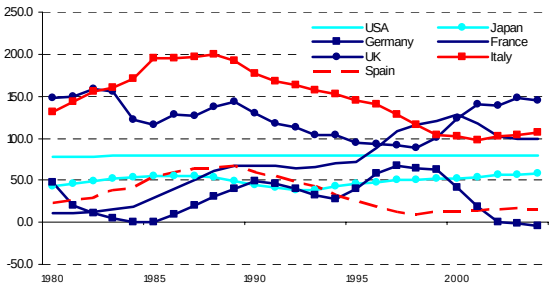


FIGURE A.3.3. MARK-UPS EVOLUTION. FOOD

IV and Time Varying estimation of equations [2.6] and [2.8]

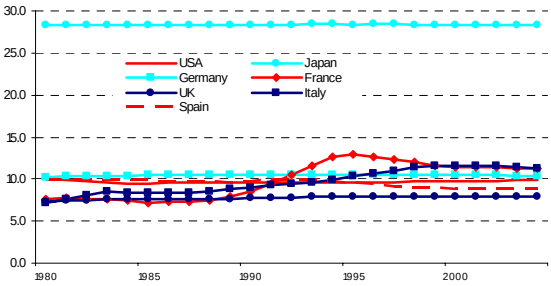


FIGURE A.3.4. MARK-UPS EVOLUTION. TEXTILES

IV and Time Varying estimation of equations [2.6] and [2.8]

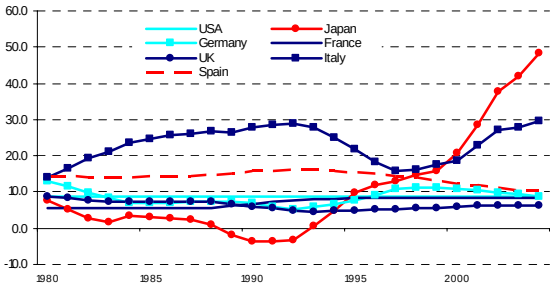


FIGURE A.3.5. MARK-UPS EVOLUTION. WOOD

IV and Time Varying estimation of equations [2.6] and [2.8]

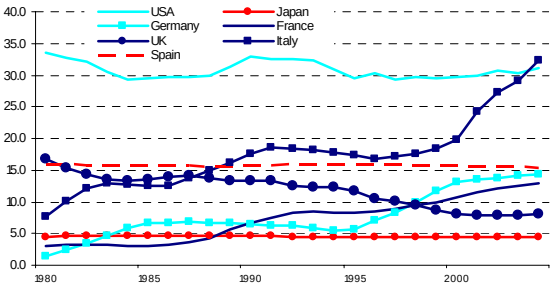


FIGURE A.3.6. MARK-UPS EVOLUTION. PAPER

IV and Time Varying estimation of equations [2.6] and [2.8]

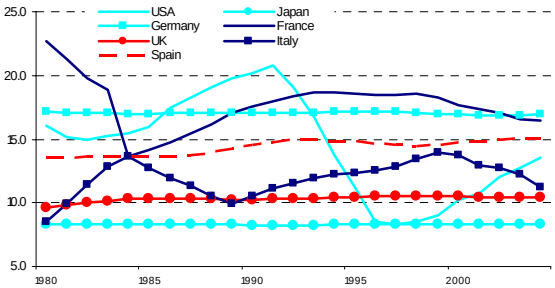


FIGURE A.3.7. MARK-UPS EVOLUTION. CHEMICAL

IV and Time Varying estimation of equations [2.6] and [2.8]

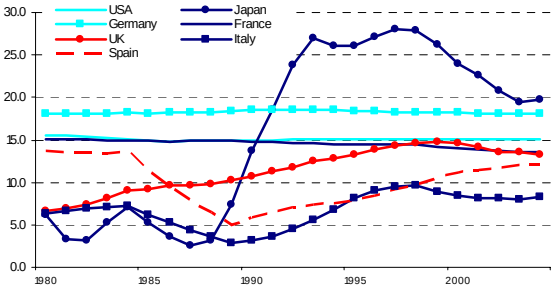


FIGURE A.3.8. MARK-UPS EVOLUTION. NON-METALLIC MINERAL

IV and Time Varying estimation of equations [2.6] and [2.8]

