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*Pro-competitive policies and the convergence of markups**

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Résumé

Cette étude fournit des estimations de l'évolution des markups sectoriels au cours des trois dernières décennies. Elle conclut à une légère augmentation moyenne des marges prix-coûts, contrairement à ce que l'on attend généralement de l'accroissement de la concurrence. De manière plus frappante, elle met en exergue la convergence des markups dans les deux dimensions, pays et secteur. Ces évolutions expliquent en partie la baisse de la part du travail dans la valeur ajoutée. Lorsque l'on prend en compte les imperfections sur le marché du travail, elles suggèrent que le pouvoir de négociation des salariés a baissé et relèvent que l'endogénéité des structures de marchés, le partage de la rente et les interactions entre marchés de produits et marchés du travail sont des ingrédients essentiels pour évaluer l'impact d'un accroissement de la concurrence.

Mots clés : Markup, Effet pro-concurrentiel, Négociation salariale, Part du travail dans la valeur ajoutée

Abstract

This paper gives estimates of sectoral markup trends over the last three decades. It concludes with a slight increase of price-cost margins overall, contrary to the generally expected effect of increased competition. More strikingly, it establishes a clear pattern of markup convergence across countries and sectors. These movements explain a notable part of the decline in the labour share. Taking into account labour market imperfections, they suggest that the workers' bargaining power has deteriorated and stress that endogeneous market structure, rent sharing and interactions between product and labour markets are key ingredients for assessing the impacts of increased competition.

Keywords: Markup, Pro-competitive effect, Wage bargaining, Labour share

JEL Classification: L11, L13, L60, J40, F02

1. Introduction

In September 2004, Volkswagen had just started a negotiation with the largest German union, IG Metall, with the declared objective of reducing labour costs by 30%. In a press conference, the carmaker's Director of Human Resources said: "Times have changed, we need new and creative solutions. […] We cannot isolate ourselves from the situation of worldwide competition".[1] The current debate, particularly in France and Germany, about the extension of the working week, without proportional labour compensation, has brought the interactions between product market competition and the balance of power in the labour market to the forefront.

The usual expected positive outcomes of increased competition in the goods markets refer to the stimulation of long-term productivity growth on the one hand, and to a lowering of distortions from imperfect competition, the so-called pro-competitive effect, on the other. At first sight, the stylised facts pointing to slowing productivity growth and more or less stable corporate profit ratios over the last thirty years in developed countries do not seem to accord with the intensified competition exemplified by the take-off of international trade flows. As the reciprocal dumping model of Brander and Krugman (1983) is a key theoretical block in establishing gains from trade due to the pro-competitive effect, wondering whether increased competition does reduce price-cost margins (PCMs) is an important question, especially as most of the studies finding some empirical support for the pro-competitive effect focus on developing countries.[2] To my knowledge, Chen, Imbs and Scott (2004) is the only exception dealing with developed countries. Their results are much more convincing as regards the impact of international trade on productivity and inflation than on markups.

From another perspective, Sutton (1991, 1997) insists on the endogeneity of market structure, which entails a non-monotonic relation between the intensity of competition and the concentration ratio of certain types of industries, working through the exit of firms unable to keep the pace. His bound approach articulates a mechanism that leads to a weakening or even a reversal of the pro-competitive effect. Also, but not necessarily related, the merger and acquisition wave of the 'nineties gives an example of an endogenous reaction of firms aiming at improving their market power.

[1] Quoted from the newspaper Les Echos, 08/24/04, my translation.

There is now an extensive literature recognising that wages are partly determined by rent-sharing between capital holders and workers. Since competition affects rents, it is of critical importance to account for labour market imperfections, especially as labour market institutions have evolved substantially. Rodrik (1997) promoted the idea that globalisation, taken here as a distinct aspect of deregulation, might have lowered workers' bargaining power by increasing the substitution between domestic and foreign workers. Blanchard and Giavazzi (2003, hereafter BG) develop a general equilibrium model to capture the outcomes of product market and labour market deregulations. They use it to shed light on one of the most striking movements over the last decades, the decline in the labour share of value added within Continental Europe, which Blanchard (1997) emphasises forcefully. This decline apparently contradicts the pro-competitive effect. BG infer that the bargaining power of workers has most likely declined since the middle of the 'eighties and show how product market deregulation may trigger labour market deregulation. Spector (2004) elaborates another formalisation highlighting the distribution conflict that product market deregulation generates, especially when rents are large and labour institutions are rather favourable to workers initially. On the empirical front, Oliveira Martins (1994) insists on market structure to infer the impact of international trade on wages. Moreover, Borjas and Ramey (1995) establish both the presence of significant rents captured by workers and the negative impact of imports on wages in concentrated sectors, especially those of lower educated workers, whereas Fontagné and Mirza (2001) also examine the positive effect of exports. Recently, Kramarz (2003) shows that outsourcing weakens the bargaining position of high-school graduate workers by limiting their "threat point", i.e. the availability of alternative jobs, and therefore concludes that competitive pressures reduce their wages.

This study provides estimates of structural markup trends over the last three decades at sectoral manufacturing level for thirteen OECD countries. It does not prove a causal link between the intensification of competition and the decline in the bargaining power of workers. However, it does establish that PCMs have not decreased overall. More precisely, it exhibits a strong pattern of markup convergence across both sectors and countries, and suggests an explanation through capital market integration. Moreover, it confirms BG's presumption by giving indirect indications that workers'

[2] See, among others, Levinshon (1993) for Turkey, Harrison (1994) for the Ivory Coast, Krishna and Mitra (1998) for India and Roberts and Tybout (1996) for a survey.

bargaining power has diminished. Indeed, this decline enables us to reconcile, at the sectoral level, the expected theoretical impact of the pro-competitive effect, the slight increase in the PCM overall and the decrease in the labour share.

The paper is organised as follows. Section 2 proposes a framework to measure structural markup changes and assesses whether assumptions regarding capital stock and user cost variables matter for the diagnosis. Results are then presented in Section 3. Section 4 focuses on labour market imperfections and on the implications of the exhibited trends for the labour share. Finally, Section 5 gives some concluding remarks.

2. Econometric specification

In a methodological paper, Boulhol (2005) compares the usual markup estimates based on the primal Solow residual (Hall,1986) and on the price-based or dual Solow residual (Roeger,1995) with straight measures of the ratio of output to costs. One important finding stresses that the main question relates to the treatment of capital either as a variable or quasi-fixed factor, and that the data clearly leans towards the fixity assumption. Capital measurement issues are secondary. It is essential, at this point, to insist that the notion of markup we are interested in is not the tautological definition given by the ratio of output to total costs. Rather, it comes from first order conditions in profit maximisation and captures the idea of market power, i.e. the capacity firms have under imperfect competition to mark up *variable* costs in setting their prices at the desired level. If capital is fixed, at least in the short run, then costs related to capital will be fixed costs. They will impact overall profitability but will disappear from the markup equation.[3]

A second lesson is that, given the slow adjustment of capital, Roeger's markups are overestimated to the extent that the returns to scale on the *variable* factors are decreasing, and are positively linked to long-term capital shares in total output. It is therefore preferable to start from the more general markup equation,

$$PY = \mu.(WN + QM + h.RK) \qquad (1)$$

[3] For more details, see Boulhol (2005).

where *PY* is output, *WN* labour costs, *QM* materials, *RK* capital costs, *h* takes the value of *0* or *1* depending on the treatment of capital as a fixed or perfectly adjusting factor respectively, and to see whether our results differ in these two extreme cases, the real world lying somewhere in between. n stands for the markup to marginal cost m, adjusted for the returns to scale on the variable factors *x*: $n \equiv m / x$. Keep in mind that the prime goal of this study is to assess the markup *trends* over the last thirty years and not to estimate the markup *levels* precisely. Indeed, it may well be that, even though markup levels are sensitive to how capital is treated, markup changes are not. Moreover, insofar as economies of scale are constant, relative changes in adjusted markups n equal relative changes in markups over marginal cost m.

