ARTICLES

NEW SURVEY EVIDENCE ON WAGE SETTING IN EUROPE

Drawing on new evidence from a firm-level survey conducted in a broad range of Member States, this article presents findings of recent research that will contribute to a better understanding of wage setting in the euro area and other EU countries. The main results of this research can be summarised as follows. The frequency of wage changes is lower than that of price adjustments and wage changes are more synchronised than price changes, with many such changes being concentrated in January. The pass-through of wages to prices is strong in firms with a high labour share and is mitigated if the firms are exposed to a high degree of competition or if their export share is high. There is evidence of downward wage rigidity, but the prevailing form of rigidity (nominal versus real) in a given country depends on wage-setting institutional features such as the degree of indexation, which varies considerably across countries. The survey evidence suggests that firms use various means to adjust labour costs that go beyond changes in base wages (e.g. cutting bonuses, reducing non-wage benefits, changing working practices, reducing promotion rates and replacing departing workers with lower-paid ones). Finally, wages of newly recruited workers are primarily determined by internal factors such as the collective agreement or the wages of similar employees in the firm rather than by external labour market conditions.

1 INTRODUCTION

A proper understanding of the patterns, sources and implications of wage and labour cost dynamics is an essential requirement for the effective conduct of monetary policy. Wage costs are an important determinant of prices. The findings of the Inflation Persistence Network (IPN), a Eurosystem research network analysing the features and determinants of price setting in the euro area, suggest that inertial wage behaviour is an important factor behind price stickiness in the euro area.[1] These findings place wage-setting policies at the heart of central banks' concerns. More generally, knowledge about the features and determinants of wage setting is key to understanding both the transmission process of monetary policy and the potential trade-offs with which monetary policy can be confronted. The flexibility of wages is also of great importance for the proper functioning of a multi-country monetary union with segmented national labour markets, such as the euro area. The degree of price and wage flexibility will, among other factors, determine the speed and cost of adjustment in the presence of emerging macroeconomic imbalances. Identifying the features of wage rigidities is of key importance in designing appropriate structural policies to facilitate this adjustment process.

Against this background, the Eurosystem has set up a new research network, the Wage Dynamics Network (WDN), with researchers from the ECB and from 24 national central banks (NCBs) in the European Union conducting an in-depth study of the features and sources of wage and labour cost dynamics in the euro area and other EU countries. The WDN has followed three lines of research. The first explores the empirical characterisation of aggregate, country and sectoral wage and labour cost dynamics in the euro area, and conducts a structural analysis of their determinants and their interaction with inflation dynamics. A second line of research focuses on micro data on wages with a view to analysing wage behaviour and possible rigidities across countries and sectors in the euro area and their implications for labour costs and price-setting. Finally, the WDN has launched an ad hoc survey on wage and price-setting behaviour at the firm level. This article presents a first set of findings based on this survey. The survey provides a unique source of information that widens our understanding of wage-setting practices, the frequency of price and wage changes, and the links between wage and price stickiness in Europe. It makes available new

1 See Altissimo, F., M. Ehrmann and F. Smets (2006), "Inflation and price-setting behaviour in the euro area", ECB Occasional Paper No 46, and the article entitled "Price-setting behaviour in the euro area" in the November 2005 issue of the Monthly Bulletin.

evidence on the extent and reasons behind different types of wage rigidity and, moreover, covers various means of labour cost adjustment that go beyond changes in base wages. The survey also addresses the issue of how wages adjust to different economic shocks stemming from the demand or the supply side.

One advantage of conducting an ad hoc firm survey is its flexibility. Firms can be asked directly about important features of price and wage setting, data which are otherwise difficult to collect. For example, the degree of competition that the firm is facing or the incidence of firm-level collective agreements versus more centralised wage-setting structures are difficult to measure otherwise, and are usually unobservable in large administrative and household data. This firm-level information makes it possible to examine the effects on wage and price setting of both firms' characteristics and the economic and institutional environment in which firms operate. Firm surveys typically also have the advantage of providing more accurate information on wages than household surveys. Nevertheless, several shortcomings inherent in ad hoc surveys, such as low rates of response and potential misunderstandings in interpreting the questions, should be borne in mind. Moreover, the replies may be influenced by the specific macroeconomic environment prevailing at the time of conducting these surveys.

The article is structured as follows. Section 2 describes the main features of the firm survey, while Section 3 briefly discusses certain institutional features of wage setting, namely the extent of collective bargaining and indexation mechanisms. Section 4 presents stylised facts on wage and price adjustment and their interaction. Section 5 examines the existence of downward wage rigidity and discusses various cost adjustment margins (over and above changes in base wages) that are relevant for European firms. Section 6 focuses on the firms' reactions to different shocks. Section 7 summarises.

2 DATA AND SAMPLE

The WDN survey was carried out by 17 NCBs between the end of 2007 and the first half of 2008 on the basis of a harmonised questionnaire. This led to a unique cross-country dataset on wage and price setting, unprecedented by international standards in terms of both geographical and sectoral coverage. The following sectors are covered: manufacturing, energy, construction, trade and transportation, market services, financial intermediation and, for some countries, non-market services. The total sample size of the dataset is some 17,000 firms. By design, this sample is relatively balanced across firm size categories within each country and for the sectors considered. Its distribution closely follows the distribution of private employment in the country. However, the sample size varies across countries both in absolute terms and relative to the number of firms in each country. Thus, individual weights have been calculated for each firm to make the sample representative of the overall number of firms in each country and to account for the number of workers that the firm represents in a given country.[2] This article concentrates on 15 countries (Austria, Belgium, Czech Republic, Estonia, France, Greece, Hungary, Italy, Ireland, Lithuania, the Netherlands, Poland, Portugal, Slovenia and Spain) for which fully harmonised data are available.[3] Data for Germany are reported wherever they are comparable with those of the other countries.[4]

2 The sample used in this article excludes firms with fewer than five employees.

3 Euro area countries include Austria, Belgium, France, Greece, Italy, Ireland, the Netherlands, Portugal, Slovenia and Spain. Non-euro area countries include the Czech Republic, Estonia, Hungary, Lithuania and Poland.

