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Manufacturing Employment Cycle.

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Abstract

The paper demonstrates that two relatively unknown features of the employment cycle in U.S. manufacturing industries can provide a clue to understanding the role of sectorial shocks in the evolution of aggregate employment. First, interindustry wage differentials rise in expansions and fall in contractions. Second, periods of increasing aggregate employment are associated with relatively good price and productivity shocks to capital-intensive sectors. The paper presents a simple general-equilibrium model where bargaining at the industry level and rents due to sector-specific capital generate a wage structure with higher wages in capital-intensive sectors but where the response of wages to sector-specific shocks is greater in labor intensive sectors. Empirical evidence is presented to support such implications of the model. The asymmetry of wage adjustments imply that aggregate employment responds more to shocks in capital-intensive industries and that procyclical wage differentials can only result from asymmetric disturbances. (JEL: E24, E32, J23, J31. Key Words: Cyclical Unemployment, Interindustry Wage Differentials, Sector-Specific Wages)

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1 Introduction

This paper stresses a channel of transmission of sectorial shocks and cross-industry reallocation of labor to aggregate employment. It is built on the observation of two related and relatively unknown empirical regularities about the employment cycle in U.S. manufacturing industries. First, periods of increasing aggregate employment coincide with relative good price and productivity shocks to capital-intensive sectors while periods of falling employment are associated with relative good shocks to labor-intensive sectors. A second feature of the data is related to the cyclical behavior of the interindustry wage structure. Although quite stable over time[1], interindustry wage differentials in manufacturing sectors widen in expansions and narrow in recessions.

In a context where wages incorporate some sector-specific components and where the response of wages to industry-specific shocks is greater in labor intensive sectors, an economy whose business cycle is mainly driven by common disturbances should have an interindustry wage structure that shrinks in expansions and widens in recessions. For example, if all sectors face similar positive shocks, it is argued that the greater wage and employment adjustment in labor intensive sectors should imply a shrinkage in wage differentials in expansions.[2] This paper will offer evidence to the contrary, focusing specifically on the cyclical behavior of interindustry wage differentials for the U.S. manufacturing sectors over the past 40 years. This implies that either the view that wages respond more in labor intensive sectors is misleading, or the widely held view that aggregate disturbances are the main drivers of the business cycle is incomplete.

This paper argues in favor of the second implication by providing evidence that wages

[1] The stability of the wage structure was first noticed (up to my knowledge) by Slichter (1950) who states that "the wage structure changes over time, but the changes are fairly small and the wage structure between industries within a period of twenty to thirty years exhibits only moderate changes".

[2] See the arguments and empirical evidence of this view of the business cycle of Bell (1954), Haddy and Tolles (1957), Watcher (1970), Hall (1975) and Wood and Solon (1990).

do have sector-specific components, and that the response of wages to shocks is greater in labor-intensive sectors. In other words, the wage adjustment tends to be in the direction of employment stabilization. Thus, when output prices, technology or the capital stock shifts, wages shift in the same direction. In this context, a widening of the interindustry wage structure results from disturbances that favor capital-intensive sectors. At the same time, positive shocks to capital-intensive sectors have a much stronger impact on aggregate employment that positive shocks to labor-intensive sectors both because the response of sector-specific wages is greater in the latter and because for a country like the United States, the distribution of employment is biased towards capital-intensive sectors. These two features explain the positive and significant association between aggregate employment dynamics and the capital intensity characteristics of the industries subject to positive disturbances. The asymmetric response of wages and employment across sectors implies that impulses with no effect in aggregate variables can nonetheless have substantial impact on aggregate employment.

The notion that wages respond more to sector-specific shocks in labor-intensive sectors can be supported from theories of efficiency wages, labor hoarding, rent sharing, bargaining and turnover, among others. In models where the wage structure is affected by the level of sectorial rents, although their level are greater in capital-intensive sectors, the response of rents to industry-specific disturbances is greater in labor-intensive industries. The stronger response of wages in labor-intensive sectors does not imply necessarily that employment variations are smaller in these sectors, for the greater adjustment in wages is accompanied by a greater shift in labor demand for similar shocks. I consider a simple general equilibrium model with wage bargaining at the industry level and sector-specific capital that implies a wage adjustment mechanism as the one just discussed, and provide empirical evidence for its support.[3]

[3]See Oi (1962) and Layard, Nickell and Jackman (1991) for discussions on alternative models with similar wage setting implications. I consider a model of bargaining because it is the simplest that provides a rationale for the wage-setting structure discussed above and not because I claim empirical validity for

Evidence against the countercyclical behavior of interindustry wage differentials is also presented in Keane (1993) and McLaughlin and Bils (2001) who argue that although high-wage firms are those with higher employment fluctuations, wage differentials fail to widen as the economy expands.[4] They show that after correcting for compositional bias, high wage industries have the largest increases in composition-corrected wages in cyclical fluctuations. The implicit countercyclical bias of not correcting for compositional effects is based on evidence that in expansions, the average wage of entrants to high-wage sectors is significantly smaller than the average wage of incumbent workers. Moreover, the reallocation of labor increases the average wage in low-wage industries.[5] In Keane words, after correcting for compositional effects, "the results here indicate that no systematic tendency for industry wage differentials to be greater in periods of higher unemployment exists. In fact, industry wage differentials have a slight tendency to narrow in recessions."

Keane (1993) and McLaughlin and Bils (2001) use the evidence against countercyclical interindustry wage differentials (and slightly in favor of procyclical wage differentials after correcting for compositional effects) to argue against efficiency wage theories of wage determination. As mentioned above, in a world where common shocks dominate, efficiency wage theories predict that adverse shocks cause a widening of wage differentials as firms in low-wage industries reduce wages to a greater extent than firms in high-wage or efficiency wage paying industries, which try to keep their best employees. This paper presents evidence on procyclical interindustry wage differentials within manufacturing industries, and I argue that this provides evidence on the role of sectorial shocks rather

the bargaining process itself.

[4]Abraham and Haltiwanger (1995) mention also that high wage manufacturing industries are more cyclically sensitive than lower-wage manufacturing industries.

[5]Keane, Moffitt and Runkle (1988) show that within manufacturing industries there exists a countercyclical bias in uncorrected real wages and that manufacturing workers with low permanent wages are more likely to become unemployed. This evidence, together with the one that high-wage industries tend to expand relatively more in expansions is consistent with the result that not correcting for compositional effects introduces a countercyclical bias in manufacturing wage differentials.

than constituting an argument against efficiency wages. Indeed, the evidence that wage and employment responses to similar disturbances are higher in labor-intensive industries is consistent with efficiency wage theories.

The paper is also related to the literature that discusses the relative impact of sectorial and aggregate shocks in employment fluctuations, started with the provocative work of Lilien (1982), who provides evidence that unusually large sectorial shifts contributed significantly to the evolution of the unemployment rate in the United States during the 1970s. While several authors have since provided mixed evidence on the relevance of both types of disturbances to employment fluctuations, it is fair to say that the mainstream view is that aggregate shocks are the main drivers of business cycles.[6]

A fundamental issue when comparing the relevance of common versus sectorial shocks is the difficulty of distinguishing them. In other words, is it possible to differentiate between different shocks and different responses to a common shock? A common strategy has been to focus on the implications of both types of disturbances on third variables – e.g., sectorial employment distribution, job vacancies, job destruction and creation dynamics.[7] This paper will identify the effects of sectorial versus common shocks by examining their opposite implications on the cyclical pattern of interindustry wage differentials. If the dominant force in fluctuations across all sectors are common disturbances, we would expect wage differentials to shrink in expansions and increase in recessions, as periods of negative shocks imply a greater fall in wages in the low-wage or labor-intensive sector. Alternatively, procyclical interindustry wage differentials can only follow from asymmetric

[6] See Abraham and Katz (1986), Blanchard and Diamond (1989), Brainard and Cutler (1993), Caballero, Engel and Haltiwanger (1997) and Davis and Haltiwanger (1999) for discussions along these lines.