The markup of interest to us is the structural markup. It is structural in the sense that it depends on structural parameters like the level of concentration in the industry, the intensity of competition, the demand elasticities. Observed markup may be impacted by transitory shocks and influenced by such economic events as price developments and cycles and therefore, the specification should control for these effects. A price shock will impact markups if there are rigidities, in the sense that prices are slow to adjust to changes in nominal marginal costs. At the macroeconomic level, for the period under study, the oil price shocks have had major impacts on observed markups resulting in distortions of value-added sharing between factor shares and profits. Among numerous reasons are: unexpected price developments, wage indexation, price stickiness, adjustment costs, terms of trade effects. It is well known that for continental Europe, especially France and Italy, wage indexation during the two oil price shocks resulted in an increased labour share and a squeezing of corporate profits and markups.[4] In order to control for price developments, the change in the GDP deflator, *DEFL*, is included in the regressors. In addition, in order to account for the oil crises specifically, two centered-variables are built: *OIL1* is the (log of the) price of WTI barrel (source OECD Economic Outlook) expressed in local currency and deflated by GDP prices; *OIL2* is the share of oil consumption in total GDP (constructed

[4] However, in a study focused on US sectors and based on a VAR model, Rotemberg and Woodford (1996) asses that an increase in markups during the oil shocks is the most consistent scenario explaining both the magnitude of the decline in output and the decrease in real wages they observe. They have on mind a representation where markups are endogeneous and "propose that oil price increases lead to *increases* in desired markups". In their case, the markup desired after a temporary shock differs from the steady-state markup.

from the number of barrels consumed, source OPEP) times the change in real oil prices over the last five years. The main justification for using *OIL2* lies in the decreased dependency of energy consumption on oil over the last two decades.

Because of its importance in the drawing up of macroeconomic policies, an abundant literature deals with the cyclicality of markups but whether markups are pro- or contra-cyclical remains unresolved. Obviously, the cyclicality relates to the observed markups. It is mostly due to mismeasurement of factor services but does not concern the true or desired markups which depend on structural parameters only. The cycle impact is controlled for, at sector and country levels, by the introduction of two variables. At sector level, following Bils (1987), the annual change in employment is used for the cycle variable, and *EMPCYC* is the de-trended series using a Hodrik-Prescott filter. At the country level, the output gap, *GAP*, from the OECD 2003 Economic Outlook, is used.

Finally, the logarithm of the structural markup n_t, is represented by a polynomial of time. The order of the polynomial was limited to two *ex post*, as greater numbers did not impact the estimates significantly. Due to data limitations, constraints had to be imposed: the macroeconomic variable (*DEFL*, *OIL1*, *OIL2* and *GAP*) effects were pooled across sectors for a given country, and thus the estimation is run at the country level. Therefore, the full specification is the following, where *i* indices country, *j* sector and *t* time:

$$Log\left(\frac{PY}{WN+QM+h.RK}\right)_{ijt} = Log(n_0)_{ij} + b_{ij}.(t-t_0) + c_{ij}.(t-t_0)^2 + l_i^{DEFL}.DEFL_{it} + l_i^1.OIL1_{it} + l_i^2.OIL2_{it} + n_{ij}^{EMP}.EMPCYC_{ijt} + n_i^{GAP}.GAP_{it} + u_{ijt} \quad (2)$$

where all RHS variables are taken as their respective difference to a reference point $t_0 = 1980$ and the structural markup is given by: $Log(n_t)_{ij} = Log(n_0)_{ij} + b_{ij}.(t-t_0) + c_{ij}.(t-t_0)^2$.

Data for this study is from the OECD STAN database and is described in the Appendix. Note that the averages across sectors presented in the following tables are unweighted, i.e. treating each equally, because our prime interest lies in the mechanisms at work rather than in the impact for the total economy.

3. Results

The results presented below correspond to the case of quasi-fixity of capital ($\eta = 0$) and sub-section 3.5 returns to the question of the sensitivity to capital treatment. In order to summarise the results, changes through time are often represented between two reference points, one common to all time series, 1980, the other being the last available point, 2000, except for Canada and Sweden, 1996, and the UK, 1998. Residual analysis indicates the need to correct for auto-correlation at the second order.[5]

3.1. Variance analysis

A crude variance analysis of the dependant variable in equation (2) on country, sector and time fixed effects reveals that the explained variance (45%) comes mostly from the sector dimension, accounting for 48% of it, then the country, with 41%, and finally time, with the remaining 11%. The prevalence of sector is not surprising given that markups are mostly determined by market structures, which should be similar for a given sector across OECD countries, but may vary substantially across sectors. The heterogeneity in the country space likely reflects differences in goods and labour market regulations. Finally, the analysis of the 11% time share is the main focus of this study.

3.2. Prices

Table 1 shows that price changes and observed markups are estimated to be negatively linked: an increase in inflationary pressures induces a reduction of (observed) markups.[6] This is consistent with price stickiness forcing firms to cut their margins in the face of unfavourable cost developments. However, the variable *DEFL* is significant for only 4 of the 13 countries at the 5% level, which may be due to the correlation with oil price variables over the period. When it is significant, it implies that a decrease of 10 points in the GDP deflator, not uncommon since 1980, leads to a 1%-2% increase in observed markups. Moreover, the two oil price variables are jointly very significant. Oil price changes between 1980 and the end period entail, beyond the *DEFL* impact, an average increase of 0.7% in observed markups for all countries, ranging from -0.6% for the UK - the only negative point - to 3.8%

[5] Estimates are produced from an AR(2) process for the residuals, the correlation parameters being specific to the (country x sector) couple. Although it corrects for auto-correlation successfully, a more general treatment would have consisted in an error correction model, which allows to distinguish the short term from the long term dynamics.

[6] Blanchard (1997) finds the same relation, although according to his footnote 41, the introduction of lags of adjustment of factor proportions leads to a weaker relation.

for Japan, very dependent on oil. Overall, price effects generated an increase in observed markups from 1980 for all countries and of 1.3% on average.

3.3. Cycles

At the sectoral level, although the estimates are weakly significant, they confirm the counter-cyclicality of markups, of which Rotemberg and Woodford (1999) provide some possible explanations, including overhead labour, adjustment costs and labour hoarding. Counter-cyclicality is supported empirically by Bils (1987) and Oliveira Martins and Scarpetta (2002) among others. Over the 132 sectors, the parameter n^{EMP} is negative in 92 cases, being significant at 10% level in only 32 sectors against 16 when positive. On average per country (Table 1), the effect of *EMPCYC* is counter-cyclical for 10 countries, pro-cyclical for 2 only and neutral in the case of the USA. Overall, a cycle materialising in an increase of 1% above trend in sectoral employment induces a decrease of 0.07% in the markups.

