3 Wage adjustment and employment in Europe: some results from the Wage Dynamics Network Survey

This box examines the link between collective bargaining arrangements, downward wage rigidities and employment. Several past studies using aggregate macroeconomic data found that some institutional features which affect the wage-setting process are associated with downward wage rigidity which, in turn, may exacerbate employment losses during downturns.[16] This box uses micro data based on a survey of firms to investigate whether the above effects were also evident at firm level in the euro area during the period 2010-13. Overall, the findings confirm that wage bargaining institutions have contributed to wage rigidities in Europe and may have exacerbated employment losses during recessions.

This box uses data from the third wave of the ESCB's Wage Dynamics Network (WDN) surveys.[17] The WDN3 survey provides firm-level information on economic conditions and collective pay agreements in 25 EU Member States during the period 2010-2013. These data show substantial variation in developments across the surveyed enterprises during the period under scrutiny, which was characterised by the sovereign debt crisis. While 44% of firms experienced a decrease in demand, 32% indicated that demand increased. The proportion of firms that reduced employment or wages is significantly higher for firms that experienced a fall in demand: employment fell in 43% of the firms that experienced a fall in demand, and 14% of these firms reduced base wages. Given the extent of the fall in demand and the cuts in employment, the relatively small percentage of wage decreases seems to be an indication of downward nominal wage rigidity. Indeed, almost one quarter of all the firms surveyed reported that they had frozen nominal wages. Wage freezes are also a strong indication of downward wage rigidity as they suggest that firms are keeping wages unchanged in order to avoid the possible tensions associated with reducing wages, even when economic conditions may justify a cut.[18]

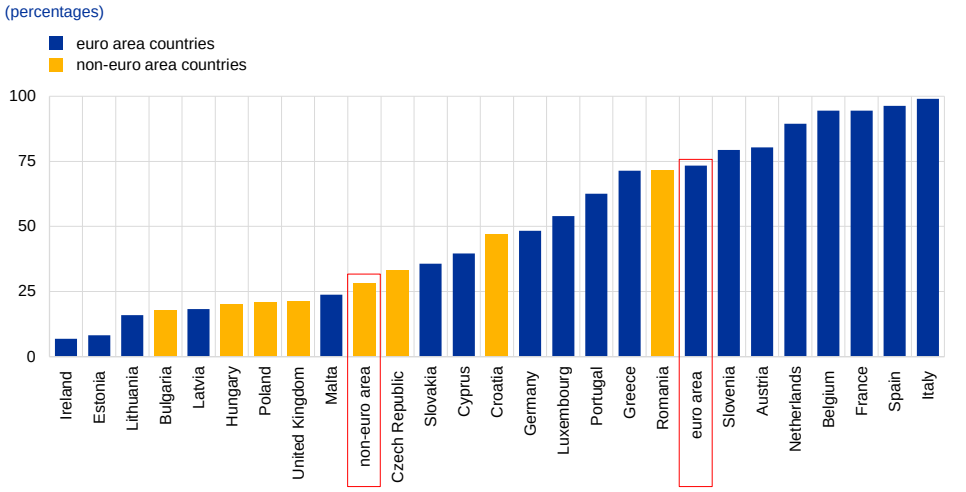
16 These institutional features associated with wage rigidities may cover a broad range of characteristics, such as trade union density, collective bargaining arrangements, employment protection, etc. For relevant results, and a concise overview of the literature, see, for example, the box entitled "Downward wage rigidity and the role of structural reforms in the euro area", *Economic Bulletin*, Issue 8, ECB, 2015; and the box entitled "The impact of institutional rigidities on wage responsiveness in the euro area", in the article entitled "Increasing resilience and long-term growth: the importance of sound institutions and economic structures for euro are countries and EMU", *Economic Bulletin*, Issue 5, ECB, 2016.

17 For full details of the latest Wage Dynamics Network Survey, as well as an overview of the main results, see the article entitled "New evidence on wage adjustment in Europe during the period 2010-13", *Economic Bulletin*, Issue 5, ECB, 2016.

18 It should be noted that in the cases of Greece and Cyprus, a significant share of firms cut wages during the reference period, following particularly significant declines in GDP in these countries.

Chart A

Share of workers covered by collective pay agreements – country overview in 2013



Sources: ECB calculations on the basis of the WDN3 survey in "New evidence on wage adjustment in Europe during the period 2010-13", *Economic Bulletin*, Issue 5, ECB, 2016.
Notes: Firms with fewer than five employees are excluded from the calculations. Figures are weighted to reflect overall employment and rescaled to exclude non-response. Figures for Ireland are unweighted. Euro area and non-euro area averages are calculated across countries that have weights.