[7] For example, Abraham and Katz (1986) and Blanchard and Diamond (1989) consider the evolution the vacancies to disentangle aggregate from sectorial shocks. Davis and Haltiwanger (1999) consider that unfavorable aggregate disturbances simultaneously reduce job creation and increase job destruction, whereas allocative disturbances increase both job creation and destruction.

shocks across sectors, as discussed above. This identification procedure serves to differentiate between asymmetric shocks or asymmetric responses to similar shocks. In any case, I leave for future research the study of the relative importance of common versus sectorial shocks in the aggregate employment cycle.

The paper continues as follows. Section 2 shows the empirical evidence on the cyclical behavior of the interindustry wage structure, as well as on the association between factor-intensity distribution of shocks and employment fluctuations. Section 3 presents a simple model that can account for these stylized facts and section 4 reports the empirical evidence supporting the wage-setting implications of the model. Section 5 concludes.

2 Some Empirical Regularities

One of the main characteristics of the interindustry wage structure is its stability over time, as Figure 1 shows for 1960 and 1995, where each axis depicts the nominal hourly wage across 446 4-digit SIC manufacturing industries from the NBER Productivity Database[8]. This suggests that the search for its explanation should focus on some structural factors. A first line of research is to focus on either unmeasured differences in job amenities or workers' characteristics. Leamer (1999) provides evidence that the economy offers a wage-effort contract curve with higher wages in high-effort industries.[9] Murphy and Topel (1987) focus on the role of unmeasured abilities of workers. Alternative view stress non-competitive features of the labor market. Krueger and Summers (1988) present evidence supporting the efficiency wage theory of wage determination by arguing that differences in wages are difficult to link to unobserved differences in ability or to compensating differentials for work conditions, suggesting that workers in high wage industries receive

[8]The correlation coefficient is 0.77 significant at 1%. In order to keep the same set of industries across time, I excluded industries 2794 and 3292 for lack of data in the 1990s. Results do not depend on their exclusion.

[9]See also Rosen (1986).

non-competitive rents. Currie and McConnell (1992) emphasize a similar point by directly linking the distribution of wages across sectors to a measure of profits per employee.

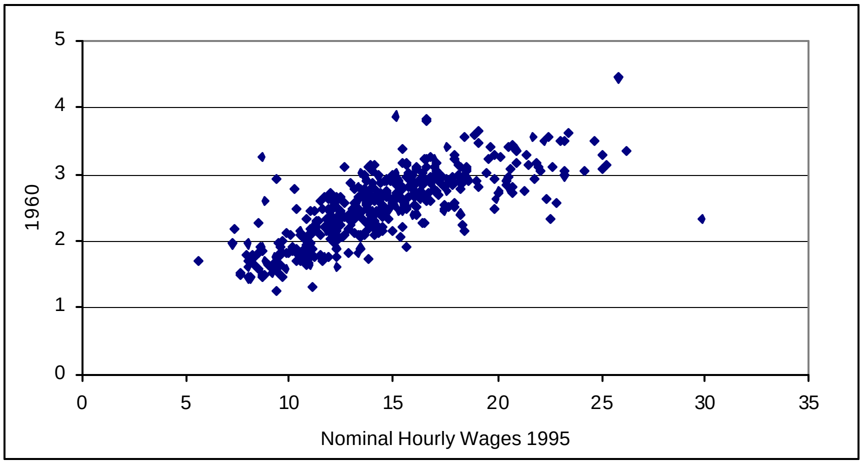

Figure 1: Stability of Interindustry Wage Structure

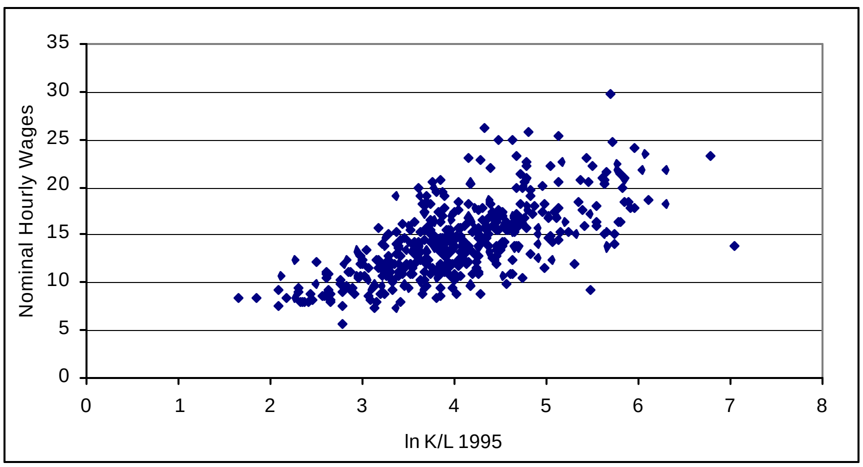

Figure 2: Wage Structure and Factor Intensities

In Leamer's case, and to some extent in explanations related to rent sharing, there exists a close association between the distribution of wages and the factor-intensity characteristics of industries. In the effort explanation of Leamer, it is more costly for capital to stay idle in capital-intensive sectors; as a result, incentives exist to increment the workload through high effort. In the case of rent-sharing explanations, it is possible to rewrite profits per employee in sector i as $r_i \cdot K_i/L_i$ where r_i stands for the return to capital in sector i and K_i/L_i is the capital-labor ratio in sector i. For reasonably similar rental rates across sectors, the cross-industry variation in profits per employee is dominated by differences in capital/labor ratios. As shown in Figure 2, in 1995 there existed a high and significant association between industry wages and capital intensity, and this relationship is very stable over time.

