Research Memorandum

Internal and external forces in sectoral wage formation:
evidence from the Netherlands

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Internal and external forces in sectoral wage formation:
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Abstract:

The purpose of this paper is to investigate the relative importance of internal and external forces in sectoral wage formation in the Netherlands (1967-1990). Internal forces relate to factors within the firm, like the workers' productivity in the firm, and external forces to factors outside the firm like wages paid elsewhere and the unemployment rate. If the labour market is competitive, the wage will depend primarily on the overall state of the labour market. If, however, internal forces are a prime determinant of wages, insider factors must play an important role in wage bargaining.

The empirical specification is taken from a model proposed by Nickell and Wadhwani. The model is estimated by GMM (generalized method of moments) using annual data of 18 sectors. The results imply that sectoral wages are largely determined by external factors, although internal forces are significant as well. Compared to other research the influence of internal forces is smaller than in the US and Japan, but larger than in most other European countries.

Furthermore, it is found that wages in the service sectors are more sensitive to external factors, like the macro unemployment rate and replacement ratio, than wages in the industrial sectors. This suggests that insider factors are more relevant in industrial sectors.

1.   Introduction

Studies of wage formation have changed drastically in the last decade. The changes are both theoretical and empirical. The theoretical background has been influenced by the persistence of high rates of unemployment in Western Europe and the finding of non-compensating sectoral wage differentials. To explain these phenomena two theories have come up: the efficiency wage theory and the insider-outsider theory. The empirical work has been influenced by the increased availability of data at firm or industry level and by the development of new econometric techniques dealing with panel data.

The present paper provides a sectoral study of wage formation based on the insider-outsider theory. The insider-outsider theory argues that the insiders (the employed) have more power in wage bargaining than the outsiders (the unemployed); see Lindbeck and Snower (1986, 1987, 1998). The insiders derive their bargaining power from the turnover costs which are involved with hiring and firm-specific training. The bargaining power enables the insiders to extract some part of the surplus gained by the firm over other firms. If insider power is significant, the (average) wage rate will depend on internal factors like the profit rate or the value added per worker and the firm-specific (or sector-specific) employment level. On the other hand, if insiders can easily be replaced by outsiders, they do not have the opportunity to demand higher wages than prevailing on the labour market outside the firm. In that case, the wage rate of an individual firm or sector will be determined by external factors like the macro wage rate and the unemployment rate. In practice wages at firm or sectoral level appear to depend on both internal and external factors. An appealing aspect of a high impact of internal factors is that the wage rate adjusts to firm performance. The resulting flexibility of the wage rate stabilizes the firm's employment level over the cycle. Unappealing aspects of a high impact of internal factors are that it results in non-competitive wage differentials and that at aggregate level it decreases the impact of unemployment on wages.

Besides making wage rates firm-specific, bargaining power of insiders may be a cause of unemployment persistence. The argument, which is brought forward by Gottfries and Horn (1987), runs as follows. Assume that the wage rate is determined in a bargaining process between workers and the firm. After the wage rate has been determined, the firm may be affected by a temporary adverse shock. As the wage rate is fixed during the contract period, the firm will reduce the employment level. In the next period the reduced number of insiders can demand a higher wage rate without seriously increasing the probability of lay-off. So, the employment level does not return to the pre-shock level. If this effect is important, it will cause a negative correlation between the firm's (or sectoral) wage rate and the previous employment level.

The purpose of this paper is to assess the role of internal and external factors in sectoral wage formation in the Netherlands. We use a pooled cross-section of time series of annual data for 18 sectors and for the market sector as a whole for the years 1963 up to 1990. This data set is used before by Graafland and Verbruggen (1993). The present study differs from theirs in several respects. Firstly, the theoretical model and the empirical specification are different. Secondly, the equations for various industries are not estimated separately, but are estimated simultaneously.

The set-up of the paper is as follows. In the next section we summarize earlier research on the importance of internal and external factors in wage formation. In section 3 we describe the empirical specification of the wage equation. The estimation results are reported in section 4. Section 5 concludes the paper.