The estimated impact of the macroeconomic cycle, through the *GAP* variable, is more robust and clearly leans towards the pro-cyclicality of markups. This may be due to some externality in demand and is consistent with the observed pro-cyclicality of accounting profits. From the latter observation, scepticism about the counter-cyclicality of markups is implied in Christiano, Eichenbaum and Evans (1996). On balance, these estimates may provide an explanation for why the debate concerning the cyclicality of markups remains unresolved. There may be a supply-driven counter-cyclical partial equilibrium effect dampened by a pro-cyclical general equilibrium one. Table 1 indicates that, on average across countries, an increase in the output gap of 1 point of GDP results in an average increase in sectoral markups of 0.20%. Note that, although the average sensitivity is three times larger than the *EMPCYC* one, employment at the sectoral level could fluctuate much more than the output gap at the country level.

3.4. Structural markups

Once controlled for price and cycle effects, one can focus on the structural markup changes. First, changes through time are significant: the assumption that there is no structural markup change over the period is rejected for 82 of the 132 sectors at the 1% confidence level and for 93 of them at 5%.[7]

[7] Wald test on *b* and *c* parameters of equation (2).

Second, the general result points to a slight average increase of 1.4% from 1980, the details of which are given in Table2. This means that on average, given the last row of Table1 for the price and cycle effects, the observed markups increased by 2.4%, 1.4% being structural.[8] Among all the sectors, 76 post a markup increase from 1980. The average of the increase is 5.5%, whereas for the 56 remaining sectors, the decrease averages -3.5%. All countries but Italy, Japan and Norway experience an increase on average. Sweden, starting from rather low markups in 1980, posts the greatest increases in all sectors but one.

This general picture is, to a large extent, surprising. Indeed, the widespread perception is certainly one which deems that competition has become fiercer over the last three decades, due to trade liberalisation and to extended domestic enforcement of competition rules. Numerous country case studies, focusing mostly on developing countries, identify that trade liberalisation has had a pro-competitive effect, reducing the distortions from imperfect competition. However, and more consistently with the results above, in an extensive analysis of the trends in the industrial concentration at sectoral level in the European Union between 1987 and 1997, Davies (2001, Table5.1.2 p.38) concludes that concentration increases slightly on average.[9]

Moreover, as most trade is intra-industry, the reference model establishing gains from trade remains the reciprocal dumping model of Brander and Krugman (1983). From their theoretical predictions, the pro-competitive effect is expected to reduce the markups and to increase both the real wages and the labour share. This increase in the labour share in OECD countries has been the missing piece in the trade-induced pro-competitive effect puzzle. Although disentangling the impacts of the determinants of structural markups is beyond the scope of this study, the first important result - no global decrease of markups - suggests that the reciprocal dumping model is probably not an adequate framework to

[8] If we measure the average structural change taking as the reference point the first available data for each sector instead of 1980, the increase is 4.2% instead of 1.4%, signalling a noticeable structural increase in the 'seventies.

[9] When concentration ratios are weighted by sector size, there is a slight *decrease* in average concentration (Table 5.1.1). In either case, given the level of market power estimated here, the overall impact of concentration changes on markup changes would be less than one percent, based on a proportional relation between elasticity and the inverse of Herfindahl index. Note however that the notions are not strictly comparable since Davies measures the concentration at the EU level. For instance in

assess gains from trade. Moreover, in focusing on markups, the potential benefits of increased competition through increased long-term productivity growth are not analysed here. Therefore, if an economist wants to analyse the outcome of increased competition, she or he should rather take into account firm heterogeneity and a Darwinian-type effect generating the exit of the least efficient firms, which are probably also the least profitable.[10]

Result 1: *Structural markup changes over the last 25 years are mostly significant. On average, markups over marginal cost went up 1.4% from 1980. More sectors see their markups increasing, and those increasing change more in absolute terms than those decreasing.*

The second result may be the most striking and highlights some form of markup convergence within countries. On the one hand, high markups tended to go down over time, which is consistent with Oliveira Martins, Scarpetta and Pilat (1996), who use the same database between 1970 and 1992 and with Borjas and Ramey (1995) who study the impact of imports on rents in US concentrated industries. On the other hand, and even more predominantly, low markups tended to go up. The combination results in a robust markup convergence which I now illustrate in different ways.

First, Table3 gives the Pearson correlation between the relative change of the estimated structural markup since 1980 and the estimated level in 1980 across sectors for each country. This correlation is negative for twelve of the thirteen countries in the sample. It equals -0.60 on average and is very significant for six countries.

Second, one can directly turn to the data. For illustration purposes, charts 1a to 1c graph the observed markup trends in the case of France. In each of these charts, the convergence is clearly visible, with an increase in low margin, a decrease in high margin sectors and a lower dispersion of markups over

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the reciprocal-dumping world, markups and local concentration fall with market integration even though global concentration does not change or even might increase with exit of firms.

[10] Another possibility is that exports, targeted at high margin markets, may have driven an increase in markups, which compensates the potential decrease due to deregulations.

time.[11] Obviously, these are just descriptive statistics and I now attempt to provide three complementary explanations.

First and foremost, the trimming of the highest markups fits well within the classical pro-competitive story. Increased competition, through facilitation of new entry or international trade for instance, lowers concentration and induces an increase in the perceived elasticity of demand faced by firms, triggering a fall in desired markups. In the case of identical firms as an example, any new entry leads to a percentage drop of the markup which is all the greater in absolute term that the initial markup is high.

Second, through the lower bound approach, Sutton (1991, 1997) insists on the non-monotonic relation between the intensity of competition and the concentration of activity. When market structure is endogeneised, especially when competition operates not only through prices but also through R&D and advertising, more competitive pressure generates the scaling up of expenditures which leaves less profitable firms in operation. Their exit may entail a rise in average markup. Moreover, concentration also increases when firms react to the increased competitive environment through mergers or acquisitions. It may well be that the sectors with the lowest markups in 1980 were subject to such intense competition that the implied low level of concentration "could not" be maintained. We can also think of sectors like textile and wearing apparel (17-19), which does not exhibit decreased markups despite the acknowledged intensified competition from developing countries, restoring profitability thanks to the levelling off of product quality. This is consistent with what is observed in chart 1a in the case of France. However, I was unable to link the markup changes to the sectoral typology developed by Davies et al (1996), based on whether competition operates through price and/or advertising and/or R&D. Part of this failure probably comes from the high level of aggregation in the samples which does not allow for a clear differentiation of the sectors. However, even at the disaggregated level, Davies (2001, p.43) reaches a similar conclusion as regards concentration: "While our typologies […] continue to have some success in explaining inter-industry differences in the *level* of concentration, it does not appear that they have much explanatory power concerning changes in market concentration". Most interestingly, Davies also highlights the convergence of concentration ratios across sectors (Table 5.1.5).

[11] From these charts, we can suspect that the removal of price-control in France in the middle of the eighties' have mattered.