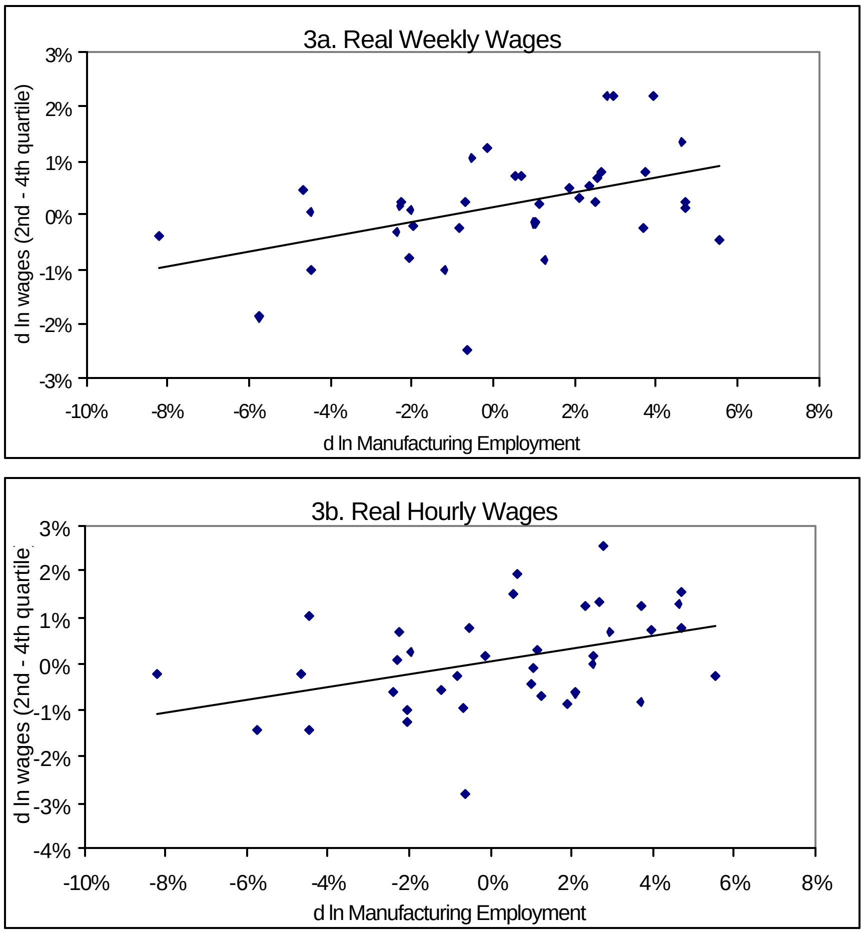

Figure 3: Cyclical Behavior Wage Differentials 1.

Less well-known is the cyclical behavior of the interindustry wage structure. Although differences in wages across industries seem to be dominated by differences in K/L ratios, that are mainly technologically determined, the reaction of wages to sector-specific disturbances may differ across sectors. Several mechanisms can support such adjustments, depending on the specific model used to explain the wage structure. In this section I establish the cyclical properties of interindustry wage differentials, abstracting from potential explanations that are discussed in detail in the rest of the paper.

TABLE 1

CYCLICAL PATTERNS OF WAGE DIFFERENTIALS

Dependent Var	(A) d ln ML	(B) d ln ML	(C) d ln ML	(D) d ln ML	(A) d ln ML	(B) d ln ML	(C) d ln ML	(D) d ln ML
Explanatory Var								
Coefficient	0.185	0.137	0.159	0.129	0.047	0.136	0.102	0.072
St. Deviation	(0.072)	(0.045)	(0.043)	(0.037)	(0.069)	(0.051)	(0.047)	(0.04)
R-Squared	0.153	0.208	0.271	0.249	0.013	0.161	0.115	0.083

Sample: 1959 - 1996
d ln ML: % change in Manufacturing Employment
Explanatory Variable: Difference between average growth rate of wages in:
(A) 1st Quartile minus 5th Quartile
(B) 2nd Quartile minus 4th Quartile
(C) 2nd to 4th Decile minus 7th to 9th Decile
(D) 2nd to 5th Decile minus 6th to 9th Decile
Industries in decreasing order of K/L ratio.

A first look at the cyclical behavior of sectorial wages is depicted in Figure 3, which plots the percentage change in manufacturing employment for each year between 1959 and 1996 against the difference between the average wage change of the 2nd and 4th quintiles of industries ordered in decreasing order of K/L. Panel (a) considers a measure of weekly wages while panel (b) measures changes in hourly wages.[10] The positive and significant correlations (0.46 and 0.40 respectively) suggest that periods of increasing employment are associated with periods of relative rises in wages in capital-intensive sectors. A broader view of the data is registered in Table 1, that reports regressions of changes in manufacturing employment against wage variations for alternative groups. The first four columns refer to variations in real weekly wages while the last four columns consider variations in real hourly wages. Overall, there is a consistent procyclical pattern of wage differentials for alternative cutting points in the wage structure. Similar results (not reported) follow if we use the evolution of total employment instead of manufacturing employment as the business cycle measure.[11]

[10] Hourly wages were estimated by assuming the same amount of weekly hours to production workers (available) and to non-production workers (not available).

[11] Also, the results reported in table 1 are not significantly altered if industries are ordered according to

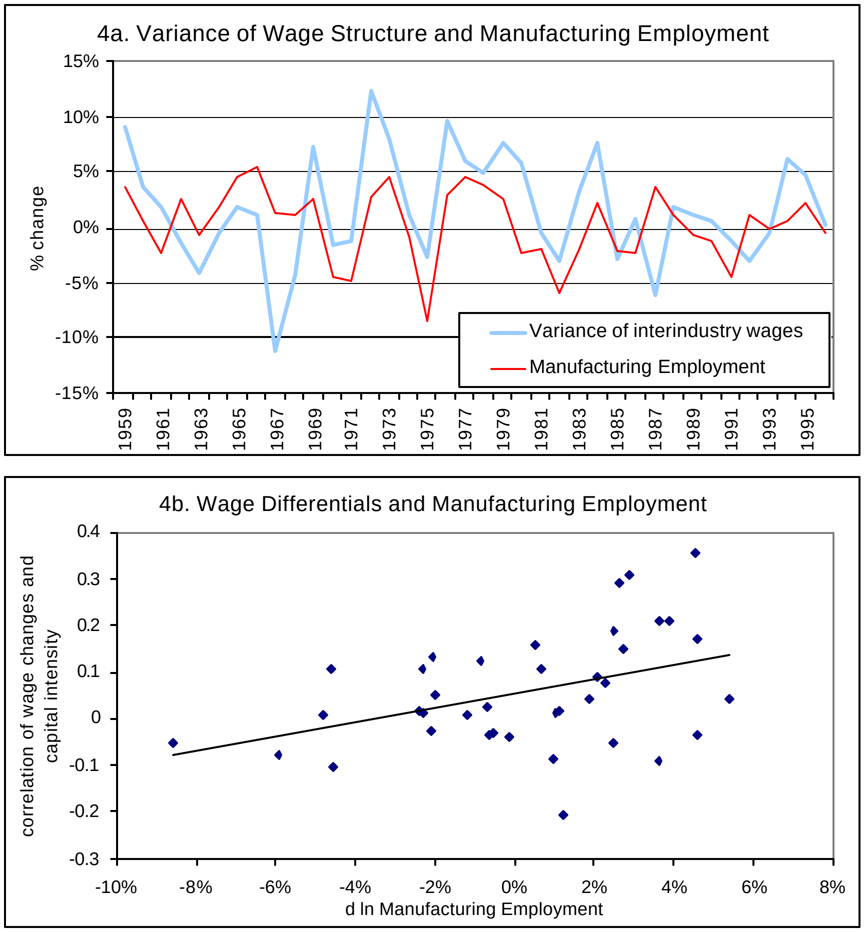

Figure 4: Cyclical Behavior of Wage Differentials 2

Figure 4 gives us an alternative look at the interindustry wage structure. It depicts the cyclical evolution of the dispersion of interindustry wages measured as the variance of weekly wages across industries. In order to make the variance comparable across years and to avoid dealing with the trend arising from the natural growth in wages, the measure uses 1959 as its base year and calculates the variance each year t, discounting the average rate of growth in wages between t and 1959; that is $var(w_{i,t})/(\overline{w_t}/\overline{w_{59}})^2$ where $\overline{w_t}$ stands for the average wage rate in year t. In this case, if between year t and $t+1$ all wages grow at the same rate, the measure shows no growth in the variance of wages. Panel (a)

their average wage level instead of capital intensity. This is of course a consequence of the high correlation between wage level and capital intensity.

of Figure 4 depicts variations in total manufacturing employment and percentage change in the variance of weekly wages. The positive and significant association reveals that periods of increasing aggregate manufacturing employment are associated with increases in the variance of the interindustry wage structure. In other words, industry wage differentials widen in expansions and narrow in recessions.[12] The first three columns in Table 2 report the results of regressions where the dependent variable is the percentage change in the variance of interindustry wage structure and the independent variable is the percentage change in total manufacturing employment between 1959 and 1996. The collective results reveal that periods of increasing employment are also periods of increases in the dispersion of the wage structure. The inclusion of a trend variable is aimed to control for a non-linear effect of the trend in the linear relationship between the level of wage dispersion and aggregate employment. It improves significantly the fitness of the regression measured using the R-squared and does not alter the relationship between variations in wage differentials and employment fluctuations. Again, the results are not altered by the use of hourly wages rather than weekly wages (not reported) or with the use of aggregate employment instead of manufacturing employment as a right hand side variable (see regressions 4 to 6), suggesting that fluctuations in the wage structure are not indicative of movements of labor between manufacturing and non-manufacturing sectors.