In the analysis below, collective pay agreements play a key role.[19] According to the WDN survey (Chart A), the share of workers covered by a collective pay agreement in the euro area countries (average almost 75%) is much higher than in the non-euro area countries (almost 30%). Several countries are significantly above the euro area average, particularly Italy, Spain, France, Belgium and the Netherlands. With the exception of the Netherlands and the Baltic countries, these high levels are mainly driven by collective bargaining agreements outside the firm (i.e. national or sectoral, rather than more decentralised firm-level agreements). Meanwhile, Ireland, Estonia, Latvia and Lithuania have collective bargaining coverage substantially below the euro area average (i.e. below 20%). Among the non-euro area EU Member States, Bulgaria, Hungary, Poland and the United Kingdom have lower proportions of workers covered by collective pay agreements, while Romania and Croatia have higher proportions.

Using the WDN firm-level dataset, this box reports estimates of the wage response to changes in the level of demand and the impact of wages on

19 Examples of studies showing that downward wage rigidities reflect institutional factors such as a high degree of union coverage and employment protection are: Holden, S. and Wulfsberg, F., "Downward Nominal Wage Rigidity in the OECD", *Journal of Macroeconomics*, Vol. 8, 2008, pp. 1-48; Anderton, R. and Bonthuis, B., "Downward Wage Rigidities in the Euro Area", *GEP Research Paper Series*, No 2015/09, University of Nottingham, July 2015. Various results also show that institutional factors can affect employment via wage rigidities. For example, Dias et al. (2013) find that firms with more flexible base wages are less likely to reduce employment (Dias, D.A., Marques, C.R. and Martins, F., 'Wage rigidity and employment adjustment at the firm level: Evidence from survey data', *Labour Economics*, Vol. 23, 2013), and Barwell and Schweitzer (2007) find for the United Kingdom that downward wage rigidities increase the probability of lay-offs (Barwell, R.D. and Schweitzer, M.E., "The Incidence of Nominal and Real Wage Rigidities in Great Britain: 1978-98." Economic Journal, Vol. 117, No 524, 2007). By contrast, Babecky et al. (2012) highlight possible substitutability between base wage flexibility and alternative labour cost adjustments (e.g. by changing the flexible component of wages) (Babecký, J., Du Caju, P., Kosma, T., Lawless, M., Messina, J. and Rõõm, T., "How do European firms adjust their labour costs when nominal wages are rigid?", *Labour Economics*, Vol. 19, No 5, October 2012).

employment during a negative demand shock.[20] By pooling the data across the 25 countries, and using ordered probit models, wage and employment responses at the aggregate EU level can be estimated.[21] As regards wages, the WDN survey allows five different outcomes when firms state what happened to their nominal base wages during the period 2010-2013, namely: strong decrease, moderate decrease, unchanged, moderate increase and strong increase. The wage specification also includes various explanatory variables such as the share of workers covered by a collective pay agreement, and developments in demand (all five categories).[22]

Focussing on the heterogeneous responses of wages to changes in demand, econometric results indicate asymmetric demand elasticities for wages which suggests downward nominal wage rigidity.[23] Chart B shows that the rise in the probability of downward base wage responses to a decrease in demand is significantly smaller than the rise in the probability of an upward wage response to an increase in demand (i.e. wages are more rigid downwards than upwards). Furthermore, a strong or moderate fall in demand significantly increases the probability that base wages will remain unchanged, whereas one might expect such decreases in demand to actually reduce wages. This is further evidence of downward nominal wage rigidity, as the distribution of changes in wages starts to bunch around unchanged base wages when demand falls. By contrast, when there is a moderate or strong increase in demand there is a lower probability of base wages remaining unchanged.

Evidence of downward nominal wage rigidity is also indicated in the estimates in Chart C (Panel A) with collective bargaining agreements reducing the probability of downward wage adjustment.[24] The higher the proportion of employees in the company who are covered by a collective bargaining agreement, the lower the probability of a wage reduction and the higher the probability of a wage rise. Given the aforementioned wide range of collective bargaining coverage across euro area countries, this result also implies significantly more downward nominal wage rigidities in countries with higher shares of employees covered by collective pay agreements.

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20 All econometric results which are reported in Charts B and C use the WDN survey data and are based on Tables 3 and 4 (respectively) in Marotzke, P., Anderton, R., Bairrao, A., Berson, C. and Tóth, P., "Wage adjustment and employment in Europe", *GEP Research Paper Series*, No 2016/19, University of Nottingham, November 2016.

21 If the estimation is only carried out for the euro area countries, then all of the econometric results are qualitatively the same for the euro area (with only marginal differences in the magnitudes of parameters). See the box entitled "Wage rigidity and employment in the euro area: an analysis with firm-level data", *Monthly Report*, Deutsche Bundesbank, December 2016, pp. 42-44.