4 As the questionnaire was not fully harmonised, the survey data for Germany cannot be used in full. Data for Luxembourg are not yet available.

3 SOME INSTITUTIONAL FEATURES OF WAGE SETTING

The harmonised WDN survey provides firm-level information on several institutional aspects of wage setting, such as the level of collective bargaining, the coverage of collective wage agreements and the degree of wage indexation. This information is particularly interesting given the institutional heterogeneity of European labour markets.[5]

3.1 COLLECTIVE WAGE BARGAINING

One of the institutional features that are likely to play an important role as regards both wage dynamics and, more generally, the operation of the labour market is the level of centralisation in collective wage bargaining. The survey asked firms whether they apply a collective wage agreement negotiated and signed outside the firm and/or at the firm level.[6] The latter type of agreement is usually regarded as more flexible than the former, in the sense that it gives firms greater scope to react to economic circumstances specific to the firm.

The percentage of firms that apply some kind of collective wage agreement is very high in the euro area countries under consideration (around 95% on average, as shown in column 3 of Table 1). By contrast, in non-euro area countries only around a quarter (27.7%) of firms apply a collective wage agreement. Differences between euro area and non-euro area countries are also noticeable when looking separately at collective

5 There is a vast literature about the role of wage-bargaining institutions in shaping labour market outcomes, wage levels, wage dispersion and wage flexibility. For a recent survey, see Freeman R. (2007), "Labour Market Institutions around the World", NBER Working Paper No 13242.

6 Collective wage agreements outside the firm include those negotiated at the regional, sectoral, occupational or national levels. In the case of Greece, however, agreements negotiated at the national level, which are binding for all firms, and workers covered exclusively by the national level agreement, have been excluded, explaining why coverage for Greece is less than 100% in columns 2 and 4 of Table 1.

Table 1 Collective bargaining – level and coverage: country overview

Country	Percentage of firms with a collective bargaining agreement			Percentage of workers covered by a collective bargaining agreement	
	firm-level	non-firm level	either form		
Austria	23.3	96.2	97.8	94.5	H
Belgium	35.3	97.9	99.4	86.3	H
Czech Republic	51.4	17.5	54.0	50.2	M
Germany	8.2	51.6	59.7	n.a.	M
Estonia	10.4	3.4	12.1	8.7	L
Spain	16.9	83.1	100	96.8	H
France	58.7	98.8	99.9	67.1	H
Greece	20.8	85.6	93.4	91.0	H
Hungary	19.0	0.0	19.0	18.4	L
Ireland	18.1	48.2	54.2	29.4	n.a.
Italy	42.9	99.6	99.6	92.2	H
Lithuania	23.1	0.8	24.4	15.6	VL
Netherlands	30.1	45.4	75.5	67.6	H
Poland	21.4	4.7	22.9	19.3	L
Portugal	10.0	58.9	62.1	90.0	H
SIovenia	25.7	74.3	100.0	n.a.	H
Total	33.1	65.4	76.5	63.4	
Euro area countries	35.7	87.7	94.7	83.3	
Non-euro area countries	26.3	6.0	27.7	24.1	

Source: Babecký et al., 2008 (see footnote 16 for full reference).
Figures are weighted to reflect overall employment and are rescaled to exclude non-responses. "Total" and "Euro area countries" aggregates do not include Germany. In the last column: level of union coverage from Du Caju, P., E. Gautier, D. Momferatou and M. Ward-Warmedinger (2008), "Institutional features of wage bargaining in 23 European countries, the US and Japan", ECB Working Paper No 974. VL = very low (i.e. 0% to 25% of workers are covered by collective agreements); L = low (26% to 50% of workers are covered); M = moderate (51% to 75% are covered); H = high (76% to 100% are covered). The figures in the columns "firm-level" and "non-firm level" do not add up to those in the column "either form" as some firms may have bargaining agreements at both levels.

agreements signed at the firm level (column 1) and those signed outside the firm (column 2). Collective agreements signed outside the firm are the predominant practice in euro area countries, while firm-level agreements predominate in non-euro area countries. Larger firms appear more likely to apply firm-level agreements and, as regards sectors, the construction and trade sectors appear to apply fewer agreements of this type.

The evidence collected by the WDN survey also confirms the well-known fact that the percentage of workers that are covered by some form of collective wage agreement is very high in the euro area countries (column 4). By contrast, non-euro area countries have very low levels of coverage, the lowest being Estonia. This is consistent with complementary information on wage-bargaining institutions at a more aggregate – country and sectoral – level (see the information in the last column of Table 1).

3.2 INDEXATION

The WDN survey questionnaire included two questions related to the indexation of wages to inflation. In the first question firms were asked to report whether or not they had a policy of adapting base wages to inflation. If they did, they were asked to report whether or not the adjustment was automatic, and whether, automatic or not, this adjustment was based mainly on past or expected inflation.

Table 2 provides a summary of wage adjustment policies across countries. It shows that in all countries included in the sample (with the exception of Italy) some form of wage adjustment to inflation is at work in a significant proportion of firms. This practice is particularly pronounced in Belgium (98%) and Spain (70%), where automatic indexation is prevalent. In most countries the link is to past inflation. Only in the case of Portugal does expected inflation appear to be more important

Table 2 Policy of adjusting base wages to inflation: country overview

(percentages)

	Policy of adjusting base wages to inflation [1]					Country-level indexation [2]
	Automatic		Informal		Total	
	Past	Expected	Past	Expected		
Austria	9	1	9	3	22	VL
Belgium	98	0	0	0	98	H
Czech Republic	7	5	28	24	59	None
Germany	n.a.	n.a.	n.a.	n.a.	*27*	None
Estonia	3	2	35	21	54	None
Spain	38	16	11	5	70	H
France	9	2	21	8	33	VL
Greece	15	5	12	10	43	None
Hungary	7	4	14	6	31	None
Ireland	6	3	19	10	30	None
Italy	1	0	3	1	6	VL
Lithuania	7	4	24	13	48	n.a.
Poland	5	2	17	6	31	VL
Portugal	3	6	13	29	52	None
Slovenia	20	3	32	5	60	L
Total	13.2	3.9	12.7	6.9	35.3	
Euro area countries	16.3	4.1	9.7	5.5	34.2	
Non-euro area countries	5.5	3.2	19.8	10.2	37.6	