An alternative approach is to estimate the distribution of wage changes across sectors with different factor intensities. For that, I estimate the correlation coefficient between sectorial wage changes and capital intensity. High and positive values in any year reveal that capital-intensive sectors have relative wage increases. Panel (b) in Figure 4 plots this correlation coefficient against changes in manufacturing employment for each year between 1959 and 1996. The positive and significant association (0.41 at 1%) confirms the message of regressions 1 to 6 in Table 2: periods of relative wage increases in capital-intensive sectors are also periods of expansions in aggregate employment, whereas recessions are

[12] The correlation coefficient is 0.41 significant at 1%. Similar results are obtained if hourly wages or variations in total employment are used.

periods of relative wage increases in labor-intensive sectors (see columns 7 to 9 in Table 2).[13]

TABLE 2

VARIANCE OF WAGE STRUCTURE

Dependent Var	(1) WW1	(2) WW1	(3) WW1	(4) WW1	(5) WW1	(6) WW1	(7) WW2	(8) WW2	(9) WW2	(10) DML	(11) DTL
Explanatory Var											
Constant	0.014	0.000	-0.001	-0.011	-0.021	-0.029	0.053	-0.004	-0.005	0.004	0.022
	(0.0074)	(0.007)	(0.007)	(0.012)	(0.01)	(0.011)	(0.018)	(0.016)	(0.018)	(0.005)	(0.003)
DML	0.626	0.571	0.603				1.548	1.477	1.432		
	(0.231)	(0.196)	(0.205)				(0.579)	(0.427)	(0.463)		
DTL				1.307	1.137	1.383					
				(0.442)	(0.376)	(0.39)					
TREND1		0.848			0.803			0.929			
		(0.208)			(0.207)			(0.164)			
TREND2			0.938			0.930			0.934		
			(0.251)			(0.24)			(0.194)		
C(DP,K/L)										0.079	0.058
										(0.043)	(0.021)
C(DT,K/L)										0.119	0.063
										(0.064)	(0.032)
R-squared	0.169	0.434	0.410	0.196	0.442	0.461	0.166	0.569	0.515	0.132	0.203
Adjusted R-squared	0.146	0.399	0.373	0.173	0.408	0.428	0.143	0.542	0.485	0.079	0.155
S.E. of regression	0.045	0.038	0.039	0.045	0.038	0.037	0.113	0.083	0.089	0.031	0.016
DW	1.281	1.851	1.592	1.271	1.899	1.592	1.114	1.873	1.511	1.600	1.317
Sample	1959-96	1959-96	1959-96	1959-96	1959-96	1959-96	1959-96	1959-96	1959-96	1961-96	1961-96

Standard Errors in Parenthesis

Definitions:

WW1: Percentage change in variance on interindustry wages using weekly wages

WW2: Cross-industry correlation of weekly wage variations and K/L ratios.

DML: Percenatge change in total manufacturing employment

DTL: Percentage change in total employment

TREND1: Three-year moving average of dependent variable

TREND2: Four-year moving average of dependent variable

C(DP,K/L): Cross-industry correlation of variations in value-added prices and K/L ratio

C(DT,K/L): Cross-industry correlation of variations in TFP and K/L ratio

Finally, and just as complementary evidence with respect to the cross-industry distribution of shocks in the business cycle, consider that the response of wages is affected by the short-run response of the return on (immobile) capital in each sector. In an economy of constant returns to scale and zero profits, the evolution of capital return is mainly determined by the path of prices, productivity and wages. For any economy-wide pressure on wages (common for all sectors), it is possible to make a cross-section estimation of the degree to which the sectorial distribution of price and productivity changes – that

[13] Again, similar results hold if total employment is used instead of manufacturing employment and if hourly wage changes are used instead of weekly wages.

determine the evolution of the return to capital – are related to aggregate employment fluctuations. For each year between 1961 and 1996, I have calculated the correlation coefficient between the natural logarithm of the capital/labor ratio and the percentage change in relative value-added prices[14], as well as multi-factor productivity growth for each of the 446 manufacturing industries[15]. Columns 10 and 11 in Table 2 report the result of regressions where the dependent variables are variations in manufacturing and aggregate employment respectively and the explanatory variables are the correlation coefficients for each of the exogenous variables. A high and positive value of the independent variables reveal variations in relative prices and multi-factor productivity in favor of capital-intensive industries. The message is the same in both cases: periods of increasing employment are associated with relative good price and productivity shocks to capital-intensive sectors, whereas recessions are periods of relative good price and productivity shocks to labor-intensive sectors. As long as sector-specific adjustments in wages are related to price and productivity shocks, these results are consistent with the cyclical behavior of the interindustry wage structure discussed above.

3 A Simple Model

Consider an economy with i sectors that differ in their factor intensities. There are two factors of production: labor and capital. Labor is mobile in across sectors, while capital is sector-specific. There exists constant return to scale technologies, product markets are perfectly competitive and output prices are determined in external markets. Although

[14]Calculated as $\widehat{p_{va,i}} = \frac{\widehat{p_i} - \sum_I \theta_{Ii} \widehat{p_I}}{1 - \sum_I \theta_{Ii}}$, where p_i is the price of output in sector i, p_I is the price of intermediate input I (materials and energy) and θ_{Ii} is the share in total costs of input I in sector i.

[15]I excluded industry-year data points where the rate of change in TFP of value-added prices is higher than 60% or smaller than -60% in any year. This procedure eliminates 141 industry-year productivity growth data points and 278 price changes industry-year data points over a total of 16,056 (446*36). The results are not significantly affected with this elimination, neither qualitatively or quantitatively.

labor is mobile across sectors, a bargaining process over wages between employees and employers in each sector implies a wage structure that generates unemployment.

Workers push for wages (w_i) considering the outside option available (w_e), that is the average wage in the economy corrected by the level of unemployment and firms push for a wage level that maximizes profits. The Nash-bargaining maximand is then

$$-_i = f(w_i/w_e)^{\beta_i} \cdot \pi_i(w_i) \tag{1}$$

where f and $f' > 0$. The wage bargain must satisfy $\partial \log -_i / \partial w_i = 0$. For simplicity, consider a function f of the type $f(w_i/w_e) = \alpha^{w_e/w_i}$ with $0 < \alpha < 1$. In this case, the bargaining process implies the following wage structure[16]

$$\frac{w_i}{w_e} = k_i \frac{\theta_{Ki}}{\theta_{Li}} \tag{2}$$

where $k_i = -\beta_i \cdot \log \alpha > 0$ and θ_{Ki} and θ_{Li} represent the share in value-added of capital and labor costs respectively. Equation (2) provides a simple structural explanation for figure 2, considering the close association between measures of factor intensities based on physical units or cost shares. Regardless of potential differences in factor returns, differences in θ_{Ki}/θ_{Li} are dominated by differences in K_i/L_i. The specificity of the capital stock implies that are exist rents in each industry and, depending on the response of the return to capital across sectors, the wage premium structure may vary. Indeed, differentiating equation (2) implies that[17]

$$\widehat{w_i} = \frac{1}{1+h_i}\widehat{w_e} + \frac{h_i}{1+h_i}(\widehat{p_i} + \widehat{t_i}) \tag{3}$$

[16] The type of function used implies that the relation between wage differentials and factor intensity is linear. In general, many other functions imply positive relationships between wage premiums and factor intensities (see Layard, Nickell and Jackman (1991)).