2. Previous research

Empirical studies on the influence of internal and external factors on wage formation at firm or industry level have been done for several countries, but mainly for the United Kingdom. Some of the studies provide evidence for the relevance of internal and external factors which is only qualitative, whereas others provide comparable quantitative results. The qualitative evidence is summarized first.

Qualitative evidence for the relevance of both internal and external factors is provided in several ways. Blanchflower and Oswald (1988) report results from a survey among 1267 personnel managers in the private sector of the British economy about the factors which influenced the level of pay decided upon in the last settlement. The three most common answers were: profitability or productivity, increasing cost of living and going rate in industry. Other studies report evidence obtained by estimating wage equations including both internal factors, such as firm performance, and external factors, such as consumer prices and aggregate unemployment. Nickell and Wadhwani (1988), using a panel of 219 large UK manufacturing firms, conclude that wage formation is dominated by external factors such as the retail price and the aggregate wage, but that internal factors such as output price and sales per man are significant as well. Christofides and Oswald (1989) estimate wage equations which include external factors such as consumer prices, regional wages and regional unemployment and internal factors such as industry prices and industry output. Using panel data of contracts reached in 420 establishments in a variety of Canadian

industries, they find that industry prices have a positive impact on real establishment wages.[1]

Table 1   *Empirical studies on internal and external factors in wage formation*

study	data	weight internal factors	impact of employment
Nickell/Wadhwani (1990)	annual data for 219 large UK manufacturing firms (1974-1982)	0.11 0.08-0.17 if alternative sample or alternative set of instruments is used	change in employment has a positive impact, but this result is not robust if alternative sample is used
Brunello/Wadhwani (1989)	annual data for 157 large Japanese manufacturing firms (1977-1987)	0.33 0.28-0.35 if alternative sample or alternative set of instruments is used	change in employment has a positive impact, but this result is not robust if alternative sample is used
Holmlund/Zetterberg (1991)	annual industry data for Norway, Sweden, Finland, Germany and US (1965-1985)	0.03-0.12 for Sweden 0.03-0.04 for Norway 0.00-0.01 for Finland 0.04-0.12 for Germany 0.30-0.48 for US	impact of lagged industry employment on wage rate is positive for Germany and insignificant for the other countries
Nickell/Kong (1992)	annual data for 14 two-digit industrial sectors in Britain (1961-1985)	0.04-0.52 0.25 unweighed average	lagged employment is not included in the regression equation
Nickell et al. (1992)	annual data for 814 large UK manufacturing firms (1972-1986)	0.11-0.16 0.05 after controlling for variations in skill mix	impact of lagged employment is not robust

[1] The authors explain real establishment wages by nominal industry prices and nominal regional wages. It would be better to express all variables in either nominal or real terms. Due to the mixture of nominal and real terms their estimate for the impact of industry prices on establishment wages of 0.08 cannot be compared directly with the weights of internal factors obtained in the studies reported below.

Blanchflower et al. (1990), using a cross-section of 2019 UK establishments, also show that both internal and external factors are relevant for micro-economic wage formation. Only in the case of unskilled labour in the non-union sector no influence of internal factors is found. This result may be due to the irrelevance of turnover costs for this particular group. As the data on firm performance are qualitative, the impact of internal factors cannot be quantified.