Source: Druant et al., 2008 (see footnote 9 for full reference).
1) Figures are weighted to reflect overall employment and are rescaled to exclude non-responses. "Total" and "Euro area countries" aggregates do not include Germany.
2) Level of indexation from Du Caju et al., 2008 (see note to Table 1). VL = very low (i.e. less than 25% of workers are covered by wage indexations clauses); L = low (26% to 50% are covered); H = high (76% to 100% are covered). Note that some firms apply more than one kind of policy and therefore the numbers in columns 1 to 4 do not necessarily add up to those in the column "Total".

than past inflation for the purposes of wage setting. Adapting changes in base wages to inflation is slightly less common in the euro area (34% of firms) than in the overall sample covered by the survey (35%). In the case of Germany, firms were not explicitly asked whether or not they have a policy of adapting base wages to inflation. Nevertheless, when asked about the two main factors behind the most recent wage increases, 27% of German firms replied that inflation was one of them.

The information collected by the survey qualifies and complements other information on formal indexation available at the country and sector level, according to which there is some form of automatic price indexation of private sector wages in seven euro area countries: Belgium, Spain, France, Cyprus, Luxembourg, Malta and Slovenia.[7] The survey evidence indicates that the practice of adapting wages to inflation is common in a wider set of countries. On average, about one-third of the firms responded that they have such policies.

4 WAGE AND PRICE ADJUSTMENT

The WDN survey can be viewed as the natural follow-up to some of the results on pricing decisions in the euro area revealed by the IPN.[8] One of the findings of the IPN is the substantial heterogeneity in the degree of price stickiness across products and sectors. These cross-sectoral differences may reflect, among other factors, the variability of input costs and the cost structure at the firm and sectoral levels, and, in particular, the share of labour costs, of which wages are an important component. The WDN survey makes it possible to analyse price and wage adjustments simultaneously and can therefore shed some light on this important issue. In addition, it can provide useful micro evidence for macro models of wage and price staggering that have become very popular in new Keynesian models. This section presents the main findings of the WDN survey on the timing and frequency of wage changes in the European Union.[9]

4.1 THE TIMING OF WAGE AND PRICE CHANGES

The WDN survey finds strong evidence of time dependence in wage setting. The survey first asked firms to specify whether wage-price changes are concentrated in any particular month(s) and, if so, to indicate the month(s) in which the adjustment typically takes place. Overall, around half of the firms in the countries in the sample tend to change wages in a particular month (Chart 1). There is a notable "January effect": around 30% of wage changes take place in that month, and the prominent role of January is evident in all countries. Another, albeit much smaller, peak is observed in July. Overall, 54% of firms state that wage changes are concentrated in (a) particular month(s).

The percentage of firms that concentrate wage changes in any particular month(s) is

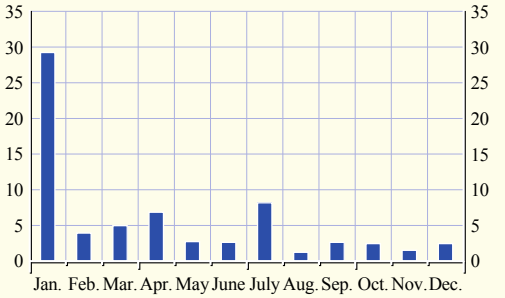
7 See Box 5 entitled: "Wage indexation mechanisms in euro area countries" in the May 2008 issue of the Monthly Bulletin and Du Caju et al. (2008), op. cit.

8 See Altissimo, F., M. Ehrmann and F. Smets (2006), op. cit., Fabiani, S., C. Loupias, F. Martins and R. Sabbatini (2007), "Pricing decisions in the euro area. How firms set prices and why", Oxford University Press, and the November 2005 issue of the Monthly Bulletin (op. cit.).

9 The section summarises some of the findings in Druant, M., S. Fabiani, G. Kezdi, A. Lamo, F. Martins and R. Sabbatini (2008), "How are firms' wages and prices linked: survey evidence in Europe", mimeo (WDN). See http://www.ecb.europa.eu/events/conferences/html/wage_dynamics_network.en.html

Chart 1 Timing of wage changes

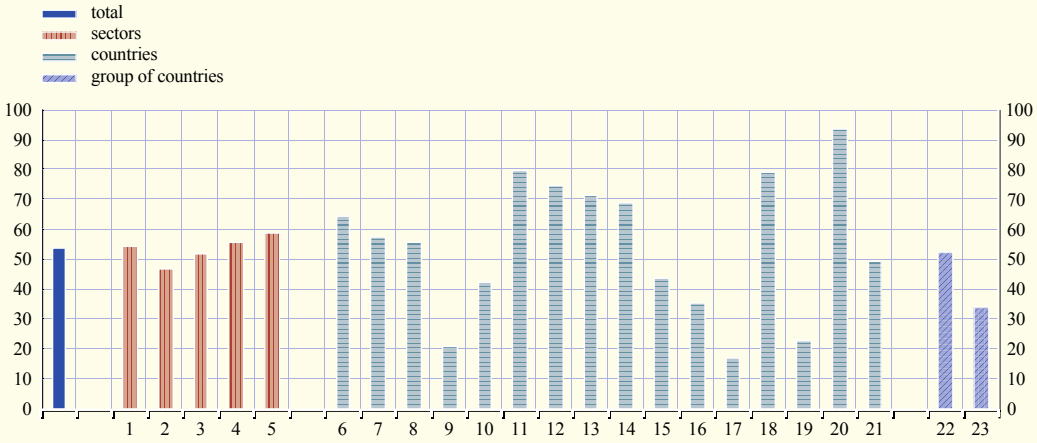
(percentage of firms that concentrate wage changes in (a) particular month(s))



Notes: Figures are weighted to reflect overall employment and are rescaled to exclude non-responses. Germany is not included in the calculations.