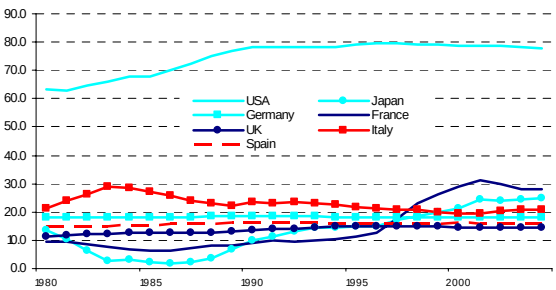


FIGURE A.3.9. MARK-UPS EVOLUTION. BASIC-METAL
IV and Time Varying estimation of equations [2.6] and [2.8]

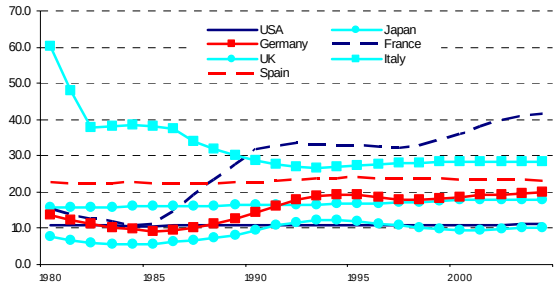


FIGURE A.3.10. MARK-UPS EVOLUTION. MACHINERY
IV and Time Varying estimation of equations [2.6] and [2.8]

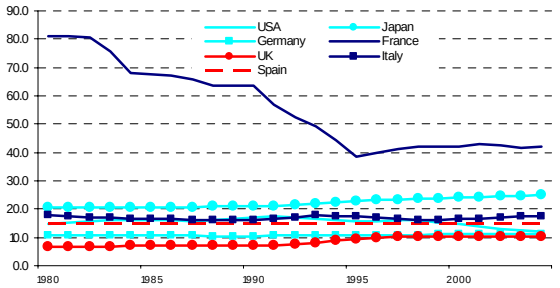


FIGURE A.3.11. MARK-UPS EVOLUTION. ELECTRICAL EQUIPMENT
IV and Time Varying estimation of equations [2.6] and [2.8]

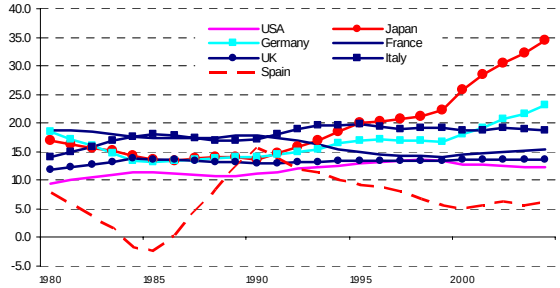


FIGURE A.3.12. MARK-UPS EVOLUTION. TRANSPORT EQUIPMENT
IV and Time Varying estimation of equations [2.6] and [2.8]

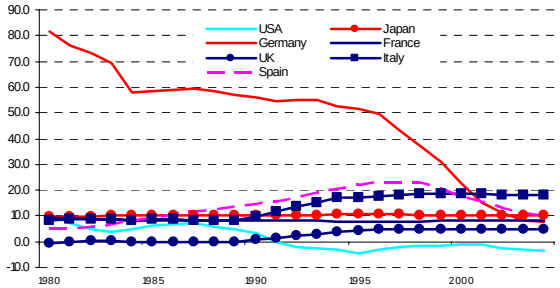


FIGURE A.3.13. MARK-UPS EVOLUTION. OTHER MANUFACTURING
IV and Time Varying estimation of equations [2.6] and [2.8]

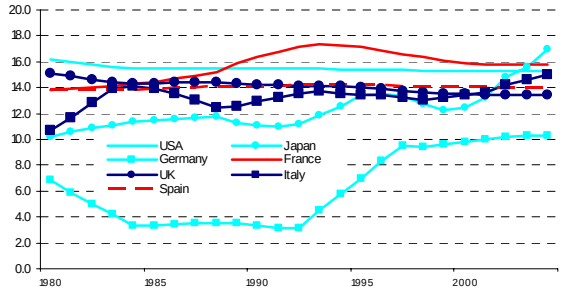


FIGURE A.3.14. MARK-UPS EVOLUTION. ELECTRICITY AND GAS
IV and Time Varying estimation of equations [2.6] and [2.8]