Quantitative evidence on the importance of internal and external factors can be obtained by including the aggregate wage rate as one of the external factors. The estimates of the impact of internal factors which are obtained in this way are summarized in Table 1. Using the same data set as in their previous paper, Nickell and Wadhwani (1990) estimate the relative weights of internal and external factors to be 0.11 and 0.89, respectively. They further obtain a positive impact of the change in employment on the wage rate. If, however, an alternative sample is used, the employment effect appears to be negative. Brunello and Wadhwani (1989), using panel data for large Japanese manufacturing firms, obtain an estimate of 0.33 for the relative impact of internal factors. Holmlund and Zetterberg (1991) find that the weights of internal factors in wage formation in the manufacturing industries in Norway, Sweden, Finland and Germany are between 0 and 0.12, whereas between 0.30 and 0.48 in the United States. This result indicates that internal variables tend to be less relevant under centralized than under decentralized wage formation. The impact of lagged employment is insignificant for four countries; only for Germany a significant positive effect is obtained, contrary to what the authors expected. Nickell and Kong (1992) conclude on the basis of annual data for 14 two-digit industries in the UK that the influence of internal factors increases with union power. To measure union power the authors use the mark-up of union on non-union wages. Note that the estimates of the importance of internal factors in this study are much larger than those in other studies for the UK. Using panel data for 814 manufacturing companies in the UK, Nickell et al. (1992) find that internal factors are more important for firms with a high degree of product market power. They further report that the parameter of firm-specific factors reduces from the range 0.11-0.16 to 0.05 after controlling for variations in the skill mix of the work force. No robust evidence of insider power, via firm-specific employment, is found. The general conclusion is three-fold: firstly, external factors are most important in wage formation at firm or industry level; secondly, internal factors play a role as well, although their influence is rather small in Europe compared to the US; thirdly, the insider effect operating via the lagged employment level does not appear to be robust.

Empirical evidence on the impact of internal factors in wage formation in the Netherlands is scarce. Graafland and Verbruggen (1993) estimate wage equations for 21 sectors. The estimation results show that wage formation in the Netherlands is dominated by macro-economic variables such as the consumer price and aggregate

labour productivity. The estimated weights of the sector-specific value added price and labour productivity in sectoral wages are on average both 0.07. More evidence on the impact of internal factors is provided by Hartog et al. (1994). Using micro data on wages and controlling for the skill mixture of the work force, they find that firm-related characteristics like firm-size, seniority of employees and the incidence of shiftwork are not as important for Dutch wage formation as for the United States. Another result of their analysis is that wages of insiders are not less dependent on unemployment than those of entrants. These results suggest that insider-outsider effects are not very important for the Dutch labour market.

3.   The empirical specification

The empirical specification of the wage equation to estimate the relative importance of internal and external variables is adopted from Nickell and Wadhwani (1990). Their wage equation is derived from a right-to-manage bargaining model. In this model the wage outcome follows from a trade off between the employers' gain and the employee's gain from the wage bargain. The employers' gain depends on expected profits, which are positively related to an autonomous technology factor and negatively to the real wage. The expected union's gain is assumed to be equal to the complement of the lay-off rate times the expected income of a union member relative to its threat point. This threat point is defined as the expected income each member can obtain outside the firm. At the time of bargaining the union has a certain number of members employed in the firm. Each member of the union has some probability on lay-off during the period under consideration. From the employment decision of the firm it follows that the expected lay-off rate will depend positively on the expected real wage and the number of union members in the firm: the higher is the membership, the greater is the chance on being laid off at any given wage.

Solving the wage bargaining problem by use of the Nash function, Nickell and Wadhwani (1990) obtain the following wage equation:

$$w = \gamma_0 + \gamma_1 (a + p^* - (1-\beta)m) + (1-\gamma_1)\, \bar{w} + \gamma_2\, \bar{u} + \gamma_3\, \bar{r}, \tag{1}$$

with: w
    log of sectoral wage rate
    a log of autonomous technology factor
    p^* log of expected output price
    m log of members employed in the sector at the time of wage bargaining

$\bar{w}$	log of macro wage rate
$\bar{u}$	macro unemployment rate
$\bar{r}$	log of replacement ratio