Chart 2 Concentration of wage changes across sectors and countries

(percentage of firms that concentrate wage changes in any particular month(s))



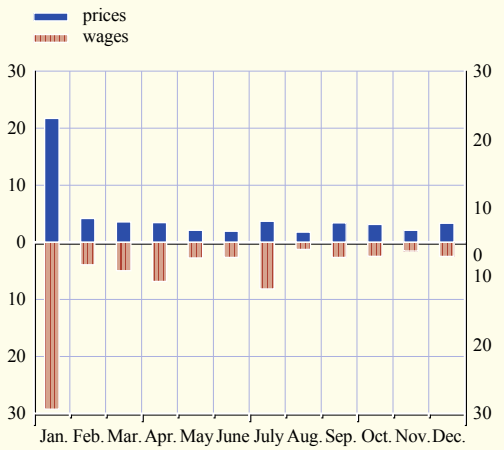
1	Manufacturing	6	Austria	12	France	18	Netherlands
2	Construction	7	Belgium	13	Greece	19	Poland
3	Trade	8	Czech Republic	14	Hungary	20	Portugal
4	Market services	9	Germany	15	Ireland	21	Slovenia
5	Financial intermediation	10	Estonia	16	Italy	22	Euro area countries
		11	Spain	17	Lithuania	23	Non-euro area countries

Notes: Figures are weighted to reflect overall employment and are rescaled to exclude non-responses. The column "total" in this chart corresponds to the sum of the monthly figures in Chart 1.

very similar across sectors (see Chart 2), with January again being the month in which the largest proportion of wage changes occurs in every sector. July also has some significance in the manufacturing and market services sectors, whereas wage changes are slightly less scattered among different months in the financial intermediation and manufacturing sectors. Small firms tend to concentrate wage changes in particular months more often than larger firms.

Chart 3 Timing of wage and price changes

(percentage of firms that concentrate wage and price changes in (a) particular month(s))



Notes: Figures are weighted to reflect overall employment and are rescaled to exclude non-responses. Germany is not included in the calculations.

By contrast, differences in the timing of wage changes across countries are much more pronounced. One extreme is Portugal, where 94% of firms reported that they concentrate their wage changes in a particular month. This contrasts with less than a quarter of firms in Lithuania, Poland and Germany.

With regard to price adjustments, the percentage of firms reporting that price changes typically take place in a specific month is around one-third (35%). As shown in Chart 3, in this case the adjustment tends to be concentrated largely in January. The WDN survey also

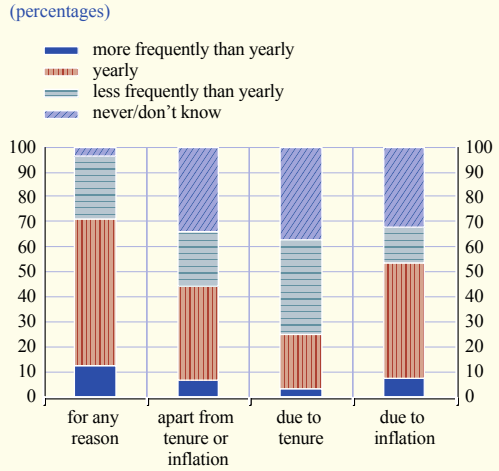
points to some degree of synchronisation at the firm level between the timing of price and wage changes. For example, 50% of firms which change prices in January also change wages in that month.

4.2 FREQUENCY OF WAGE AND PRICE ADJUSTMENT

The survey also contains information on the frequency of wage adjustment. Chart 4 shows that around 60% of firms represented in our sample report that they change their employees' base wages once a year, 12% do so more often and 26% change wages less frequently. Inflation stands out as the predominant factor behind frequent wage adjustment, while the frequency of wage changes due to tenure is the lowest.

The frequency of wage changes shows little variation across sectors. Wage changes are least frequent in the trade and business services sectors and most frequent in the construction sector. Firm size also appears to have little impact on the degree of variation. By contrast, the degree of cross-country heterogeneity is larger: in Lithuania, Greece and Slovenia firms report the highest frequency of changes in base wages, while Italian, Hungarian and Portuguese firms adjust their wages least frequently. On average, there is very little difference between firms in euro area and non-euro area EU countries.

Chart 4 Frequency of wage changes



Notes: Figures are weighted to reflect overall employment and are rescaled to exclude non-responses. Germany is not included in the calculations.

The large cross-country differences that emerge with regard to wage-setting practices, and in particular the frequency of wage changes, may be attributable to institutional features. This possibility has been formally explored through regression analysis. Indeed, according to results reported by the latter, some labour market institutional features (e.g. indexation and the level of wage bargaining) play a major role in explaining cross-country differences in the frequency of wage changes.

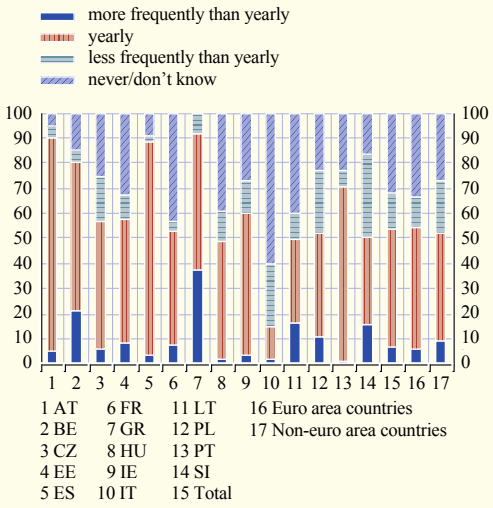
The frequency of price adjustment is higher than that of wage changes. Around 40% of the firms surveyed report that, on average, they change prices once a year (compared with 60% in the case of wage changes), and 7.4% report that prices are changed less frequently than once a year (compared with 26% in the case of wage changes). The cross-country variation in the frequency of price changes is limited as compared with that of wage changes. By contrast, the sectoral differences in price change frequencies are larger than those in wage change frequencies. This is consistent with the finding that product market characteristics, such as the degree of competition and the labour share, are significant determinants of differences in price change frequencies, whereas differences in wage change frequencies are influenced by institutional factors.