Finally, one cause favouring markup convergence is the improved efficiency of financial markets. Let me outline this idea. Following an arbitrage argument, an investor will choose the sector providing her or him with the best return. For a given sector, the gross rate of return r is:

$$r = \frac{PY - WN - P_m M}{K} = \frac{1-1/n_{fix}}{a_K}.R \qquad if\ capital is\ quasi-fixed$$

$$or \quad = \left(1+\frac{1-1/n_{\text{var}}}{a_K}\right)R \quad if\ capital \text{ costs } are \text{ variable costs}$$

a_K being the capital share of output. If financial markets are efficient, the excess return variable $p \equiv r / R = h+(1-1/n)/a_K$ should be equal for every sector: in other words, the assumption of equalised returns across sectors implies that the (adjusted) Lerner index should be proportional to the capital share of output.[12] This does not mean that (adjusted) markups over marginal cost should be equal in every sector, but this creates a strong convergence constraint. To better understand it, using data for the USA as an example, under the assumption that capital costs should be treated as fixed (variable respectively) costs and using average capital shares for each sector, the average excess return p equals *1.7* (*1.9* resp.). If excess returns were equal to this average in each sector - the stylised assumption of capital market efficiency - we could infer the markup level for each sector, based on the same capital shares, from $n_j = 1/[1-a_{K,j}.(\overline{p}-h)]$. This computation puts forward that in this case, although average markup would barely change, the dispersion of markups would fall by slightly less (slightly more resp.) than *50%*.[13] In other words, although these calculations are admittedly rough, they clearly point to the link between capital market efficiency and markup convergence across sectors. The channel is of course the capital mobility from low profit sectors to high profit ones. These three explanations combined help in understanding why markups may have not decreased on average (and even increased slightly) despite a perceived feeling of increased competition.

Result 2 *There is a strong convergence of markups through time across sectors within countries. Three complementary explanations are proposed: increased competition materialises on the one hand, by lower concentration in high profit industries, on the other, by higher concentration in low profit*

[12] Implicitly, we bluntly ignore the sectoral heterogeneity in terms of risk and depreciation rate of capital.

[13] Allowing capital shares to vary with markups leads to the same conclusion in the Cobb-Douglas case.

ones due to the endogenous reaction of firms; improved financial market efficiency balances the return on capital across sectors.

The markup convergence also appears clearly within sectors across countries. Table 4 shows that, although structural markups increased in 7 out of the 11 sectors from 1980, the dispersion across countries decreased in 8 sectors. The causes seem fairly straightforward. To the extent that OECD countries are similar, economic integration entails a convergence of markup determinants at the sectoral level. Call it globalisation, the increased international trade flows and international capital mobility induce a convergence of markups within sectors.

Result 3: *At sectoral levels, structural markups are converging across countries. International economic integration is very likely to be the main driver.*

Adding the sector and country dimensions, these results indicate a global convergence of markups, as chart 2, a graphic representation of the last row of Table 3, tells compellingly. The last row of Table 4 indicates that the dispersion of markups decreased by more than 20 percent between 1980 and 2000. Moreover, regressing the log-difference of estimated structural markups between the end period and 1980 on the 1980 markup and on country and sector fixed effects for the 132 sectors yields a parameter for the initial (1980) markup of -0.72, being very significant (Student of -11.3). It is as if we could write a conditional convergence equation:

$$Logm_{ijT} = (1-k)Logm_{ijt} + k.Log\overline{m}_{ij}$$

with $k = 0.72$, *T = t + 20* years and $\overline{m}_{ij}$ being the long term markup of which the estimate is read from the fixed effects. To make the analogy with growth theory, there are both b -convergence $(0 < k < 1)$ and s - convergence.

3.5. Capital sensitivty

In the case of quasi-fixity, the average increase in structural markup might reflect an endogenous increase to restore profitability in the face of higher real interest rates which weigh on fixed costs. However, when capital is treated as a perfectly adjusting factor, the slight increase in markups on average is attenuated somewhat but results pointing at various types of convergence are maintained.

These conclusions are also robust to different computations of capital variables. In other words, although markup levels depend on the specification, markup changes are not really sensitive to this choice. This suggests that capital changes are not large enough to have an impact on estimated markup changes, which is not too surprising given the fairly low capital shares in total output. Moreover, when focusing on the sample with less aggregated sectors, the main results remain.

4. Implications for the labour share

4.1. Labour share sensitivity to markup

A priori, the greater the markup, the lower the labour share of value added, s_L. However, the sensitivity depends on the parameters of the production function and should therefore be measured at sectoral level. For a given sector *j*, based on the estimated structural markups, the following panel specification is tested:

$$s_{L,it} = q.Logm_{it} + e_i + e_t + u_{it} \qquad (3)$$

where e_i and e_t are country- and time-fixed effects respectively, controlling for relative factor prices, disinflation and potentially biased technical change in particular. One should not read more into equation (3) than an accounting relationship. Table 5 gives the estimates which are very significant. For all sectors on average, a *1%* increase in structural markups leads to a decrease in the labour share of *1.7* points, ranging from *1.1* to *2.4* points depending on the sector. Therefore, the overall increase in the structural markups highlighted above partly account for the reduction in the manufacturing labour share, of 4.1 points of value added on average across countries, experienced by the thirteen OECD countries over the last three decades.[14]

From 1980, as shown in Table 6 for the ten countries for which data for all the sectors is complete, the manufacturing labour share decreased by 9.7 points of value added on average across countries, of which within-sector changes represent 9.3 points. Based on the estimates of equation (3) and sector weights, the changes in structural markups explain a decrease of 2.8 points. Blanchard (1997)

[14] From the STAN database, the manufacturing labour share of value added has declined since 1970 in all thirteen countries except Japan (+19 points), Norway (+3 points) and Austria (flat).

estimated that changes in the labour share *for the total economy* were almost exclusively due to biased technical change and not to markup changes. The main limitations in his approach come from constraining the production function to the Cobb-Douglas case and from focusing at the country level only. In addition, even he expresses some doubts about these results.[15] Those presented in Table 6 for manufacturing hopefully shed some light on this question.

4.2. Price-cost margin, markup and bargaining power

Up to this point, firms were assumed to be wage-takers. I would now like to introduce wage bargaining and investigate one avenue aiming at reconciling the expected classical link between increased competition and markups - i.e. a negative relationship - with the above results underlining an overall joint increase in PCMs and decrease in labour shares. With g being the bargaining power of workers and W_u the reservation wage, the objective function being maximised in the Nash-bargaining process is classically $[PY-(WN+QM+RK)]^{1-g}[(W-W_u).N]^g$. Under the right-to-manage model, firms continue to choose employment based on a given wage, be it negotiated, and real wage remains allocative: first order conditions and all the previously used relations are left unchanged.

Under the efficient bargaining model however, both wages and labour are bargained over simultaneously. This creates a wedge between markups and PCMs. At this stage, an additional notation is necessary. m is still the markup over marginal cost, but the true adjusted markup, $n \equiv m/x$, differs, due to workers' rents, from the PCM which is the (adjusted) markup over the average cost of the variable factors, now denoted $\bar{n}$ and still defined by equation (1). Indeed, the labour first-order condition becomes:

$$W/P = (\partial Y/\partial N)/m + g.(1-1/n).Y/N$$

which states that the wedge between real wages and the marginal product of labour depends not only on product market imperfections but also on the rents captured by workers based on their bargaining power. Using Euler's equation and the other first-order conditions lead to:

$$PY = \frac{n}{1+g.(n-1)}.(WN+RK+QM)$$

[15] "The great variation in the coefficient across countries […] makes me uneasy about the results", pp 137-138.