In equation (1) wages depend both on internal and external factors. The external factors are the macro wage rate ($\bar{w}$), the macro unemployment rate ($\bar{u}$) and the average replacement ratio ($\bar{r}$). These variables reflect the options of the employees outside the firm. The higher the replacement ratio or the lower the macro unemployment rate, the lower will be the costs for employees of quitting the firm and searching a job elsewhere. Similarly, the higher the macro wage rate, the higher the revenue of searching for a job in another firm. A change in these external factors therefore forces the employer to raise his wage offer in order to motivate his work force and prevent quitting. The internal factors are the firm's expected output price (p^*), the technology factor (a) and the number of union members (m). A rise in the expected output price and technology factor or a fall in the number of union members reduces the expected lay-off rate, and this enables the firm's work force to increase the wage claim without worsening the employment perspectives. The latter effect is especially interesting if union membership is related to employment status, as it may cause employment persistence. An unforeseen adverse shock in the output price which decreases the number of union members, will cause an upward pressure on wages in the next period. This effect might temporarily offset the negative influence of the overall unemployment rate on wages, thereby slowing down the restoration of the labour market to the situation previous to the shock. If this effect is important, it will cause a negative correlation between the firm's wage rate and the previous employment level.[2] The weight of the internal factors γ_1 can be shown to depend positively on the union's power in the Nash bargaining process.

In order to provide a testable specification of the wage equation, Nickell and Wadhwani make two additional assumptions. Firstly, the number of union members (or insiders) is set equal to last period's employment. Secondly, using the Cobb-Douglas specification to describe the production technology, the technology factor is substituted by the output level per worker and a rest term in current employment: $a=y-n+(1-\beta)n$. The employment term can be combined with the negatively signed

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[2] It is noted that the negative sign of the correlation between the wage rate and the previous employment level depends crucially on the assumptions with respect to both the persistence of the shock and the sluggishness in labour demand. Blanchard and Summers (1986), for example, argue that if labour demand is sluggish and the exogenous shocks are correlated over time, a positive correlation results between the wage change and the previous employment change. See Lever (1994) for a discussion of the two models in an integrated framework.

lagged employment term capturing union membership to obtain the change in the employment level (in logs) as explanatory variable. Note that if membership is set equal to current employment, the change in the employment level vanishes as explanatory variable.

In addition to Nickell and Wadhwani, we are also interested in the question whether sectoral wages are linked to macro wages at wage cost level or at gross wage level. In the theoretical model the macro wage affects the sectoral wage through the outside option of the employee, which is defined in net terms. As the system of employees' taxes and social premiums is uniform for all employees, this is equivalent to a link at gross wage level. Since the rate of employers' social premiums is much more firm or sector specific, we expect that the influence of macro wage costs on sectoral wage cost must be corrected for divergences in the employers' rate of social premiums. In order to test this hypothesis we must include the difference between the sectoral and macro rates of social premiums in some way. As the wage equation is in logs, the difference between the rates must enter in logs as well. Let T ($\bar{T}$) denote the sectoral (macro) rate of social premiums and $t=-log(1-T)$ ($\bar{t}=-log(1-\bar{T})$). Then $\bar{t}-t$ denotes the difference between the logs of the complement of the sectoral and macro rate of social premiums paid by employers. Based on these considerations we use the following wage equation:

$$w_g = \gamma_0 + \gamma_1 (p^* + y^* - n^*) + (1-\gamma_1) \bar{w}_g + \gamma_2 \bar{u}$$
$$+ \gamma_3 \bar{r} + \gamma_4 \triangle n^* + \gamma_5 (\bar{t} - t), \tag{2}$$

where w_g ($\bar{w}_g$) denotes the log of the gross sectoral (respectively macro) wage level. If $\gamma_5 = (1-\gamma_1)$, the link between macro wage rate and sectoral wage rate runs at wage cost level. On the other hand, if $\gamma_5 = 0$, the link is at gross wage level. Note that in the latter case firms (sectors) have an incentive to reduce their rate of social premiums in order to improve their competitive position against other firms (sectors).

4.   Estimation results

The wage equation (2) is estimated using annual data for 18 sectors from 1963 up to 1990.[3] Together these sectors form nearly the total market sector. The residential sector (exploitation of and trade in real estate) is not included in the study because it is mainly defined for statistical reasons. The energy sector is not included because employment is very small and the output price is quite volatile. Non-market sectors

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[3] The sectors included are listed in the appendix.