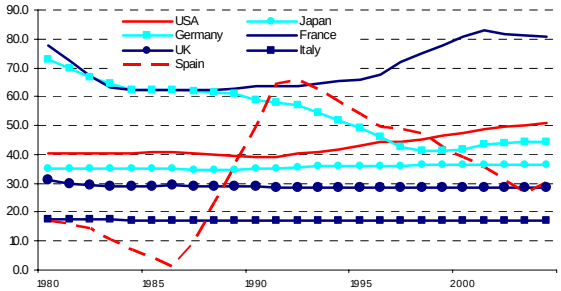


FIGURE A.3.15. MARK-UPS EVOLUTION. CONSTRUCTION
IV and Time Varying estimation of equations [2.6] and [2.8]

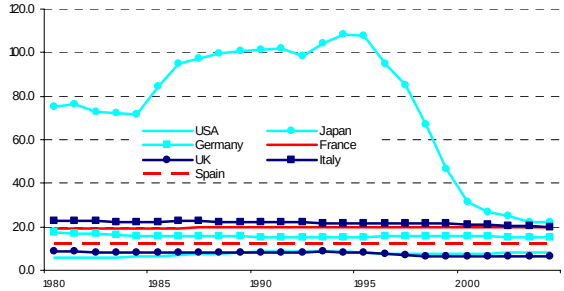


FIGURE A.3.16. MARK-UPS EVOLUTION. TRADE
IV and Time Varying estimation of equations [2.6] and [2.8]

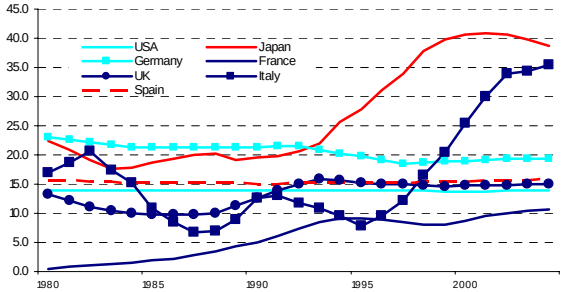


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FIGURE A.3.17. MARK-UPS EVOLUTION. HOTELS AND RESTAURANTS

IV and Time Varying estimation of equations [2.6] and [2.8]

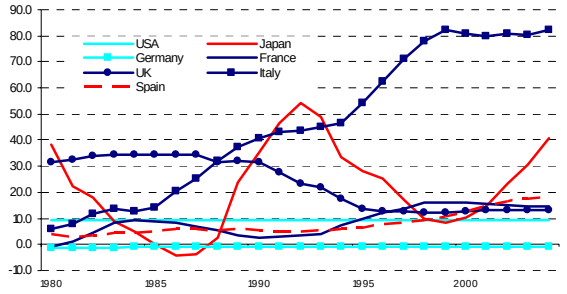

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FIGURE A.3.18. MARK-UPS EVOLUTION. TRANSPORT

IV and Time Varying estimation of equations [2.6] and [2.8]

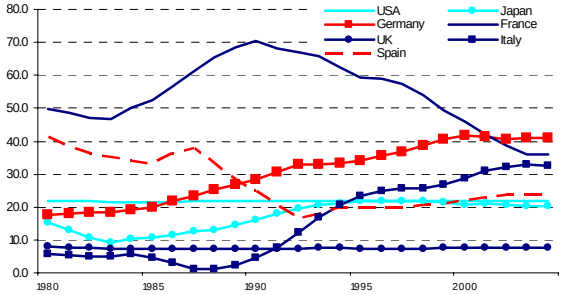

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FIGURE A.3.19. MARK-UPS EVOLUTION. COMMUNICATIONS

IV and Time Varying estimation of equations [2.6] and [2.8]

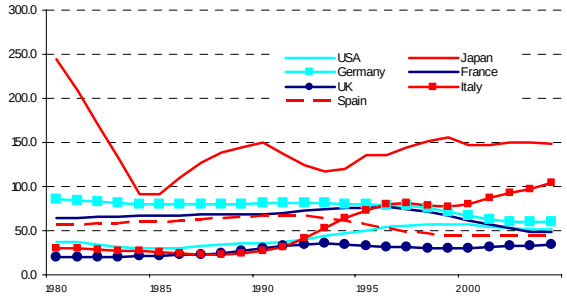

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FIGURE A.3.20. MARK-UPS EVOLUTION. BUSINESS ACTIVITIES

IV and Time Varying estimation of equations [2.6] and [2.8]