This implies that the PCM, $\overline{n}$, which was estimated in Section 3, is in fact equal to $n/[1+g.(n-1)]$. This relationship can be expressed more conveniently in terms of the Lerner index:

$$\overline{n} = \frac{n}{1+g.(n-1)} \quad \Leftrightarrow \quad (1-1/\overline{n}) = (1-g).(1-1/n) \quad \Leftrightarrow \quad \overline{L} = (1-g).L \qquad (4)$$

(when capital is fixed, one obtains: $\overline{L} = (1-g)/(1-g.a_K).L$)

One can easily interpret equation (4). The Lerner index derived from the data, $\overline{L}$, is seen from the point of view of the firm paying the wage *W* which includes the rents kept by workers. $\overline{L}$ refers therefore to the share kept by the firm and equals the true Lerner index, L, times $(1-g)$. The straightforward implication is that when labour market imperfections are ignored, as is the case in most markup estimates, the degree of product market imperfection, as represented by markup over marginal cost, is under-estimated, and even more so the greater the bargaining power. Innovatively, Crépon, Desplatz and Mairesse (2002) extend Hall's approach to estimate markups and bargaining power on a panel of French firms. They come to a significant and stronger value than that found in other studies for g of around 0.6, leading them to reject the right-to-manage model in favour of the efficient bargaining version.[16] Next, it appears immediately from (4) that, when we wrongly omit labour market imperfections, the then estimated PCM, $\overline{n}$, can rise even if the true structural markup , n , is under downward pressure, provided that the bargaining power has been eroded sufficiently. Actually, deriving (4) entails:

$$\frac{\Delta g}{1-g} = \frac{\Delta L}{L} - \frac{\Delta \overline{L}}{\overline{L}} \qquad (5)$$

such that, if the true markup decreases, as one expects "classically" as a results of increased competition ($\Delta L < 0$), whereas the PCM increases ($\Delta \overline{L} > 0$) as we highlighted above, workers must have been losing some bargaining power.

As for the labour share, to get an idea of the magnitude involved, consider the Cobb-Douglas case:

$$Y = A.K^a N^b M^c$$

The labour share of value added is then:

[16] The authors calculate the average markup in the panel but their specification implies that the deviation from this average for a given firm can be treated as a residual, which bothers me, at least because sectoral determinants of markups are likely correlated with their RHS variables.

- i) perfect labour market or right-to-manage: $s_L = b/(m-c)$

- ii) efficient bargaining and capital adjusting perfectly: $s_L = [b+g.(m-x)]/(m-c)$

- iii) efficient bargaining and quasi-fixed capital: $s_L = [b+g.(m-x).(1-a_K)/(1-g.a_K)]/(m-c)$

Deriving the labour share with respect to the markup and the bargaining power yields:

- i) $\Delta s_L = -s_L/(m-c).\Delta m$

- ii) $\Delta s_L = -(s_L - g)/(m-c).\Delta m + (m-x)/(m-c).\Delta g$

- iii) $\Delta s_L = -[s_L - g.(1-a_K)/(1-g.a_K)]/(m-c)\Delta m + (m-x)/(m-c).(1-a_K)/(1-g.a_K)^2.\Delta g$

With $s_L = 0.7, c = 0.7, m = 1.06, x = 1$,[17] one gets in the first case, $\Delta s_L = -1.9\Delta m$ which is consistent with estimates of equation (3) found in Table 5. In the second case, with $g = 0.3$, $\Delta s_L = -1.1.\Delta m + 0.18\Delta g$. Because workers keep part of the rents, the labour share is less sensitive to markup changes. In addition, it is not very sensitive to g: a loss of 10 points in the bargaining power reduces the labour share by 1.8 points only, so that the decline in the labour share would most likely be the joint effect of an increase in (true) markup and a decrease in the workers weight. Finally, for the third case, one has to be careful about consistency in setting parameter value: with $a_K = 0.06$ and $\bar{n} = 1.11$, $s_L = 0.7, c = 0.7$ are consistent with $n = 1.16$ and still $m = 1.06$ (hence $m/n = x = b + c = 0.90$). These values imply that the output is shared according to $a_K = 0.06, a_L = 0.20, a_M = 0.70$, the remaining 0.04 being profits. In this case where capital is quasi-fixed, the labour share evolves according to $\Delta s_L = -1.2.\Delta m + 0.41\Delta g$ and is more sensitive to bargaining power changes. A fall in the bargaining power could be the main driver of the decline in the labour share, and even, if large enough, may offset a possible decrease in true structural markups.

Result 4: *The observed slight increase in price-cost margins is closely related to the decline in the labour share with a sensitivity estimated between 1.5 and 2. When accounting for labour market imperfections, the decrease in the bargaining power of workers might explain both the increase in estimated price-cost margins, which differ in this case from markups over marginal cost, and the decrease in the labour share. In particular, if true markups over marginal cost have gone down*

[17] This calibration is consistent with data for the USA presented in the table 1 of Boulhol (2005).

following intensified competitive pressure, bargaining power must have fallen to be consistent with the observations.

5. Concluding remarks

The general impact of economic integration and perceived fiercer competition might be found in the labour market. Indeed, the overall effect on the product markets does not fit in with the textbook version of a straightforward decrease in market power: there has been no *common* trend in structural price-cost margins at manufacturing sectoral level over the last decades and a slight average increase. More specifically, the results highlight a clear pattern of markup convergence across both sectors and countries, potentially channelling through increased financial market efficiency and capital mobility. In other words, this means that high margins have shrunk *and* low margins bounced.

Since it is difficult to dismiss the perception of more intense competition, these results imply that the decline, if any, in true market power is more than counterbalanced by a decrease in the workers' bargaining power, which erodes the labour share in value added. This has important implications for economic modelling and especially for the assessment of welfare gains from increased competition. In particular, the reciprocal dumping model is misleading since increased competition seems to have more consequences for rent-sharing between shareholders and workers than for the producer / consumer trade-off. In terms of welfare then, to the extent that consumers are also workers, the net effect is ambiguous. Boulhol (2003) showed that the most beneficial theoretical impact from the pro-competitive effect, for a government having some aversion for inequality, was actually the redistribution from shareholders to consumers: in the data used, this mechanism does not materialise. Consequently, theoretical models focusing on the outcomes of increased competition should at least include three ingredients: endogenous market structure, rent-sharing and interactions between product and labour market.

Obviously, it is tempting to infer from the joint increase in competition and decrease in bargaining power, as the weakening of unions symbolises, a causal link. BG propose that intensified competition diminishes the workers' willingness to bargain as there are lower rents to struggle for. This argument is

not really convincing because it applies to the employers' bargaining power reciprocally.[18] Let me suggest another possibility. In recent years, pressure has mounted from investors to require a high rate of return on equity. If this requirement acts as an effective constraint, this entails that the observed markup n will be tied up at a relatively high level. Therefore, increased competition would be passed on to workers. Equation (5) gives the implied bargaining power changes necessary to maintain the price-cost margin constant for a given change in true market power. Under this scenario, based on reasonable values of parameters, $n = 1.15$ $g = 0.3$, a one percent fall in true markup would generate a five point drop in the bargaining power. In this light, equation (5) could be read as linking the workers' bargaining power, to the firm market power and the "financial market power".

Finally, there are at least three directions worth pursuing to strengthen the results presented in this study. First and foremost, working with more disaggregated data will refine the estimates since the two-digit level mixes industries heterogeneous in terms of market power. Second, a specification identifying the workers' bargaining power directly would enable us to disentangle the markup from the bargaining power changes. Finally, trying to link the markup trends to those in its structural determinants further could enrich the analysis dramatically. These determinants mainly include market structure characteristics (R&D, firm size, competition type), product and labour market regulation and international features.