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are excluded, because during the estimation period wages in these sectors were generally institutionally determined instead of being negotiated. Four observations are used for taking differences and lags, so the estimation period is from 1967 up to 1990. The estimation period cannot be extended, because earlier data for the replacement ratio are not available. The data are based on the National Accounts of the Central Bureau of Statistics in the Netherlands.

In order to reduce the degree of autocorrelation and to eliminate the constant term γ_0, which is probably sector-specific, equation (2) is estimated in first differences. Furthermore, following Nickell and Wadhwani a lagged dependent variable is included to allow for possible dynamics in wage formation. We also experimented with discrete lags in some of the explanatory variables.

The parameters of the wage equation are estimated by GMM (generalized method of moments). The GMM method, which is described by Arellano and Bond (1988, 1991), produces two-stage instrumental variable estimates. Using this method has two attractive features. Firstly, GMM allows for heteroscedasticity in the error term. In the first stage it estimates a covariance matrix. This matrix is used in the second stage to compute the parameter estimates. Secondly, simultaneity bias can be avoided by using instruments for explanatory variables that might be correlated with the error term. Possible candidates in our wage equation are the lagged dependent variable, the sectoral value added price and labour productivity and sectoral employment. For these variables the one and two years lagged sectoral variables and the related unlagged macro variables are used as instruments. The lagged dependent variable is instrumented by the two and three years lagged dependent variables. The number of cross-section observations is too small to include further lags of the dependent variable in the set of instruments, as advocated by Arellano and Bond (1991).

The selected estimation results for the wage equation are reported in Table 2. The Sargan test statistic indicates whether the instruments are correlated with the error term. In all cases its value is well below the critical value of 18.3, which implies that the instruments are valid. Further support for instrument validity is provided by the last reported test statistic. This statistic, which has a standard normal distribution, indicates that there is no correlation between the differenced errors and their second lag. This is a necessary condition for the undifferenced errors to be serially uncorrelated. The absence of first-order serial correlation in the level equation is required in order to establish the instrument validity of the two and three years lagged dependent variables in the GMM method.

The first column in Table 2 presents the estimation results of a pooled regression for all sectors. The results show that sectoral wage formation is dominated by the external influence of the macro wage development. The internal factors such as the value added price and value added per worker influence wages for only 14 per cent.

Table 2   *Estimation results: 1967 - 1990; dependent variable:* $\triangle w_g^{a,b}$

variable	total	industry[c]	services[d]
$\triangle(p{+}y\text{-}n)$	0.14	0.07	0.26
	(4.44)	(1.82)	(5.01)
$\triangle \bar{w}_g$	0.86	0.93	0.72
	(25.56)	(23.66)	(13.42)
$\triangle \bar{u}_{-1}$	−0.09c	0.00	−0.36
	(2.30)	(0.04)	(4.18)
$\triangle \bar{r}_{-\frac{1}{2}}$	0.10	−0.04	0.13
	(2.44)	(0.56)	(3.89)
$\triangle^2 n$	−0.05	−0.04	−0.02
	(1.58)	(0.50)	(0.20)
$\triangle(\bar{t}\text{-}t)$	0.66	0.60	0.34
	(6.24)	(2.89)	(1.15)
RSS	0.096	0.074	0.022
Sargan test for instrument validity,	7.4	13.9	10.3
Test of 1st-order serial	1.6	1.1	1.4
Test of 2nd-order serial	−0.4	−0.5	−0.2

[a]   t-values between parentheses.

[b]   For *p*, *y-n*, and *n* the one-year and two-year lagged sectoral variables and the corresponding unlagged macro variables are used as instruments. $\bar{w}_g$, $\bar{r}$, $\bar{u}_{-1}$, t and $\bar{t}$ are treated as exogenous variables.

[c]   Sectors 1-13 in the appendix.