4.3 THE INTERACTION BETWEEN PRICE AND WAGE ADJUSTMENTS

The apparent synchronisation of price and wage changes at the firm level identified in the previous section is confirmed by the fact that around 40% of firms, when asked directly, acknowledged the existence of some relationship between the timing of price and wage adjustments within their company, though

Chart 5 Frequency of wage changes due to inflation, by country

(percentages)



Notes: Figures are weighted to reflect overall employment and are rescaled to exclude non-responses. Germany is not included in the calculations. In the case of Greece, figures relate to the percentage of firms that actually change wages due to inflation, as the option "never/don't know" was not provided in the Greek questionnaire.

only 15% of all firms stated that this relationship was relatively strong. Breaking the latter percentage down, decisions are taken simultaneously in the case of 4% of firms, prices follow wages in the case of 8%, and wages follow prices in the remaining 3%. The intensity of the link between wage and price changes depends on the share of labour costs in total costs. As regards whether wages feed into prices, around 60% of firms surveyed stated that they would use a strategy of increasing prices when faced with a permanent unexpected increase in wages. Furthermore, regression analysis [10] reveals that the share of labour costs in total costs is a significant determinant of the probability of choosing a price increase as an adjustment. This is supported by the finding that the frequency of price adjustment is lower in firms and sectors with a high labour cost share, which suggests that labour costs and wages have an influence on price adjustments at the firm level.[11] Moreover, firms with a high labour cost share also report more frequently that there is a strong link between price and wage changes.

Inflation developments influence firms' wage-setting decisions. The extent to and speed with which inflation feeds through to wage changes is influenced, on the one hand, by a firm's internal wage adjustment policies and, on the other hand, by the characteristics of the prevailing institutional setting in each country. Results from regression analysis show that indexation does indeed play a major role in explaining the frequency of wage changes. In particular, firms tend to adjust wages more frequently in the presence of a (formal or informal) policy of adapting wage changes to (past or expected) inflation. Another source of information available from the survey on how inflation developments affect firms' wage decisions is the frequency of wage adjustments due to inflation. Chart 4 shows that inflation stands out as the prevalent factor triggering frequent wage adjustment (at an annual or infra-annual frequency). Although sectoral heterogeneity is relatively limited, the variability across countries is instead remarkably large (Chart 5).[12] While in Austria, Belgium and Spain over 80% of firms change wages annually or more frequently on account of inflation, in Italy only 15% of firms appear to do so.

5 DOWNWARD WAGE RIGIDITY

The degree of downward wage rigidity has been the subject of a growing body of empirical research, partly because it has implications for the optimal rate of inflation.[13]

10 See Bertola, G., A. Dabusinskas, M. Hoeberichts, M. Izquierdo, C. Kwapil, J. Montornès and D. Radowski (2008), "Price, wage and employment response to shocks: evidence from the WDN survey", mimeo (WDN). See http://www.ecb.europa.eu/events/conferences/html/wage_dynamics_network.en.html

11 See Druant et al. (2008), op.cit. The IPN has obtained similar results at the sectoral level.

12 The Netherlands is not included in this chart, as Dutch firms were not explicitly asked about these policies.

13 The debate goes back to Tobin, J. (1972), "Inflation and Unemployment", American Economic Review, 62(1), pp. 1-18, who argued that if central bankers aim at inflation rates which are too low, this could hamper the functioning of labour markets, as it would be difficult to cut wages. Higher inflation would allow easier wage adjustments and thus "grease the wheels of the economy".

5.1 DOWNWARD WAGE RIGIDITY EVIDENCE

Two types of downward rigidity are usually considered in the existing literature. Downward nominal wage rigidity (DNWR) relates to the inability of firms to implement (and, correspondingly, the reluctance of workers to accept) cuts in nominal wages. Similarly, downward real wage rigidity (DRWR) reflects the inability of firms to increase wages at rates below the prevailing rate of inflation. Recent studies using micro data have focused on the distributions of nominal wage changes to estimate downward wage rigidity. A spike at zero on this distribution is understood as evidence of nominal rigidity, as it suggests that a number of firms were unable to decrease nominal wages and thus kept them unchanged. If, by contrast, the spike is around the expected level of inflation, this is taken as evidence of real wage rigidity.[14] Another branch of the empirical literature relies on survey evidence to determine the presence and sources of downward wage rigidity.[15]

A recent study uses the WDN survey data to investigate the existence of downward nominal and real wage rigidities in EU countries as well as the role played by firm characteristics and the economic and institutional environment in which firms operate in determining wage rigidity.[16] In this study DNWR is measured as the percentage of firms which report that they have frozen base wages over the previous five years. The WDN survey does not include a measure which directly captures DRWR. However, it is reasonable to expect that this will correlate closely with the extent to which wages set by the firm are strongly linked to inflation.[17] This study therefore uses the percentage of firms for which there is an automatic link between wages and past or expected inflation as a proxy for real wage rigidity (RWR). This includes firms that are constrained from adjusting real wages both downwards and upwards. This concept of real wage rigidity is nevertheless a relatively narrow one, as there may be reasons other than indexation which prevent real wages from adjusting.

A first key finding from the WDN survey is that the prevalence of nominal wage cuts among European firms, with the exception of Germany, is extremely low. Only around 4% of firms stated that wages had ever been cut in the previous five years. Prima facie, this is strongly suggestive of downward wage rigidity

Table 3 Downward nominal and real wage rigidity across countries

(percentage of firms affected by wage rigidities)

Country	DNWR	RWR
Austria	13.3	9.8
Belgium	11.8	98.2
Czech Republic	26.5	11.7
Estonia	21.7	4.4
Spain	2.4	54.8
France	7.1	9.6
Greece	12.5	20.0
Hungary	5.9	11.2
Ireland	7.1	8.2
Italy	3.9	1.7
Lithuania	19.9	10.8
Netherlands	23.2	n.a.
Poland	10.0	6.9
Portugal	15.0	9.0
Slovenia	2.9	23.5
Total	9.6	16.8
Euro area countries	8.1	20.3
Non-euro area countries	13.4	8.5

Note: Figures are weighted to reflect overall employment and are rescaled to exclude non-responses.