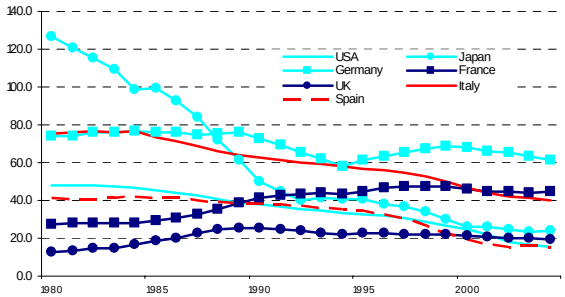

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FIGURE A.3.21. MARK-UPS EVOLUTION. EDUCATION

IV and Time Varying estimation of equations [2.6] and [2.8]

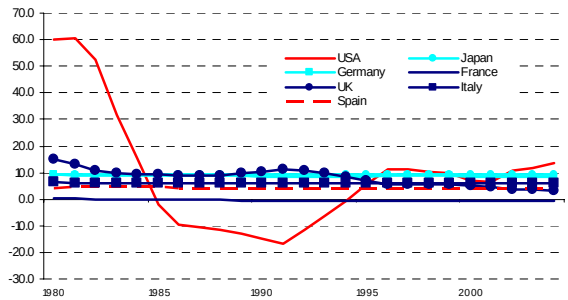

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FIGURE A.3.22. MARK-UPS EVOLUTION. HEALTH

IV and Time Varying estimation of equations [2.6] and [2.8]

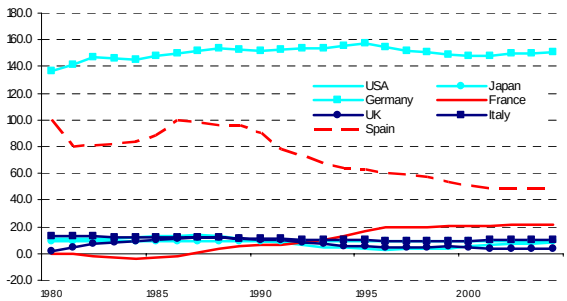

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FIGURE A.3.23. MARK-UPS EVOLUTION. PERSONAL SERVICES

IV and Time Varying estimation of equations [2.6] and [2.8]

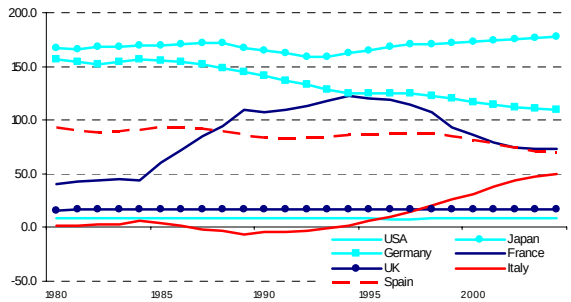


FIGURE A.3.24. BARGAINING POWER EVOLUTION. AGRICULTURE
IV and Time Varying estimation of equation [2.8]

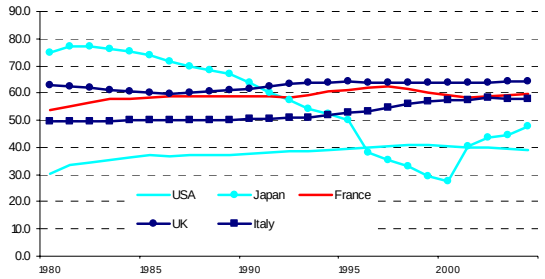


FIGURE A.3.25. BARGAINING POWER. TEXTILES
IV and Time Varying estimation of equation [2.8]

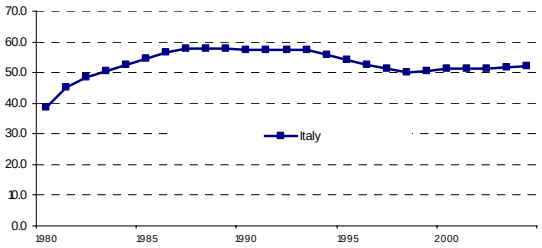


FIGURE A.3.26. BARGAINING POWER EVOLUTION. WOOD
IV and Time Varying estimation of equation [2.8]