[d]   Sectors 14-18 in the appendix.

This estimate is more or less in line with the results for United Kingdom summarized in Table 1. It is larger than the values obtained for Sweden, Norway, Finland and Germany, and smaller than those for the US and Japan. The parameter of the acceleration in the sectoral employment level is insignificant and has the wrong sign. Hence, the estimates do not provide evidence in favour of the insider-effect. This result is consistent with the findings for other countries reported in Table 1.

Another interesting estimation result concerns the influence of the sector specific and macro rate of social premiums paid by employers. The estimation result shows that sectoral wages are linked to macro wages partly at gross wage level and partly at wage costs level. This result indicates that the external factors affect sectoral wage

formation not only through the threat point of the employees (in which case only the gross wage link would be relevant), but also through the competitive position of firms on the goods market. If the rate of social premiums in the own sector falls relatively to that paid by other sectors the competitive position of the sector will improve. As a result, the lay-off rate will fall and this enables employees to demand higher wages.

The estimates further suggest a small influence of the replacement ratio. Since the absolute value of the parameters of the external variables, such as the replacement ratio and the unemployment rate, is rather small compared to that of the macro wage rate, this provides another indication that the effect of the macro wage on the sectoral wage only partly runs through the threat point of the employees. An alternative explanation for the strong influence of the macro gross wage on the sectoral gross wage is that wage leading and following patterns play a dominant role (Graafland and Verbruggen, 1993). Finally, the lagged dependent variable was dropped because no significant influence was found. We also experimented with including separately the short-term and long-term unemployment rate, but this did not improve the estimation results.

In the second and third columns of Table 2 separate estimation results are reported for the industrial and the service sectors. The results show profound differences in wage formation between these sectors. First, in the industrial sectors sectoral wages are even more closely related to the aggregate wage. The sectoral influence of value added price and value added is only half of the value found for the total economy. In contrast, wages in the service sectors are found to be more dependent on these sectoral variables. In light of the theoretical background of the empirical specification, this would imply that insider forces are more important for the service sector than for the industrial sector. This is opposite to the idea that insider power will be more likely in high productive and capital intensive firms. Moreover, this implication can also be questioned because of another large differ-ence in the estimation result, namely concerning the influence of the unemployment rate and the replacement ratio. Wages in the service sectors appear to be much more sensitive to the labour market situation and the replacement ratio of the unemployed. This is in line with the intuition that secondary labour markets, characterized by low wage levels and frequent unemployment spells, are more present in the service sectors. In the industrial sector wages appear to be even completely independent of the unemployment situation and the replacement ratio, indicating the existence of strong primary labour markets with high wage levels and high job security and a high degree of insider power. This casts doubt on the presumption implicit in most research reviewed in section two, that the influence of firm-specific or sectoral variables on wage formation is due to insider power. In contrast, the estimation results for the industrial sector and service sector in Table 2 suggest that an inverse

relation is more probable. The explanation for this phenomenon could be that employees with strong insider power want to protect themselves against fluctuations in their income due to firm or sector specific shocks, by enforcing rules that connect the firm-specific or sectoral wage outcome to the macro wage development.

5.   Conclusions

The purpose of this paper is to investigate the relative importance of internal and external forces in sectoral wage formation in the Netherlands (1967-1990). Internal forces relate to factors within the firm and external forces to factors outside the firm like wages paid elsewhere. If the labour market is competitive, the wage will depend primarily on the overall state of the labour market. If, however, internal forces are a prime determinant of wages, insider factors must play an important role in wage bargaining.

The specification of the sectoral wage equation is taken from a model proposed by Nickell and Wadhwani (1990). The external forces are the macro wage rate, the macro unemployment rate and the average replacement ratio. These variables reflect the options of the employees outside the firm. The internal forces are the expected sectoral output price, production capacity and the number of insiders: a rise in expected output price or technology level or a fall in the number or insiders reduces the expected lay-off rate, creating room for higher wage claims. If the number of insiders is related to lagged employment, the relative change in employment enters the wage equation with a positive sign, causing persistence in wage formation. An unforeseen adverse shock in employment decreases the number of insiders and generates an upward pressure on wages in the next period, thereby slowing down the restoration of the labour market.