14 This kind of methodology has been used by, among others, Dickens, W. T., L. Goette, E. L. Groshen, S. Holden, J. Messina, M. E. Schweitzer, J. Turunen and M. E. Ward (2007), "How Wages Change: Micro Evidence from the International Wage Flexibility Project", Journal of Economic Perspectives 21(2), pp. 195-214; Messina, J., P. Du Caju, C. Filipa Duarte, M. Izquierdo and N. Lynggård Hansen (2008), "The Causes and Consequences of Nominal and Real Wage Rigidity: A Sectoral Approach", mimeo (WDN); and Holden, S. and F. Wulfsberg (2007), "Downward nominal wage rigidity in the OECD", ECB Working Paper No 964.

15 This body of literature follows the pioneering work of Blinder, A. S. and D. H. Choi (1990), "A Shred of Evidence on Theories of Wage Stickiness," The Quarterly Journal of Economics 105(4), pp. 1003-15.

16 This section mainly draws on findings by Babecký, J., P. Du Caju, O. Kosma, M. Lawless, J. Messina and T. Rõõm (2008), "Downward wage rigidity and alternative margins of adjustment: survey evidence from European firms", mimeo (WDN). See http://www.ecb.europa.eu/events/conferences/html/wage_dynamics_network.en.html

17 This is confirmed by empirical evidence based on a comparison of the WDN survey measure with other measures of downward real wage rigidity obtained from micro studies on wage change distributions.

(DWR) in Europe. Table 3 shows that real wage rigidity, as defined above, is much more prevalent among the firms surveyed (with 16.8% affected) than DNWR (with only 9.6% affected), which is consistent with other evidence of downward wage rigidity in most continental European countries, as opposed to the United States and the United Kingdom.[18] There are sizeable differences between the EU countries as regards downward wage rigidity. Overall, non-euro area countries in the sample are twice as likely to experience DNWR as euro area countries, and the reverse is true for real wage rigidity. DNWR appears stronger than average in the Czech Republic, Estonia, Lithuania, the Netherlands and Portugal. It is considerably smaller than average in Spain, France, Italy, Hungary and Slovenia. Real wage rigidity is especially prevalent in Belgium, Spain and Slovenia, and less so in Italy, Estonia and Poland. Efficiency wages and fairness considerations seem to be important reasons behind the reluctance of firms to cut wages.

It appears that there are only modest differences in the incidence of wage rigidity across sectors and firm size categories. All in all, country characteristics seem to matter more for DWR than the sectoral dimension, which suggests that national labour market institutions may be behind these differences between countries. This is consistent with findings from individual wage data. Indeed, in the recent literature the centralisation of wage setting and the degree of collective bargaining coverage have been related to the extent of downward wage rigidity. On the basis of the WDN survey information and multivariate regression analysis, Babecký et al. (2008) find that high country-level bargaining coverage and the strictness of employment protection legislation (EPL) increase DNWR.

5.2 ALTERNATIVE MEANS TO ADJUST LABOUR COSTS

The relevance of downward wage rigidity also depends on whether firms have other means than base wages to adjust labour costs. The WDN survey provides unique evidence on cost adjustment via non-wage labour costs. Surveyed firms were asked whether they have ever used means other than base wages to adjust labour costs. These include the possibility to reduce or eliminate bonus payments, reduce or eliminate non-pay benefits, change shift assignments or shift premia, slow or freeze the rate at which

18 See, for example, Dickens et al. (2007), op.cit.

Table 4 Alternative means to adjust labour costs: country overview

(percentage of firms that use a given means to adjust labour costs)

Country	Any means	Reduce bonuses	Reduce benefits	Change shifts	Slow promotions	Employ lower-paid workers	Early retirement
Belgium	46	18.4	7.9	7.2	15	26.4	18.9
Czech Republic	67.9	32.2	7.5	11.1	1.9	8.7	8.9
Estonia	93.6	40.2	20.5	21.1	6.2	16.2	2.6
France	58.6	14.7	6.1	-	15.4	39	30.3
Greece	83.5	20.4	12.4	-	-	-	-
Hungary	67.2	22.7	11.9	38.3	35.1	26.5	10.2
Ireland	88.3	13.3	4.9	9.8	4.7	27.6	4
Italy	71.2	25.6	21.8	26	34	45.6	20.2
Poland	50.5	23.6	16.3	12.4	12.8	23.7	10.9
Portugal	39.5	13.7	8.4	10.7	14	16.2	0
Slovenia	57.5	13.5	12.8	9.1	18.9	15.8	8.9
Total	62.4	22.8	14.8	19.2	20.9	32.2	16.7
Euro area countries	63.5	20.6	14.8	21.4	25.2	38.8	20.7
Non-euro area countries	60.4	26.7	14.9	16.3	13.4	20.7	9.7

Notes: Figures are weighted to reflect overall employment and are rescaled to exclude non-responses. Data for Austria, Germany, Netherlands and Spain are not available. Firms may also use other means, such as company restructuring, reduction in overtime and reduction in workforce, etc.

Table 5 Alternative means to adjust labour costs: sectoral overview

(percentage of firms that use a given means to adjust labour costs)

Sector	Any means	Reduce bonuses	Reduce benefits	Change shifts	Slow promotions	Employ lower-paid workers	Early retirement
Manufacturing	61.2	21.1	13.5	18.9	20.5	31.9	17.7
Energy	66.2	30.7	22.1	4.1	13.0	18.5	25.2
Construction	50.9	20.6	15.2	11.0	13.1	16.2	5.6
Trade	64.0	25.4	17.6	22.1	21.9	37.2	10.9
Market services	65.7	23.3	14.8	21.4	22.2	32.9	19.2
Financial intermediaries	60.1	30.6	15.6	5.2	24.2	36.7	30.8
Non-market services	25.6	8.9	4.0	7.6	12.3	8.5	0.7
Total	62.4	22.8	14.8	19.2	20.9	32.2	16.7

Notes: Figures are weighted to reflect overall employment and are rescaled to exclude non-responses. Austria, Germany, Netherlands and Spain are not included in the calculations. Firms may also use other means, such as company restructuring, reduction in overtime and reduction in workforce, etc.

promotions are filled, recruit new employees at a lower wage level than those who left voluntarily, and encourage early retirement in order to replace high-wage employees with lower-paid entrants. Around half of the firms surveyed have used some of the means above to adjust labour costs, particularly those firms subject to downward nominal wage rigidity. Table 4 shows the percentage of firms in each country that reported using the various means to adjust labour costs. The prevalence of individual strategies varies quite substantially across countries. The reduction of bonus payments is the most common method used in the non-euro area countries, while it is less prevalent among euro area countries (with the exception of Italy, where almost a quarter of firms report using this method). Hiring new employees at lower rates of pay than those earned by employees leaving the company or encouraging early retirement are the most commonly used methods in Belgium, France and Italy.