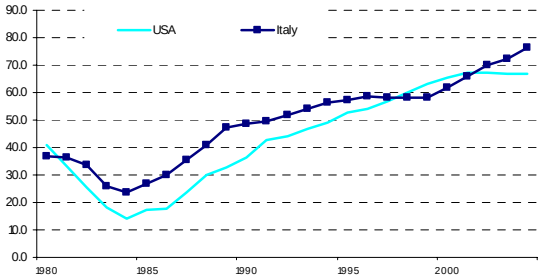


FIGURE A.3.27. BARGAINING POWER EVOLUTION. PAPER
IV and Time Varying estimation of equation [2.8]

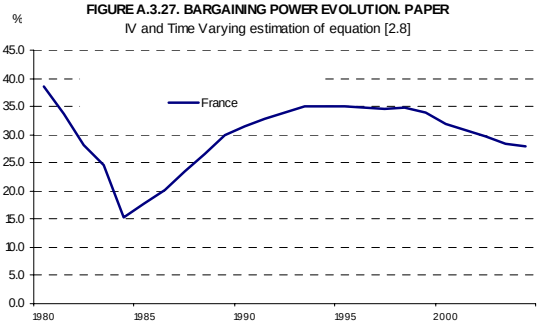


FIGURE A.3.28. BARGAINING POWER EVOLUTION. NON-METALLIC MINERAL. IV and Time Varying estimation of equation [2.8]

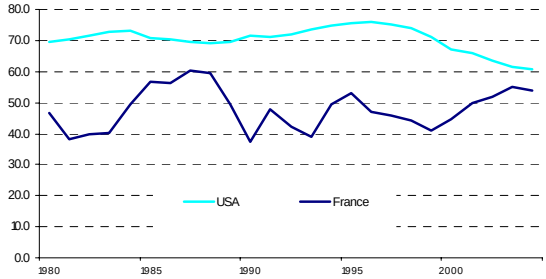


FIGURE A.3.29. BARGAINING POWER. BASIC-METAL
IV and Time Varying estimation of equation [2.8]

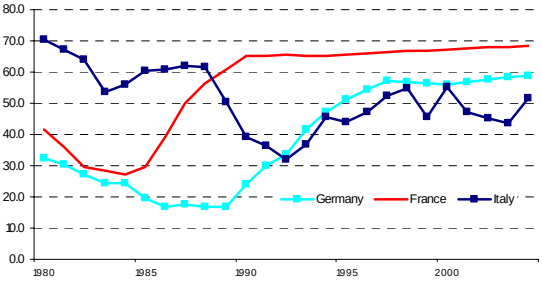


FIGURE A.3.30. BARGAINING POWER EVOLUTION. MACHINERY
IV and Time Varying estimation of equation [2.8]

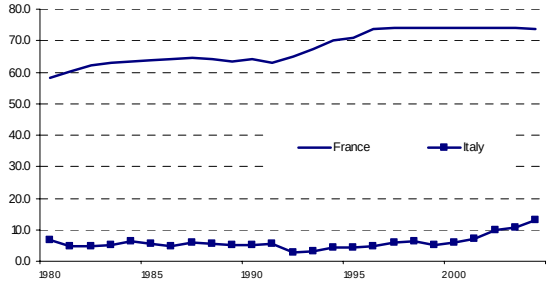


FIGURE A.3.31. BARGAINING POWER EVOLUTION. TRANSPORT EQUIPMENT. IV and Time Varying estimation of equation [2.8]

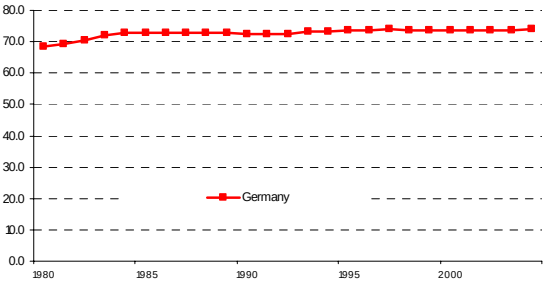


FIGURE A.3.32. BARGAINING POWER. ELECTRICITY AND GAS
IV and Time Varying estimation of equation [2.8]

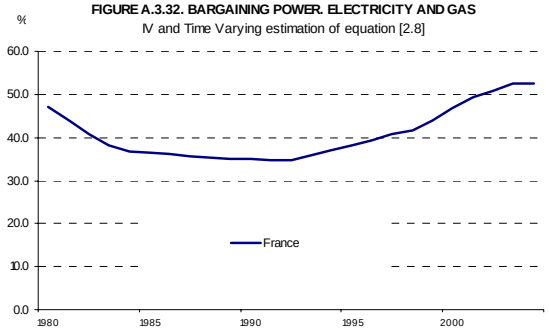


FIGURE A.3.33. BARGAINING POWER EVOLUTION. CONSTRUCTION
IV and Time Varying estimation of equation [2.8]