22 A host of other control variables are also included in the specification.

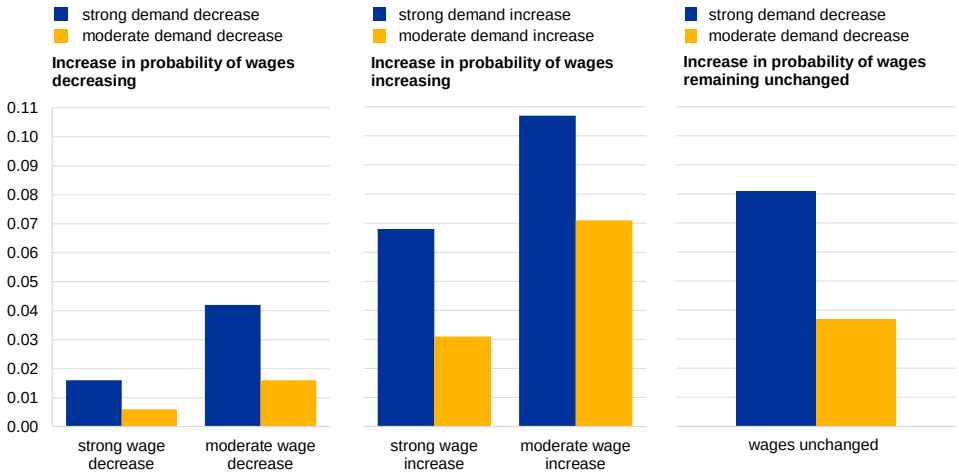
23 These asymmetric demand elasticities remain de facto unchanged regardless of whether the collective pay agreement variable is included in the equation.

24 The significant correlation of the error terms confirms that wages are endogenous in the employment equation and that the instrumental variables approach is adequate.

Chart B

Estimated wage responses to various developments in demand

(decimals; increase in the probability of a change in wages)



Sources: Marotzke et al. (2016).
Notes: Estimates based on ordered probit estimation methods (i.e. marginal effects on the probability of observing the outcome). The chart shows, for various developments in demand, the estimated probability of a certain wage development compared with the reference category of unchanged demand. For instance, the far left hand side column shows that the estimated probability of a strong decrease in wages given a strong decrease in demand is 1.6 percentage points higher than when demand is unchanged (see Table 3 of the source for further details). All parameters are statistically significant, mostly at the 1% level based on robust standard errors.

However, downward wage rigidities, such as the asymmetric wage behaviour highlighted in Chart B, may also be due to other factors – possibly unrelated to collective bargaining – such as employers fearing that wage cuts may reduce employees' motivation and have a negative impact on productivity.[25]

Estimation results also point to a negative effect of downward wage rigidities on employment (Chart C, Panel B). The impact of wage adjustments on employment also proves to be significant. The probability that employment will fall or remain unchanged is significantly lower when wages decrease (compared to the reference category of unchanged base wages). The probability of an increase in employment is accordingly raised if wages decrease. By contrast, if wages increase, the probability of a decrease in employment is higher (compared to the reference category of unchanged base wages).

Overall, the study presented in this box confirms that wage rigidities in Europe during the period 2010-13 were associated with more negative employment developments. First, collective pay agreements seem to reduce the probability of downward wage adjustment; second, the rise in the probability of downward wage responses to a decrease in demand was significantly smaller than the rise in the