In addition to varying across countries, the means of adjustment used also tend to differ across sectors (see Table 5). The use of cheaper labour to replace workers who leave the firm is the dominant strategy in most sectors. Firms belonging to the energy and financial intermediation sectors are the most likely to target bonuses when trying to reduce costs. Early retirement is the least likely strategy to be followed; the sector that uses it most widely is manufacturing. The various cost-reduction methods are not mutually exclusive, and firms often use more than one such strategy. Reductions in benefits and bonuses appear to be one of the most popular combinations. Recruiting cheaper labour to replace workers who have left voluntarily and encouraging early retirement to create vacancies for lower-paid (e.g. more junior) staff is another common pairing, suggesting that some firms are using turnover to reduce labour costs. Finally, a third combination involves the use of the company's internal wage structure, with changes in shift patterns and slowing of promotions.

When exploring whether firms affected by downward wage rigidity can circumvent this constraint using alternative means to reduce labour costs, Babecký et al. (2008) find that firms subject to such rigidity are indeed more likely to do so. Moreover, regression analysis also shows that firms operating in a competitive environment are more likely to employ non-base wage labour cost adjustment strategies, and that there is a greater probability that such non-base wage means will be used to reduce costs in the case of collective bargaining agreements. This link is more significant in the case of firm-level bargaining contracts than in the case of higher-level bargaining contracts, probably reflecting the fact that the former type of agreement provides companies with more margin for manoeuvre.

Box

WAGES OF NEW WORKERS

Wages offered to newly hired employees may respond differently to aggregate labour market conditions than those of employees in ongoing employment relationships. A better understanding of the significance of such differences is needed because, as emphasised by Pissarides (2007) and Haefke et al. (2008), it is mostly rigidity in the wages of new employees which has an impact on job creation.

Most micro evidence based on individual wage data for the United States and some European countries (e.g. Carneiro et al., 2008) suggests that the wages offered to new workers are more responsive to changes in the unemployment rate than the wages of those in ongoing employment relationships. Pissarides (2007) surveys this evidence and concludes that, on average, a one percentage point rise in the unemployment rate is associated with a 3% decline in new workers' wages, whereas the corresponding elasticity for those in ongoing employment relationships is only about one-third of that.

However, direct firm-level survey evidence on the wage-setting practices followed by firms in the United States (Bewley, 2007) and Sweden (Agell and Lundborg, 2003) suggests that the wages of new workers are tightly linked to those of incumbents. The WDN survey discussed in this article lends support to this view. As reported by Galuscak et al. (2008), almost 80% of the firms surveyed report that internal factors, such as the collective agreement or the wages of similarly qualified workers already employed in the firm, are of greater significance than external labour market conditions in shaping the wages of new workers. There is some evidence to suggest that external labour market conditions might be more relevant in non-euro area countries (36% of firms) than in euro area countries (15% of firms). This difference might be partly attributed to institutional factors: in non-euro area countries bargaining is more decentralised and the percentage of workers covered by collective pay agreements is lower.

External labour market conditions also appear to be more important in certain sectors such as business services and in smaller-sized firms. Moreover, the probability that the wages of new workers deviate from the internal wage scale is lower the higher the average tenure of the firm's workforce and the lower the degree of competition the firm is facing. These findings lend support to the hypothesis advanced by Bewley (2007) that internal equity considerations are particularly important in firms that are characterised by the dominant presence of long-term and full-time jobs. Indeed, in the WDN survey firms report that both fairness considerations and the fear that wage differences between new and incumbent workers may have an impact on effort and morale are the most important reasons for not adjusting the relative wage of new workers in response to changing labour market conditions. This is particularly true in firms that employ skilled workers.

References

Agell, J. and P. Lundborg (2003), "Survey evidence on wage rigidity and unemployment: Sweden in the 1990s", Scandinavian Journal of Economics, 105, pp. 15-29.

Bewley, T. F. (2007), "Insights gained from conversations with labour market decision-makers", ECB Working Paper No 776.

Carneiro, A. and P. Portugal (2008), "Worker flows and real wage cyclicality", mimeo, Bank of Portugal.

Galuscak, K., M. Keeney, D. Nicolitsas, F. Smets, P. Strzelecki and M. Vodopivec (2008), "The determination of wages of newly hired employees: survey evidence on internal versus external factors", mimeo (WDN). See http://www.ecb.europa.eu/events/conferences/html/wage_dynamics_network.en.html

Haefke C., M. Sonntag and T.van Rens (2008), "Wage Rigidity and Job Creation", IZA Discussion Paper 3714.

Pissarides, C. (2007), "The Unemployment Volatility Puzzle: Is Wage Stickiness the Answer?", The Walras-Bowley Lecture, North American Summer Meetings of the Econometric Society, Duke University, June 2007.

6 THE RESPONSE OF WAGES TO SHOCKS

Finally, the WDN survey also elicits information on how firms react to various shocks or unanticipated changes in the firms' business environment. The shocks considered are two supply shocks, namely an increase in the cost of an intermediate input (e.g. an oil price increase) and an increase in wages (for example due to contracts negotiated at higher levels), and a demand shock, namely an unanticipated slowdown in demand. All three hypothetical shocks are common to all firms in the market, and the wage shock was explicitly described as permanent. The respondents were asked to assess the relevance of the following four adjustment strategies in response to these shocks: an increase in prices, a reduction in profit margins, a reduction in output, and a reduction in costs.