[17] Consider $\theta_{fi} = a_{fi} w_{fi} / p_i$ where a_{fi} represents the amount of factor f required to produce one unit of good i. Differentiating the right hand side of (2) and using the definition of the elasticity of substitution implies that $\widehat{\theta_{Ki}} - \widehat{\theta_{Li}} = (\sigma_i - 1)(\widehat{w_i} - \widehat{r_i}) = \frac{(\sigma_i - 1)}{\theta_{Ki}}(\widehat{w_i} - \widehat{p_i} - \widehat{t_i})$. Equation (3) follows directly by reordering terms.

where $\widehat{p_i} + \widehat{t_i}$ are percentage changes in product prices and multifactor productivity, and $h_i = (1 - \sigma_i)/\theta_{Ki}$. It is not possible a priori not know the sign of h_i for it depends on the size of σ_i. If $\sigma_i < 1$ or $\sigma_i > 1 + \theta_{Ki}$ the response of wages to sector-specific shocks is greater in labor-intensive sectors, for $h_i/1 + h_i$ becomes a negative function of K_i/L_i for similar enough elasticities of substitution. However, if $1 < \sigma_i < \theta_{Ki}$ the wage reaction to sector-specific wages is negative. The intuition for this result is the following. The rise in prices and productivity generates an expansion in the return to capital at the initial wage level.[18] The change in factor returns will affect relative factor intensities (in physical units) depending on the elasticity of substitution. If σ_i is smaller than one, the movement towards lower K/L implies a rise in the relative share of capital in value-added, and hence a rise in the wage premium. The consequent increase in wages and fall in return to capital generates a new accommodation of K/L that is dominated by the fist effect, causing a final rise in the share of capital. The second effect dominates in the case when $\sigma_i > 1 + \theta_{Ki}$, and so the wage premium increases anyway. Next section presents empirical evidence on the size and sectorial distribution of h_i based on equation (3).

Given the wage setting structure, firms demand labor according to their labor demand curves, given by $L_i = a_{Li}K_i/a_{Ki}$. Totally differentiating it implies that

$$\widehat{L_i} = \frac{\sigma_i}{\theta_{Ki}}(\widehat{p_i} + \widehat{t_i} - \widehat{w_i}) \tag{4}$$

Depending on the relative strength of the sector-specific shocks and the wage response whether employment in each sector rises or falls. Interestingly, the shift in labor demand to price and productivity changes is greater in labor intensive sectors. Considering the case where $h_i > 0$, the pressure on sector-specific wages compensates the greater shift in labor demand, and the final effect on employment is dubious. A similar situation occurs in high-wage sectors, where the smaller shift in labor demand is accompanied with a smaller pressure on wages.

[18] $\widehat{r_i} = \frac{1}{\theta_{Ki}}\left(\widehat{p_i} + \widehat{t_i} - \theta_{Li}\widehat{w_i}\right)$.

The final step required to close the system is to establish the determinants of the outside option available for workers at the moment of the bargain. Although workers in each sector take the outside option as given, in general equilibrium w_e should correspond to an average of wage across sectors corrected by the level of unemployment. Log differentiating the outside option implies that $\widehat{w_e} = \widehat{\overline{w}} + \widehat{(1-\mu)}$ that can be proxied as $\sum_i \lambda_i \widehat{w}_i + \sum_i \lambda_i \widehat{L}_i$ where λ_i is the employment share of sector i in aggregate labor force ($\sum_i \lambda_i \leq 1$). Using (4) and plugging into (3) we get the following expressions for the percentage change in sector i wages as a function of all exogenous variables for the 2-sector case

$$\begin{aligned} \widehat{w_1} &= (\widehat{p_1} + \widehat{t_1}) \cdot \frac{h_1 + h_1 h_2 + \phi_1 - h_1 \lambda_2 + h_1 \phi_2 + h_2 \phi_1}{C} \\ &\quad + (\widehat{p_2} + \widehat{t_2}) \cdot \frac{\phi_2 + h_2 \lambda_2}{C} \end{aligned} \tag{5}$$

and

$$\begin{aligned} \widehat{w_2} &= (\widehat{p_2} + \widehat{t_2}) \cdot \frac{h_2 + h_1 h_2 + \phi_2 - h_2 \lambda_1 + h_1 \phi_2 + h_2 \phi_1}{C} \\ &\quad + (\widehat{p_1} + \widehat{t_1}) \cdot \frac{\phi_1 + h_1 \lambda_1}{C} \end{aligned} \tag{6}$$

where $C = 1 + h_1 + h_2 + h_1 h_2 - \lambda_1 - \lambda_2 - \lambda_1 h_2 - h_1 \lambda_2 + \phi_1 + \phi_2 + \phi_1 h_2 + \phi_2 h_1$ and $\phi_i = \lambda_i \sigma_i / \theta_{Ki}$. The coefficient on $(\widehat{p_1} + \widehat{t_1})$ in equation (5) is greater than the coefficient of $(\widehat{p_2} + \widehat{t_2})$ in (6) if $h_1/C > h_2/C$ which implies $h_1 > h_2$ if both are positive. In other words, if the elasticities of substitution are smaller than 1 and similar enough across sectors the response of wages to sector-specific shocks is greater in labor intensive sectors. If the elasticities of substitution are greater than one, then it is not possible to establish a relationship between h_1 and h_2 that in general equilibrium implies a greater response of wages in labor intensive sectors. As discussed above, it is an empirical issue to determine the sign of h_i.

An alternative way of writing equations (5) and (6) is

$$\widehat{w_1} = (\widehat{p_1} + \widehat{t_1}) \frac{h_1(1 - \lambda_1 - \lambda_2) + h_1 h_2 + h_1 \phi_2 + h_2 \phi_1}{C} + \widehat{m} = \alpha_1 (\widehat{p_1} + \widehat{t_1}) + \widehat{m} \tag{7}$$

$$\widehat{w_2} = (\widehat{p_2} + \widehat{t_2})\frac{h_2(1-\lambda_1-\lambda_2) + h_1 h_2 + h_1\phi_2 + h_2\phi_1}{C} + \widehat{m} = \alpha_2(\widehat{p_2} + \widehat{t_2}) + \widehat{m} \qquad (8)$$

where $\widehat{m} = [(\widehat{p_1}+\widehat{t_1})(\phi_1 + h_1\lambda_1) + (\widehat{p_2}+\widehat{t_2})(\phi_2 + h_2\lambda_2)]/C$. The advantage of expressing the wage adjustment in this form is that if $\alpha_1 = \alpha_2 = 0$ interindustry wage differentials do not vary. For the wage structure to widen and shrink it is required that α_1 and/or α_2 differ from zero. Its evolution is given by

$$\begin{aligned} \widehat{w_2} - \widehat{w_1} &= (\widehat{p_2} + \widehat{t_2} - \widehat{p_1} - \widehat{t_1}) \cdot \frac{h_1 h_2 + h_1\phi_2 + h_2\phi_1}{C} \\ &+ \frac{(1-\lambda_1-\lambda_2)}{C} \cdot (h_2(\widehat{p_2} + \widehat{t_2}) - h_1(\widehat{p_1} + \widehat{t_1})) \qquad (9) \end{aligned}$$

If $h_1 > h_2 > 0$ (which implies $\alpha_1 > \alpha_2$), interindustry wage differences will fall if common shocks are causing the business cycle. Alternatively, is capital-intensive sectors are subject to relatively good shocks, wage differentials increase unless h_1 is much greater than h_2. This latter effect tends to vanish if the economy is close to full employment. In consequence, procyclical wage differentials can only follow from disturbances favoring high-wage sectors, although the converse is not necessarily true.