Appendix: Data description

Sectoral data come from the OECD Structural Analysis (STAN) Database. Table A1 details the 23 manufacturing sectors. Two samples have been built covering thirteen OECD countries' manufacturing industries at the two-digit level for the period 1970-2000, using International Standard Industrial Classification (ISIC), third revision. One has more detailed information but is sparse, as some sectors are missing for a number of countries, and is composed of 138 time series (a country-sector crossing). The other contains more aggregated data but is more balanced with 132 annual time series available out of a total of 143.

[18] Unless the bargaining costs are asymetrical as BG suppose.

The variables are PROD, Production (Gross Output) at current prices ($P.Y$ in the text), LABR, Labour compensation of employees ($W.N$ in the text), VALU, Value added at current prices and for Materials, $Q.M = PROD - VALU$.

Capital : The price of capital, p_k, used in the study is the price of investment calculated from the Gross Fixed Capital Formation at current prices (GFCF) and in volume (GFCFK). When data is not available, the price of the GDP deflator (source OECD Economic Outlook) is chosen for p_k. The user cost of capital is calculated classically according to: $R = p_k.(r + d - \dot{p}_k{}^a)$, where *r* is the interest rate, *d* the depreciation rate and $\dot{p}_k{}^a$ is the expected relative change in the price of capital. By default, *r* was chosen as the long-term interest rate (but an alternative with short-term rate was also tested), the depreciation was fixed at *0.05* (but *0.07* was also tested) and $\dot{p}_k{}^a$ was set at the average of the price change over the last three years. I also tested as *r*, the average of the short-term and the long-term rates, and even a constant for the real interest rate.

Net capital stock (NCAPK) is available directly in the data for Belgium and Italy only. For the other countries, I calculated the series based on the Gross Fixed Capital Formation in volume (GFCFK) according to: $K_t = (1-d).K_{t-1} + GFCFK_t$. Only, the starting point value for the net capital stock is missing to build the series. It was derived differently depending on the countries, due to data availability. For Austria, Finland, Japan, Norway and the USA, I used the Consumption of Fixed Capital (CFC) and inferred: $p_{k0}.K_0 = CFC_0 / d$ for the first date. For Canada, France, the UK, the Netherlands and Sweden, I computed $p_{k0}.K_0 = c.VALU_0.q$. c is the average, for each sector over time and over countries for which the gross capital stock (CAPK) is available, of $p_k.CAPK / VALU$ and is reported in TableA2. The parameter q reflects the ratio of net capital stock to gross capital stock. I ran simulations based on various methodologies (double-decline, geometric, hyperbolic, see OECD, 2001) and reasonable values of parameters to arrive at a ratio of between *0.50* and *0.85*. I chose $q = 0.70$ by default, but compared the results with $q = 0.55$. Finally, as Denmark provides gross capital stock only, I used the constant ratio q to deduce net capital stock for all dates.

For more details on other series of capital services based on Gross Capital Stock, on the Consumption of Fixed Capital and on various depreciation rates, see Boulhol (2005).

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Table 1: Price and cycle effects on observed markups from 1980 to 2000 *(a)*

$$Log\left(\frac{PY}{WN+QM}\right)_{ijt} = Log(\mu_0)_{ij} + b_{ij}.(t-t_0) + c_{ij}.(t-t_0)^2 + l_i^{DEFL}.DEFL_{it} + l_i^1.OIL1_{it} + l_i^2.OIL2_{it} + \nu_{ij}^{EMP}.EMPCYC_{ijt} + \nu_i^{GAP}.GAP_{it} + u_{ijt}$$

		PRICE			CYCLE				
country	Number of sectors	DEFL Effect	OIL Effect (b)	**Total Price Effect**	$\bar{\nu}_i^{EMP}$ (c)	ν_i^{GAP}	EMPCYC Effect (c)	GAP Effect	Total Cycle Effect (c)
		Parameter Estimate x Change in Variable		**DEFL + OIL effects**	Parameter Estimate		Parameter Estimate x Change in Variable		EMPCYC + GAP Effects
aut	11	-0.2%	0.8%***	**0.6%**	**-0.08**	**0.03**	0.0%	0.0%	0.0%
bel	9	-0.3%	0.4%***	**0.1%**	**-0.20**	**0.16****	-0.4%	-0.1%	-0.6%
can	11	1.9%***	0.4%**	**2.3%**	**0.16**	**0.06**	-0.2%	-0.2%	-0.4%
dnk	11	1.1%**	0.3%	**1.4%**	**-0.02**	**0.09**	-0.2%	0.2%	0.0%
fin	11	-0.7%	0.7%**	**0.0%**	**-0.14**	**0.09**	-0.4%	-0.1%	-0.5%
fra	11	0.4%	0.7%***	**1.1%**	**-0.13**	**0.16***	-0.1%	0.0%	-0.1%
gbr	11	1.8%***	-0.6%***	**1.1%**	**-0.09**	**0.43*****	0.1%	1.5%	1.6%
ita	11	2.1%**	0.1%	**2.2%**	**-0.15**	**0.46*****	0.5%	-1.8%	-1.3%
jpn	6	0.4%	3.8%***	**4.1%**	**-0.10**	**0.21**	-0.3%	-0.4%	-0.8%
nld	11	0.2%	1.4%***	**1.5%**	**0.05**	**0.29*****	0.1%	0.6%	0.7%
nor	11	-0.7%*	1.4%***	**0.7%**	**-0.08**	**0.02**	0.2%	0.0%	0.2%
swe	7	0.9%	0.0%	**0.8%**	**-0.16**	**0.63*****	-0.5%	-2.3%	-2.8%
usa	11	0.4%	0.8%***	**1.2%**	**0.00**	**0.02**	-0.5%	0.1%	-0.4%
	132								
mean		**0.6%**	**0.7%**	**1.3%**	**-0.07**	**0.20**	**-0.1%**	**-0.1%**	**-0.25%**

(a): 1996 for Canada and Sweden, 1998 for the UK. The observation period starts as early as 1970 when data is available

(b) Significativity is based on the joint significance of the two oil parameters.

(c): average across sectors: $\bar{\nu}_i^{EMP} = \underset{j}{Mean}(\nu_{ij}^{EMP})$

(*):Significativity at 10%, (**) at 5%, (***) at 1%

Table 2: Structural markup changes between 1980 and 2000 (Equation 2, *h = 0*)