The wage equation is estimated using annual data of 18 sectors in the Dutch market sector for the years 1967 up to 1990. The estimation results show that sectoral wages are dominated by external factors, although internal factors are significant as well. This result is in line with Graafland and Verbruggen (1993). The relative weight of the internal variables is estimated at 0.14, which is close to earlier results obtained for the United Kingdom. It is larger than earlier results obtained for Sweden, Norway, Finland and Germany, but smaller than those obtained for the US and Japan. Secondly, the estimates for the impact of the change in sectoral employment on sectoral wage formation are insignificant and of the wrong sign. The result that the impact of previous employment or the change in employment on wage formation is not significant is found in other studies as well.

Separate estimation results for the industrial sector and the service sector show profound differences in wage formation. For the industrial sector wages are found to

be insensitive to the unemployment rate and replacement ratio, which suggests strong insider power. For the service sector opposite results are found, indicating that the labour market in the service sector is more competitive. This result is also in line with research by Graafland and Verbruggen (1993). Reconstruction of their results show that the influence of unemployment rate and replacement ratio on wages is higher for service sectors than for industrial sectors, although not so pronounced as found in this paper. This difference in findings may be due to the more restricted wage specification used in this paper and by the different estimation procedure.

Furthermore, the estimation results show that wages in the service sector are also more related to sectoral output prices and labour productivity than industrial wages. This result is in contrast with the hypothesis underlying the wage model used by Nickell and Wadhwani (1988) and casts doubt on the presumption that the influence of internal variables stems from insider power. Instead, the estimation results suggest that insiders might use their power to protect themselves against unwanted fluctuations in their wage due to firm- or sectoral specific shocks, by relating their wage claim to external variables like the macro wage development.

Further research should investigate the following three aspects. Firstly, whether the impact of internal factors is positively related to firm-size. Some evidence in this direction is provided by Brunello and Wadhwani (1989) for Japan and by Nickell et al. (1992) for the UK. Secondly, whether the impact of internal factors is related to union power. Support for this relationship is found by Nickell and Kong (1992). Thirdly, whether the impact of internal factors is positively related to product market power as is found by Nickell et al. (1992) for the UK.

Appendix Data and sector definitions

The data are derived from internal sources of the Central Planning Bureau. They are based on the National Accounts of the Central Bureau of Statistics in the Netherlands. The symbols for the macro variables are:

$\bar{W}$ wage cost per labour year in market sector
$\bar{u}$ number of active job seekers as a percentage of working population
$\bar{R}$ ratio between net government assistance and net average wage
$\bar{T}$ rate of social premiums paid by employers in the market sector

The symbols for the sector variables are:

W wage cost per labour year per sector
P gross value added price per sector (factor costs)
Y volume of gross value added per sector (factor costs)
N employment per sector (in labour years)
T sector specific rate of social premiums paid by employers

The sectors included are:

1 agriculture, horticulture, forestry and fishing
2 animal food processing industry (meat and dairy products)
3 'other' food processing industry (like processing fish, fruit and vegetables, grain and flour processing, sugar and margarine)
4 beverage and tobacco-processing industry
5 textiles and clothing industry (including leather and footwear industry)
6 wood and furniture industry, manufacturing of building materials, earthenware and glass products
7 paper, printing and publishing industry
8 chemical, rubber and plastic-processing industry
9 basic metal industry
10 manufacture of metal products, instruments and machinery
11 electrotechnical industry
12 transport equipment and automobile industry

13 construction and installation

14 trade

15 sea and air transport

16 'other' transport and communication

17 banking and insurance

18 'other' market services (hotels and restaurants, repair of consumer goods, business services, cleaning, washing and 'other' personal services)

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