The effect of price and technology shocks on aggregate employment has two components. First, positive shocks in one sector imply a shift in the labor demand that is compensated by a rise in wages in that sector. The net effect on employment is always positive as can be seen by plugging equations (5) and (6) into (4). At the same time, positive shocks in one sector generates rises in wages in the other sectors, generating an unambiguous fall in employment. The aggregate response of employment will depend on the strength of both forces.

Algebraically, the evolution of aggregate employment is given by $\widehat{L_T} = \lambda_1\widehat{L_1} + \lambda_2\widehat{L_2}$ that implies[19]

$$\widehat{L_T} = \frac{(1-\lambda_1-\lambda_2)}{C}\left[\phi_1(1+h_2)(\widehat{p_1} + \widehat{t_1}) + \phi_2(1+h_1)(\widehat{p_2} + \widehat{t_2})\right] \qquad (10)$$

[19]Expression (10) assumes σ equal across sectors, so that differences in the reaction of wages are determined by factor intensity variables. The message does not change of course if a more general case is considered.

that can be rewritten as

$$\widehat{L_T} = \frac{(1-\lambda_1-\lambda_2)}{C}\left[\lambda_1\eta_1(1+h_2)(\widehat{p_1}+\widehat{t_1})+\lambda_2\eta_2(1+h_1)(\widehat{p_2}+\widehat{t_2})\right] \tag{11}$$

where η_i is the wage elasticity of the labor demand curve in sector i. In general, the effect on aggregate employment is determined by the distribution of shocks, the elasticity of labor demand curve, the response of wages to sector specific shocks and the relative size of the sectors. Focusing again in the case where h_1 and h_2 are greater than zero, the term $(1-\lambda_1-\lambda_2)/C$ is unambiguously greater than zero and hence the effect of sectorial shocks on aggregate employment will depend on the relative size of $\lambda_1\eta_1(1+h_2)$ and $\lambda_2\eta_2(1+h_1)$. In this case, the effect of disturbances to sector 2 on aggregate employment will be greater than the response to shocks in sector 1 if $\lambda_1\eta_1(1+h_2) < \lambda_2\eta_2(1+h_1)$. In general, the elasticity of labor demand is greater in labor intensive sectors, and hence the inequality holds in countries where the differences in wage response to shocks dominate the differences in wage elasticities of labor demand and differences in the sectorial distribution of employment. Ceteris paribus, in countries with a employment distribution biased toward capital-intensive sectors the aggregate response of employment to shocks in capital intensive sector is greater than to shocks in low-wage sectors.

The relevant interpretation of expression (11) in light of the results reported in table 2 is that if $\lambda_1\eta_1(1+h_2) \neq \lambda_2\eta_2(1+h_1)$ then variations in relative prices with no effect on average prices or productivity changes with no effect on average productivity can nonetheless have significant impact on the aggregate evolution of employment. In particular, if $\lambda_1\eta_1(1+h_2) < \lambda_2\eta_2(1+h_1)$ the model is able to explain the evidence that the distribution of shocks does matter for the evolution of aggregate employment. And this is possible if differences in employment distribution and reaction to sector-specific shocks dominate differences in wage elasticities of labor demand. It is an empirical issue to determine whether for the U.S the inequality holds in the direction consistent with the results presented in section 2.

4 Sector-Specific Wage Adjustments

The capacity of the model to replicate the cyclical pattern of wage differentials and aggregate employment rests on two fundamental elements of the wage determination process. First, that wages depend on sector-specific elements and second, that the response of wages to sector-specific shocks is greater in labor-intensive industries. This section presents evidence that this is the case.

A first approach considered is to run panel regressions based on equation 3 under the assumption that h_i is constant over time and varies linearly across sectors with different factor intensities and that for each industry-year, the evolution of the outside option or average wages is considered exogenous. Tables 3-1 and 3-2 report result of panel regressions (both fixed and random effects) where the dependent variable is the percentage change in industry´s i real weekly or hourly wages for 4-digit US SIC manufacturing sectors between 1961 and 1996 and the dependent variables are percentage change in relative value-added prices and multifactor productivity and interactions of these variables with a measure of capital intensity.[20] The presence of year dummies and their interactions with $\ln K_i/L_i$ represent the year variations in the outside option, similar across sectors. Overall, there exist significant evidence that of rent sharing at the sectorial level, and for a greater response of wages in labor intensive sectors.

[20]Each observation is an industry/year pair.

TABLE 3-1

PANEL REGRESSIONS OF REAL WEEKLY WAGES

	Fixed Effects						Random Effects					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Explanatory Var												
Constant	-0.012	0.018	-0.012	-0.061	-0.018	-0.074	-0.012	0.018	-0.012	-0.031	0.018	-0.040
	(0.0022)	(0.0003)	(0.0021)	(0.0115)	(0.0123)	(0.0118)	(0.0021)	(0.0003)	(0.0021)	(0.0101)	(0.0107)	(0.0103)
DP	0.074	0.243	0.177	0.179	0.186		0.072	0.239	0.173	0.174	0.180	
	(0.0042)	(0.018)	(0.0171)	(0.0172)	(0.0186)		(0.0041)	(0.0175)	(0.0167)	(0.0168)	(0.0182)	
DP* ln(K/L)		-0.038	-0.025	-0.025	-0.027			-0.037	-0.024	-0.025	-0.026	
		(0.0041)	(0.0039)	(0.0039)	(0.0043)			(0.004)	(0.0038)	(0.0039)	(0.0042)	
DT	0.191	0.404	0.304	0.321	0.346		0.189	0.389	0.290	0.314	0.342	
	(0.0073)	(0.0292)	(0.0279)	(0.0286)	(0.0304)		(0.0071)	(0.0286)	(0.0273)	(0.0281)	(0.0298)	
DT* ln(K/L)		-0.044	-0.029	-0.034	-0.040			-0.041	-0.026	-0.033	-0.040	
		(0.0076)	(0.0072)	(0.0074)	(0.0079)			(0.0074)	(0.007)	(0.0072)	(0.0077)	
DP-1					0.030						0.026	
					(0.0185)						(0.0181)	
DP-1*ln(K/L)					-0.007						-0.006	
					(0.0043)						(0.0042)	
DT-1					0.051						0.046	
					(0.0304)						(0.0298)	
DT-1*ln(K/L)					-0.016						-0.017	
					(0.0078)						(0.0077)	
DVADD						0.058						0.049
						(0.0077)						(0.0073)
DVADD*ln(K/L)						-0.008						-0.007
						(0.0018)						(0.0017)
Year dummies	yes	no	yes	yes	yes	yes	yes	no	yes	yes	yes	yes
Year dummies * K/L	no	no	no	yes	yes	yes	no	no	no	yes	yes	yes
R- squared	0.166	0.065	0.168	0.166	0.165	0.131	0.166	0.065	0.168	0.181	0.184	0.149
Within R-squared	0.168	0.067	0.170	1.840	0.187	0.151	0.168	0.067	0.170	0.182	0.185	0.149
N	15737	15737	15737	15737	15073	15737	15737	15737	15737	15737	15073	15737