sector	Austria		Belgium		Canada		Denmark		Finland	
	Struct. Mkup n_{1980}	Relative Change $\frac{n_{2000}}{n_{1980}}-1$	Struct. Mkup n_{1980}	Relative Change $\frac{n_{2000}}{n_{1980}}-1$	Struct. Mkup n_{1980}	Relative Change $\frac{n_{2000}}{n_{1980}}-1$	Struct. Mkup n_{1980}	Relative Change $\frac{n_{2000}}{n_{1980}}-1$	Struct. Mkup n_{1980}	Relative Change $\frac{n_{2000}}{n_{1980}}-1$
15-16	1.121	6%	1.113	0%	1.108	6%	1.079	-1%	1.094	0%
17-19	1.111	1%	1.037	6%	1.088	2%	1.112	-2%	1.121	3%
20	1.233	-6%	1.111	-2%	1.056	5%	1.128	-1%	1.100	1%
21-22	1.129	7%	1.117	3%	1.140	1%	1.081	5%	1.132	8%
23-25	1.098	13%	1.113	4%	1.073	8%	1.105	10%	1.177	-1%
26	1.178	4%	1.117	5%	1.167	-1%	1.135	2%	1.216	-2%
27-28	1.119	4%	1.060	3%	1.078	-1%	1.084	6%	1.115	2%
29	1.081	6%	.	.	1.127	0%	1.082	2%	1.159	-6%
30-33	1.081	6%	.	.	1.142	-7%	1.087	5%	1.166	7%
34-35	1.093	2%	1.040	0%	1.056	3%	1.034	-2%	1.087	0%
36-37	1.092	7%	1.090	1%	1.094	5%	1.142	-5%	1.212	-9%
mean		**4.6%**		**2.1%**		**1.8%**		**1.8%**		**0.4%**
	France		UK		Italy		Japan			
15-16	1.150	-1%	1.087	4%	1.146	0%	1.144	-11%		
17-19	1.045	7%	1.098	0%	1.197	-4%	.	.		
20	1.120	3%	1.115	2%	1.285	-1%	.	.		
21-22	1.150	-2%	1.075	5%	1.183	0%	.	.		
23-25	1.158	0%	1.119	-1%	1.123	5%	1.168	6%		
26	1.078	12%	1.120	0%	1.280	-7%	.	.		
27-28	1.103	3%	1.049	4%	1.187	-2%	1.138	-1%		
29	1.169	-5%	1.135	2%	1.218	-8%	1.150	-7%		
30-33	1.211	-9%	1.194	-3%	1.225	-9%	1.162	-7%		
34-35	1.022	7%	1.016	4%	1.111	-3%	1.120	-8%		
36-37	1.238	-5%	1.096	6%	1.228	-4%	.	.		
mean		**0.9%**		**1.9%**		**-2.9%**		**-4.8%**		
	Netherlands		Norway		Sweden		USA		All countries	
15-16	1.085	4%	1.059	-1%	1.012	13%	1.070	4%		
17-19	1.129	-4%	1.088	0%	0.971	16%	1.065	0%		
20	1.019	8%	1.098	-4%	.	.	1.178	-5%		
21-22	1.110	5%	1.093	2%	1.079	11%	1.123	0%		
23-25	1.128	1%	1.104	3%	1.086	15%	1.097	10%		
26	1.188	0%	1.161	-1%	1.051	13%	1.078	8%		
27-28	1.096	-1%	1.123	-3%	1.080	9%	1.078	4%		
29	1.064	2%	1.124	-3%	.	.	1.081	-3%		
30-33	1.107	-3%	1.143	-3%	.	.	1.092	6%		
34-35	0.976	6%	1.029	1%	1.133	-1%	1.039	4%		
36-37	1.152	-7%	1.133	-9%	.	.	1.105	4%		
mean		**0.9%**		**-1.5%**		**11.0%**		**3.0%**		**1.4%**

Table 3: Markup convergence across sectors

country	Pearson correlation between $(\Delta n / n)_{2000/1980}$ and n_{1980}
aut	-0.67**
bel	-0.23
can	-0.59**
dnk	-0.16
fin	-0.41
fra	-0.87***
gbr	-0.74***
ita	-0.52*
jpn	0.49
nld	-0.72***
nor	-0.40
swe	-0.82***
usa	-0.45
total	-0.60***

(*):significativity at 10%, (**) at 5%, (***) at 1%

Table 4: Convergence within sectors across countries

	Structural markup average			Structural markup standard deviation		
sector	1980	2000	Change	1980	2000	Change
15-16	1.097	1.116	+	0.039	0.044	+
17-19	1.089	1.110	+	0.056	0.029	-
20	1.131	1.131	<>0	0.075	0.056	-
21-22	1.118	1.157	+	0.032	0.036	+
23-25	1.119	1.177	+	0.032	0.041	+
26	1.148	1.176	+	0.065	0.030	-
27-28	1.101	1.121	+	0.037	0.033	-
29	1.125	1.109	-	0.047	0.030	-
30-33	1.144	1.132	-	0.050	0.045	-
34-35	1.058	1.069	+	0.047	0.033	-
36-37	1.144	1.129	-	0.058	0.045	-
mean	1.116	1.130	0.014	0.049	0.038	-0.011

Table 5: Labour share sensitivity to markup

$$s_{L,it} = q.Logn_{it} + e_i + e_t + u_{it}$$

sector	q	Std Error	Nb obs	Adj RSquare
15-16	-2.45	0.10	393	0.88
17-19	-2.04	0.12	364	0.88
20	-1.63	0.15	336	0.76
21-22	-1.01	0.12	364	0.77
23-25	-1.67	0.12	391	0.78
26	-1.62	0.09	361	0.84
27-28	-1.35	0.22	391	0.80
29	-1.27	0.18	271	0.77
30-33	-1.72	0.15	271	0.85
34-35	-2.32	0.16	391	0.78
36-37	-1.35	0.09	336	0.85
mean	-1.67			

Table 6: Contribution of structural markup changes

to manufacturing labour share changes

	Manufacturing labour share changes from 1980 (% value added)	Within-sectors changes (% value added)*	Structural markup contribution (% value added)**
aut	-14.5	-15.9	-8.7
can	-11.3	-12.1	-4.5
dnk	-8.9	-7.0	-3.6
fin	-11.3	-4.5	-2.4
fra	-9.4	-9.4	-0.8
gbr	-10.1	-9.8	-2.9
ita	-2.2	-2.1	4.5
nld	-14.5	-13.7	-2.1
nor	-3.4	-2.9	1.2
usa	-11.6***	-15.6	-8.6
mean	-9.7	-9.3	-2.8

(*) Here is the within/between decomposition, with j being sector, t time and k_j sector j share in manufacturing value added.

$$s_{L,t} = \sum_j k_{j,t}.s_{L,j,t} \Rightarrow \Delta s_L = s_{L,T} - s_{L,t} = \sum_j \frac{k_{j,t} + k_{j,T}}{2}.\Delta s_{L,j} + \sum_j \frac{s_{L,j,t} + s_{L,j,T}}{2}.\Delta k_{L,j} = Within + Between$$

(**) $\sum_j \frac{k_{j,t} + k_{j,T}}{2} q_j.(\Delta m_j / m_j)$, q_j coming from equation (3) and Table 5, $(\Delta m_j / m_j)$ from Table 2.

(***) Although the US labour share in total value added did not change much from 1980, the manufacturing labour share decreased sharply over the period. Almost three quarters of this drop comes from the 'Motor Vehicules' and 'Chemicals' sectors. This is consistent with Borjas and Ramey (1995) who find a strong impact of international trade in the automobile industry because rents were high originally.