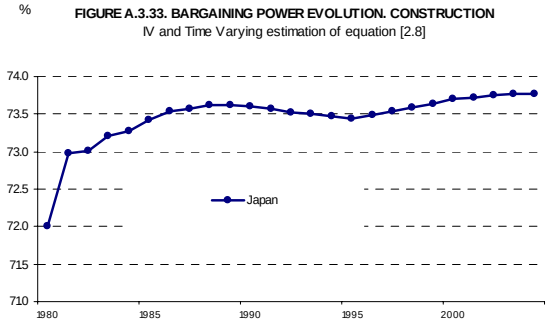


FIGURE A.3.34. BARGAINING POWER EVOLUTION. HOTELS AND RESTAURANTS. IV and Time Varying estimation of equation [2.8]

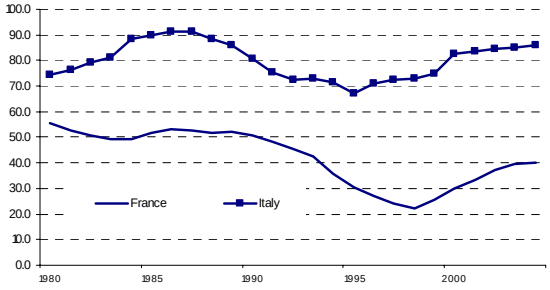


FIGURE A.3.35. BARGAINING POWER EVOLUTION. TRANSPORT
IV and Time Varying estimation of equation [2.8]

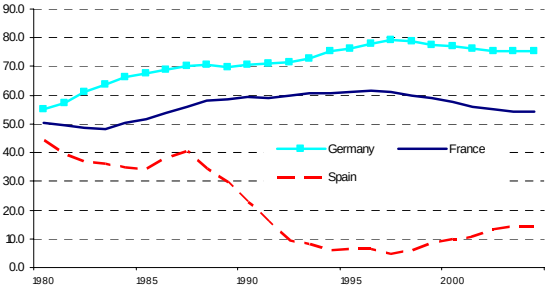


FIGURE A.3.36. BARGAINING POWER. EDUCATION
IV and Time Varying estimation of equation [2.8]

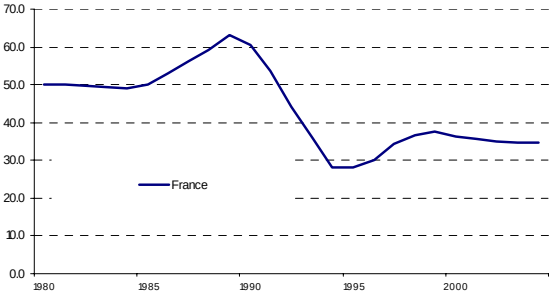


FIGURE A.3.45. BARGAINING POWER. HEALTH
IV and Time Varying estimation of equation [2.8]

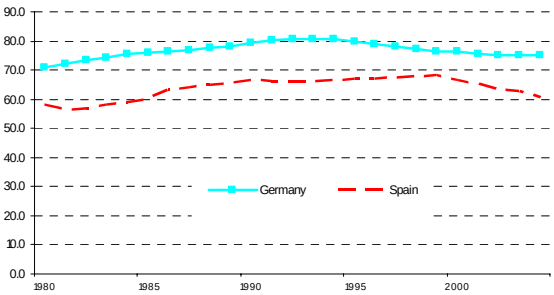
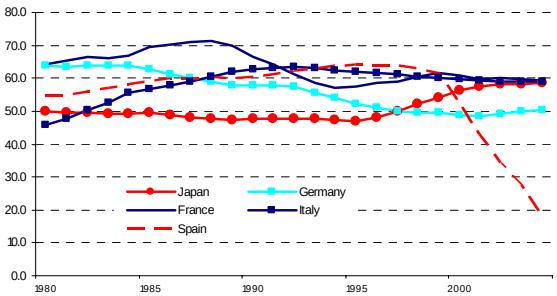


FIGURE A.3.46. BARGAINING POWER EVOLUTION. PERSONAL SERVICES
IV and Time Varying estimation of equation [2.8]



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