Standard Errors in Parenthesis
DP: Percentage change in value-added relative prices
DT: Percentage change in TFP
DVADD: Percentage change in real Value Added
ln(K/L): Natural Logarithm of Capital-Labor ratio
Sample: 446 industries, 1961-1996

Two elements are worth noticing. First, according to equation (3), these results reveal that $h_i/1+h_i$ is positive and decreasing on $\ln K/L$. However, the sign of h_i and its size is not clear. Assuming that differences in the elasticities of substitution across sectors are not related to factor intensities, cross industry differences in $h_i/1+h_i$ are only consistent with greater and positive h_i in labor-intensive sectors. Second, considering the distribution of K/L across sectors, the coefficients of the regressions imply that the effect of price and productivity shocks on industry wages is positive, even for very high capital-intensive sectors.[21] This result provides indirect evidence that σ_i is smaller than one in most industries, and that the pattern of responses is dominated by differences in θ_L. The only case where this logic may not apply is when the elasticities of substitution are greater than 1 in most sectors, and increasing with capital intensity. In such scenario, the results reported in tables 3-1 and 3-2 are consistent with h_i smaller than zero. Empirical studies on elasticity of substitution do not find that pattern.[22]

The evidence that h_i is positive in most sectors and decreasing the more capital intensive a sector validates the model in its ability to replicate the features of the business cycle presented in section 2. According to expression (9), if $h_1 > h_2 > 0$ increases in the dispersion of interindustry wages are procyclical if expansions are periods of relative good shocks to high-wage sectors. This is indeed the evidence presented in the last two columns of table 2. Furthermore, equation (11) reveals that the response of aggregate employment is greater if disturbances affect capital-intensive sectors if $h_1 > h_2 > 0$ and differences in the distribution of employment dominate differences in wage elasticity of labor demand. Although we do not have direct evidence from this, the bias of the production structure in the United States toward capital-intensive sectors suggests that this may be perfectly the case. I rather take the results in table 2 as evidence that this is the case.

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[21] There are very few industries with extreme capital intensity for which the net effect of price and productivity shocks is negative.

[22] See Hamermesh (1993).

TABLE 3-2

PANEL REGRESSIONS OF REAL HOURLY WAGES

	Fixed Effects						Random Effects					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Explanatory Var												
Constant	0.002	0.017	0.003	-0.021	-0.017	-0.028	0.002	0.017	0.003	-0.008	0.000	-0.017
	(0.0024)	(0.0004)	(0.0024)	(0.0131)	(0.0140)	(0.0135)	(0.0024)	(0.0004)	(0.0024)	(0.0115)	(0.0121)	(0.0117)
DP	0.074	0.285	0.225	0.222	0.218		0.073	0.280	0.221	0.219	0.212	
	(0.0048)	(0.0202)	(0.0194)	(0.0196)	(0.0210)		(0.0046)	(0.0196)	(0.0188)	(0.019)	(0.0205)	
DP* ln(K/L)		-0.050	-0.037	-0.036	-0.035			-0.049	-0.036	-0.036	-0.034	
		(0.0046)	(0.0044)	(0.0045)	(0.0049)			(0.0045)	(0.0043)	(0.0044)	(0.0048)	
DT	0.197	0.525	0.434	0.430	0.441		0.195	0.509	0.419	0.425	0.440	
	(0.0082)	(0.0328)	(0.0316)	(0.0325)	(0.0344)		(0.008)	(0.0321)	(0.0309)	(0.0318)	(0.0336)	
DT* ln(K/L)		-0.083	-0.062	-0.061	-0.064			-0.079	-0.059	-0.061	-0.064	
		(0.0085)	(0.0082)	(0.0084)	(0.0089)			(0.0083)	(0.008)	(0.0082)	(0.0087)	
DP-1					0.056						0.052	
					(0.0209)						(0.0204)	
DP-1*ln(K/L)					-0.013						-0.012	
					(0.0048)						(0.0047)	
DT-1					0.068						0.066	
					(0.0343)						(0.0336)	
DT-1*ln(K/L)					-0.023						-0.023	
					(0.0089)						(0.0087)	
DVADD						0.031						0.028
						(0.0087)						(0.0083)
DVADD*ln(K/L)						-0.006						-0.005
						(0.002)						(0.0019)
Year dummies	yes	no	yes	yes	yes	yes	yes	no	yes	yes	yes	yes
Year dummies * K/L	no	no	no	yes	yes	yes	no	no	no	yes	yes	yes
R- squared	0.132	0.049	0.137	0.143	0.147	0.108	0.132	0.049	0.137	0.146	0.150	0.110
Within R-squared	0.133	0.050	0.138	0.147	0.151	0.110	0.133	0.050	0.138	0.147	0.151	0.110
N	15737	15737	15737	15737	15073	15737	15737	15737	15737	15737	15073	15737

Standard Errors in Parenthesis
DP: Percentage change in value-added relative prices
DT: Percentage change in TFP
DVADD: Percentage change in real Value Added
ln(K/L): Natural Logarithm of Capital-Labor ratio
Sample: 446 industries, 1961-1996

An alternative way of confirming this result is to estimate the wage effect of price and productivity shocks in each sector on a time series basis, and compare the respective coefficients across factor intensities. Consider the following regression based on expression (3) for each sector i between 1961 and 1996:

$$\widehat{w_{it}} = \beta_0 + \beta_1 \widehat{p_{it}} + \beta_2 \widehat{t_{it}} + \beta_3 \widehat{\overline{w_t}} + \varepsilon_{it} \tag{12}$$

where $\widehat{w_{it}}$ is the rate of growth in real wages (both hourly and weekly), $\widehat{p_{it}}$ is the rate of growth of the relative price of industry i to an average of all manufacturing sectors,

$\widehat{t_{it}}$ is the rate of TFP growth and $\widehat{\overline{w_t}}$ is the percentage change in observed average real wages (both hourly and weekly) used as a proxy for the percentage change in the outside option. Table 4 reports the coefficients and standard errors of cross-industry regressions, where the dependent variables are β_1 and β_2 and the explanatory variable is $\ln K/L$ for 1990.[23] The negative and highly significant coefficients confirm the results from the panel regressions: the response of wages to sector-specific shocks is smaller in capital-intensive sectors. Moreover, given the distribution of K/L across sectors, Table 4 reveals that for almost all sectors the coefficients β_1 and β_2 are positive.

TABLE 4

CROSS-INDUSTRY COMPARISONS

Dependent Var	(1) β1	(2) β2	(3) β1	(4) β2
Explanatory Var				
Constant	0.262	0.307	0.316	0.468
	(0.041)	(0.05)	(0.048)	(0.059)
K/L	-0.041	-0.031	-0.052	-0.069
	(0.009)	(0.012)	(0.012)	(0.015)
R-squared	0.037	0.014	0.042	0.048
Adjusted R-squared	0.034	0.012	0.040	0.045
S.E. of regression	0.185	0.227	0.220	0.273

Standard Errors in Parenthesis
Definitions:
Reg. (1) and (2) are derived from analysis with weekly real wages
Reg. (3) and (4) are derived from analysis with hourly real wages
β1: Coefficient on relative prices in regression (13)
β2: Coefficient on productivity growth in regression (13)
K/L: Capital-Labor ratio in 1990
Sample: 445 industries (excluded 2793, 2794 and 3292)

With respect to the evolution of employment at the sectorial level during the employment cycle, while there exist a high co-movement of employment across sectors, high wage manufacturing industries tend are more cyclically sensitive than lower-wage manufactures. In other words, high-wage industries tend to expand relatively more in expansions.[24] According to the model presented above, although the expansion of labor demand to sector-specific shocks is greater in labor-intensive sectors, this effect is com-

[23]Results are not affected by the specific year used to measure K/L. The results are not affected if the measure of average wage change is excluded from the regressions.