Table A1: ISIC Rev. 3 Classification

Sector desrciption		More aggregated sample	
15	FOOD PRODUCTS AND BEVERAGES	15-16	FOOD PRODUCTS, BEVERAGES AND TOBACCO
16	TOBACCO PRODUCTS	17-19	TEXTILES, TEXTILE PRODUCTS, LEATHER AND FOOTWEAR
17	TEXTILES	20	WOOD AND PRODUCTS OF WOOD AND CORK
18	WEARING APPAREL, DRESSING, DYING OF FUR	21-22	PULP, PAPER, PAPER PRODUCTS, PRINTING AND PUBLISHING
19	LEATHER, LEATHER PRODUCTS AND FOOTWEAR	23-25	CHEMICAL, RUBBER, PLASTICS AND FUEL PRODUCTS
20	WOOD AND PRODUCTS OF WOOD AND CORK	26	OTHER NON-METALLIC MINERAL PRODUCTS
21	PULP, PAPER AND PAPER PRODUCTS	27-28	BASIC METALS AND FABRICATED METAL PRODUCTS
22	PRINTING AND PUBLISHING	29	MACHINERY AND EQUIPMENT, N.E.C.
23	COKE, REFINED PETROLEUM PRODUCTS AND NUCLEAR FUEL	30-33	ELECTRICAL AND OPTICAL EQUIPMENT
24	CHEMICALS AND CHEMICAL PRODUCTS	34-35	TRANSPORT EQUIPMENT
25	RUBBER AND PLASTICS PRODUCTS	36-37	MANUFACTURING NEC; RECYCLING
26	OTHER NON-METALLIC MINERAL PRODUCTS		
27	BASIC METALS		
28	FABRICATED METAL PRODUCTS, except machinery and equipment		
29	MACHINERY AND EQUIPMENT, N.E.C.		
30	OFFICE, ACCOUNTING AND COMPUTING MACHINERY		
31	ELECTRICAL MACHINERY AND APPARATUS, NEC		
32	RADIO, TELEVISION AND COMMUNICATION EQUIPMENT		
33	MEDICAL, PRECISION AND OPTICAL INSTRUMENTS		
34	MOTOR VEHICLES, TRAILERS AND SEMI-TRAILERS		
35	OTHER TRANSPORT EQUIPMENT		
36	MANUFACTURING NEC		
37	RECYCLING		

Table A2: Computation of initial capital stock for each sector:

Average over time and countries (Belgium, Canada, Finland, France and Italy) of

$$p_k.CAPK/VALU$$

sector	c
15-16	2.75
17-19	2.07
20	3.91
21-22	2.89
23-25	3.31
26	3.15
27-28	3.14
29	1.52
30-33	1.52
34-35	2.39
36-37	2.55

Chart 1A
France: Convergence in observed markups

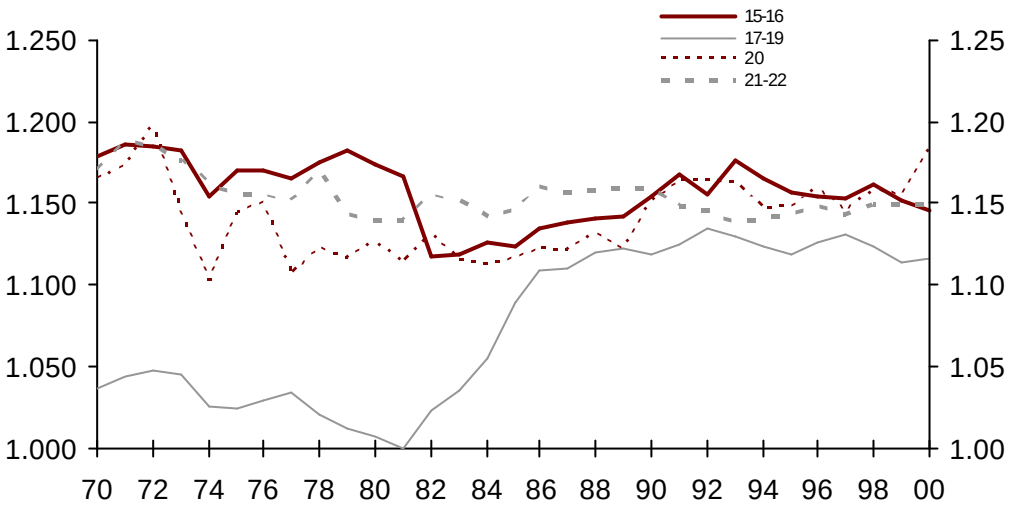

Chart 1B
France: Convergence in onbserved markups

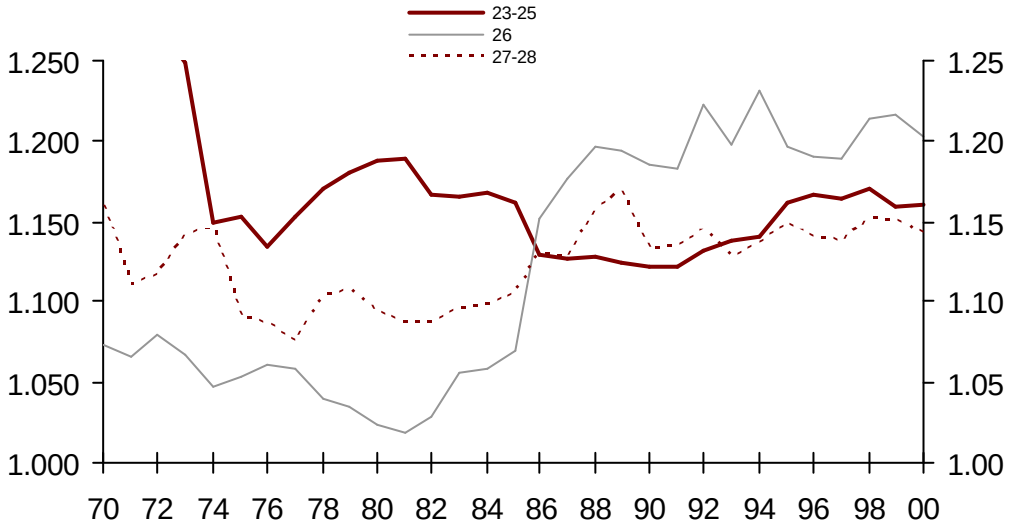

Chart 1C
France: Convergence in observed markups

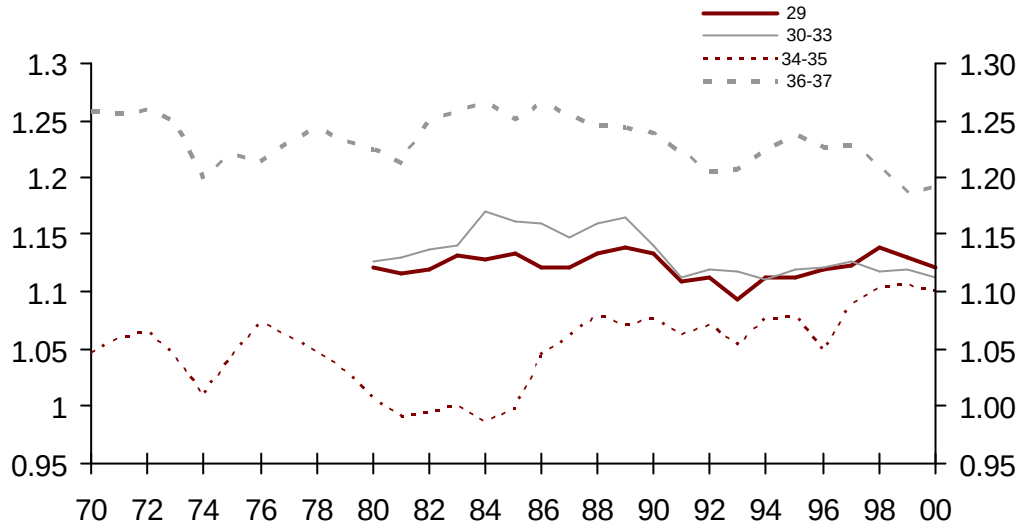

Chart 2
Convergence in structural markups