Table 6 Reaction after cost-push shocks, wage shocks and demand shocks

(percentage of firms)

Adjustment strategy	Cost-push shock	Wage shock	Demand shock
Reduce (other) costs	67.8	59.0	78.0
Adjust prices	66.1	59.2	51.2
Reduce margins	53.6	49.8	56.8
Reduce output	21.6	22.5	48.6

Note: Figures are weighted to reflect overall employment and are rescaled to exclude non-responses.

Approximately 70% of respondents indicate that reducing other costs and increasing prices are "very relevant" and "relevant" options in response to an increase in the cost of an intermediate input (cost-push shock), with the option of reducing costs being slightly more important than that of increasing prices. Around 60% of the firms indicate that they would adjust prices in the case of a wage shock (a cost-push shock). In the case of a slowdown in demand, around 80% of firms would try to reduce costs, whereas each of the other strategies is relevant for about half of the firms surveyed (see Table 6). Table 6 provides an overview of the relative importance of the various adjustment strategies. However, firms often employ combinations of these strategies. The combination of adjusting prices (increasing for the supply shocks and decreasing for the demand shock) and reducing other costs appears to be the most popular strategy among respondents.

The role of economic and institutional influences on the adjustment mechanisms used by firms has also been investigated, and in particular the extent to which shocks can be expected to pass through to prices in the case of wage and other cost-push shocks.[19] Firms operating in a more competitive environment are more responsive to both supply shocks, attaching greater importance to lowering margins, output and reducing other

19 See Bertola et al. (2008), op. cit.

Table 7 Cost-cutting strategies

(percentage of firms)

Cost-cutting strategy	After a cost-push shock	After a wage shock	After a demand shock
Reduce base wages	1.2	-	1.2
Reduce flexible wage components	9.5	11.5	10.5
Reduce number of permanent employees	10.9	11.5	15.5
Reduce number of temporary/other employees	18.0	19.9	25.0
Reduce hours worked per employee	7.0	7.7	8.5
Reduce other costs	53.5	49.4	39.4

Note: Figures are weighted to reflect overall employment and are rescaled to exclude non-responses.

costs than firms exposed to fewer competitive pressures. By contrast, exposure to foreign markets limits the pass-through of cost increases to prices (inasmuch as it reduces firms' readiness to increase prices), particularly in the case of a permanent wage shock. There are several effects associated with collective bargaining: firms subject to collective bargaining at the national, regional or sectoral levels are more likely to respond to a cost-push shock by increasing prices. In the case of a wage shock, the influence of collective bargaining is less clear, but works in the same direction. Finally, regression results show that firms operating in the market services sector are less responsive to shocks than manufacturing firms, and larger firms seem to rely more on cost-cutting strategies than smaller ones. Nevertheless there is significant cross-country heterogeneity with regard to the responses to these shocks. It appears that the differing responses to an intermediate cost shock may, in part, be attributable to cross-country differences in employment protection legislation (EPL). However, EPL differences have less bearing on the differing responses to wage shocks.

The survey further enquired about the different cost-cutting strategies used in response to the various shocks. Surveyed firms could choose up to six different options: (i) reduce base wages, (ii) reduce flexible wage components, (iii) reduce the number of permanent employees, (iv) reduce the number of temporary employees, (v) reduce hours worked per employee and (vi) reduce non-labour costs. The reported cost-cutting strategies are summarised in Table 7. Interestingly, around half of the firms surveyed identified non-labour cost reduction as the most relevant cost-cutting strategy following a supply shock, while the corresponding share was around 40% following a demand shock. Non-labour costs include negotiating with suppliers about prices, reducing administrative costs and reducing advertising costs. As expected, given the evidence on wage rigidity, cutting base wages is chosen by a very small percentage of firms (1.2%). Reducing flexible wage components is the preferred strategy of a larger, although modest, number of firms (around 10%).

7 CONCLUSION

Understanding the features and determinants of wage setting is important for the monetary policy transmission process. A better knowledge of the role of wages, and of the labour market in general, in the transmission process facilitates the shaping of monetary policy in the pursuit of price stability and increases the precision of macroeconomic models and their empirical application to policy analysis. In addition, identifying the sources of wage rigidities is of key importance in designing appropriate structural policies to facilitate the adjustment process in the presence of macroeconomic imbalances within the euro area.

Drawing on new evidence from a firm-level survey conducted in a broad range of Member States, this article contributes to a better understanding of wage-setting practices across the European Union. A number of tentative conclusions can be drawn from this evidence. First, the frequency of wage changes is lower

than that of price adjustments. 60% of the firms surveyed change wages once a year, and around 25% less frequently than once a year, while the corresponding percentages for price changes, at 40% and 7.4% respectively, are significantly lower. Second, around 30% of the firms surveyed report that wage changes typically take place in January. Wage changes are therefore more synchronised than price changes. Third, the survey evidence corroborates other micro evidence of downward nominal and real wage rigidity in a number of euro area countries. The prevailing form of rigidity (nominal versus real) in a given country depends on wage-setting institutions such as the degree of indexation, which varies quite considerably across countries. Fourth, the evidence on downward rigidity focuses on base wages. However, firms do have a number of other means for reducing labour costs, such as cutting bonuses, reducing non-wage benefits, changing working practices, reducing promotion rates and replacing departing workers with lower-paid ones. The WDN survey evidence suggests that around half of the firms surveyed have used one or another of these strategies to reduce costs. Fifth, it is, nonetheless, internal factors, such as the collective agreement or the wages of similar employees in the firm, which, for most firms, are the more important factors behind the wages of newly hired workers. Firms are reluctant to deviate from internal wage scales for reasons of fairness and efficiency. Finally, the survey evidence contributes to a better understanding of the link between wages and prices. Especially in firms with a high labour share, the pass-through of wages to prices is strong. Firms with a high labour cost share also report more frequently that there is a close link between the timing of price and wage changes. The pass-through of wages to prices is mitigated if the degree of competition or the export share is high.

Further analysis using micro-founded macroeconomic models is now required in order to gain a fuller understanding of the macroeconomic and policy implications of these micro findings for the monetary policy transmission process and macroeconomic adjustment in the euro area. This is a major current research objective of the WDN.