[24]See Keane, Moffit and Runkle (1988), Abraham and Haltiwanger (1995), Davis, Haltiwanger and Schuh (1996) and Hall (1998).

pensated by a greater reaction of wages. It is not clear whether conditional on shocks, the expansion to capital-intensive sectors differs from that of labor-intensive sectors.

Tables 5-1 and 5-2 present the results of panel regressions where the dependent variables are the percentage change in total employment and in total hours against variations in relative prices, multifactor productivity and interaction terms with measures of factor intensity. I have also included year dummies and their interactions with K/L. The results reveal that the greater adjustment of wages do not dominate the greater shift in labor demand in labor-intensive sectors, making employment, hours and wages more volatile in these industries than in capital intensive sectors. These results do not vary if measures of wage changes are also included. Do these results contradict the evidence of greater response of employment in capital-intensive sectors in the business cycle? No, because the regressions in table 5 correct for sector-specific shocks. In other words, they are conditional on the observed shocks. A greater response of employment in high-wage sectors during the business cycle (see footnote 22) is consistent with these results if expansions are periods of relative good shocks to capital-intensive industries. This is exactly the message of the paper.

TABLE 5-1

PANEL REGRESSIONS ON TOTAL EMPLOYMENT

Dependent Var	Fixed Effects (1)	(2)	(3)	(4)	Random Effects (5)	(6)	(7)	(8)
Explanatory Var								
Constant	0.007	0.001	0.008	-0.013	0.007	0.039	0.011	-0.024
	(0.0045)	(0.0043)	(0.0044)	(0.0039)	(0.0045)	(0.0043)	(0.0044)	(0.0039)
DP	0.418	0.523	0.505		0.416	0.519	0.501	
	(0.0351)	(0.0341)	(0.0347)		(0.0347)	(0.0337)	(0.0343)	
DP*ln(K/L)	-0.057	-0.072	-0.071		-0.056	-0.071	-0.070	
	(0.0081)	(0.0078)	(0.0079)		(0.008)	(0.0078)	(0.0079)	
DT	1.159	1.340	1.328		1.173	1.436	1.336	
	(0.0571)	(0.0564)	(0.0572)		(0.0567)	(0.0561)	(0.0569)	
DT*ln(K/L)	-0.158	-0.176	-0.183		-0.161	-0.178	-0.185	
	(0.0148)	(0.0146)	(0.0147)		(0.0147)	(0.0145)	(0.0147)	
DWW		-0.603				-0.590		
		(0.0588)				(0.0573)		
DWW*ln(K/L)		0.005				0.002		
		(0.0157)				(0.0153)		
DHW			-0.405				-0.391	
			(0.0532)				(0.0521)	
DHW*ln(K/L)			0.008				0.004	
			(0.0143)				(0.0139)	
DVADD				0.737				0.750
				(0.0133)				(0.0129)
DVADD*ln(K/L)				-0.120				-0.124
				(0.0032)				(0.0031)
Year Dummies	yes	yes	yes	yes	yes	yes	yes	yes
R-Squared	0.188	0.251	0.221	0.362	0.288	0.251	0.222	0.362
Within	0.194	0.260	0.230	0.360	0.194	0.260	0.230	0.360
N	15750	15737	15737	15750	15750	15737	15737	15750

Standard Errors in Parenthesis
DP: Percentage change in value-added relative prices
DT: Percentage change in TFP
DWW: Percentage change in real weekly wages
DHW: Percentage change in real hourly wages
DVADD: Percentage change in real Value Added
ln(K/L): Natural Logarithm of Capital-Labor ratio
Sample: 446 industries, 1961-1996

TABLE 5-2

PANEL REGRESSIONS ON TOTAL HOURS

Dependent Var	Fixed Effects (1)	(2)	(3)	(4)	Random Effects (5)	(6)	(7)	(8)
Explanatory Var								
Constant	-0.005	-0.009	-0.003	-0.026	-0.005	0.040	0.024	-0.025
	(0.0048)	(0.0047)	(0.0044)	(0.0042)	(0.0048)	(0.0047)	(0.0044)	(0.0042)
DP	0.372	0.439	0.547		0.371	0.436	0.544	
	(0.0373)	(0.0734)	(0.0345)		(0.0369)	(0.0369)	(0.0342)	
DP*ln(K/L)	-0.045	-0.056	-0.074		-0.045	-0.055	-0.073	
	(0.0086)	(0.0086)	(0.0079)		(0.0085)	(0.0085)	(0.0079)	
DT	1.038	1.162	1.378		1.054	1.170	1.383	
	(-0.0608)	(0.0618)	(0.057)		(0.0603)	(0.0616)	(0.0568)	
DT*ln(K/L)	-0.013	-0.142	-0.176		-0.013	-0.144	-0.178	
	(0.0066)	(0.0159)	(0.0147)		(0.0066)	(0.0159)	(0.0146)	
DWW		-0.435				-0.409		
		(0.0645)				(0.0625)		
DWW*ln(K/L)		0.027				0.020		
		(0.0173)				(0.0166)		
DHW			-0.797				-0.789	
			(0.053)				(0.0519)	
DHW*ln(K/L)			0.007				0.006	
			(0.0142)				(0.0139)	
DVADD				0.756				0.768
				(0.0141)				(0.0137)
DVADD*ln(K/L)				-0.121				-0.124
				(0.0034)				(0.0033)
Year Dummies	yes	yes	yes	yes	yes	yes	yes	yes
R-Squared	0.187	0.206	0.311	0.365	0.187	0.206	0.311	0.365
Within	0.193	0.213	0.323	0.363	0.193	0.213	0.323	0.363
N	15750	15737	15737	15750	15750	15737	15737	15750

Standard Errors in Parenthesis
DP: Percentage change in value-added relative prices
DT: Percentage change in TFP
DWW: Percentage change in real weekly wages
DHW: Percentage change in real hourly wages
DVADD: Percentage change in real Value Added
ln(K/L): Natural Logarithm of Capital-Labor ratio
Sample: 446 industries, 1961-1996

5 Conclusion

The paper shows that although the response of wages and employment to sector-specific shocks is greater in labor intensive sectors, interindustry wage differentials widen in expansions and narrow in recessions. This is contrary to the behavior that we would expect if common shocks were the main drivers of the business cycle. The paper offers an explanation for both stylized facts, based on the relevance of sectorial shocks. The asymmetric response of wages in labor-intensive and capital-intensive sectors to disturbances implies that the former have a higher tendency to smooth their employment path.

Two further extensions of this paper are wise. First, it is possible to estimate what part of the business cycle that is due to aggregate and sectorial shocks. Up to know, the literature has given most of the weight to aggregate shocks. This paper just highlights that procyclical interindustry wage differentials are evidence of relevance of sectorial shocks, but no effort is done in order to quantify its implication on the employment cycle. Second, the asymmetric adjustment in wages across sectors suggests a new road to discuss the costs of business cycles.[25] Part of the literature emphasizing the small costs of the business cycle is based on the smooth evolution of wages along the cycle. However, the results presented here suggest that there is much more variation in wages along the cycle, and hence in the presence of incomplete markets the costs of employment fluctuations may be much higher.

[25] This point was suggested to me by Carmen Pages-Serra.

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