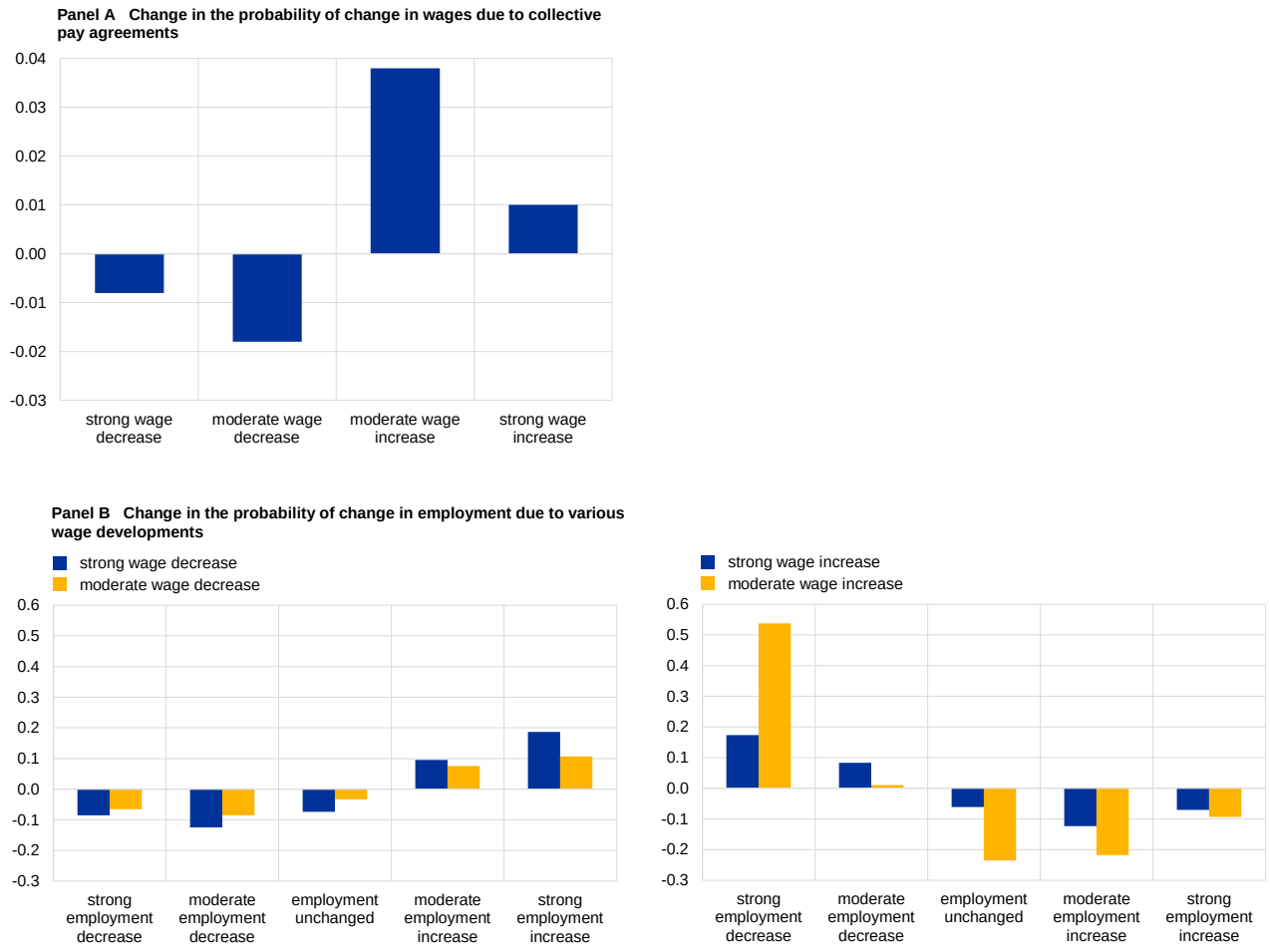
[25] Although not part of the empirical results of the study on which the results in Charts B and C are based, efficiency wages are often cited as a potential cause of downward wage rigidities. See, for example, Chapter 3 in Layard, R., Nickell, S. and Jackman, R., *Unemployment: Macroeconomic Performance and the Labour Market*, Oxford University Press, 1991; Stiglitz, J., "Alternative Theories of Wage Determination and Unemployment in LDCs: The Labor Turnover Model", *Quarterly Journal of Economics*, Vol. 88, 1974, pp. 194-227; Solow, R., "Another possible source of wage stickiness", *Journal of Macroeconomics*, Vol. 1, Issue 1, 1979, pp. 79-82; and Du Caju, P., Kosma, T., Lawless, M., Messina, J. and Rõõm, T., "Why firms avoid cutting wages: survey evidence from European firms", *ILR Review*, Vol. 68, Issue 4, 2015.

probability of an upward wage response to an increase in demand (i.e. suggesting downward wage rigidities and asymmetric wage behaviour).[26] Finally, the results point to a negative effect of downward wage rigidities on employment at firm level.

Chart C

Wage and employment responses to collective pay agreements and wage dynamics

(decimals; change in probability of a change in wages (Panel A); change in probability of a change in employment (Panel B))



Sources: Marotzke et al. (2016).
Notes: Estimates based on instrumental variable ordered probit estimation methods (marginal effects on the probability of observing the outcome). Panel A shows how the estimated probability of a certain wage development changes when the share of employees covered by a collective wage agreement rises. The marginal effects on the probability of observing a change in wages are in absolute terms and not in comparison to a reference category. Results are based only on firms experiencing a fall in demand, but parameters and results are very similar for the whole sample of firms and all five categories of demand. Panel B shows, for various wage developments, the estimated probability of a certain development in employment compared with the reference category of unchanged wages. All parameters are statistically significant, mostly at the 1% level based on robust standard errors.

From a policy perspective, collective bargaining seems to contribute to downward wage rigidities which, in turn, may exacerbate employment losses during recessions. During the crisis, some euro area countries introduced reforms which provided firms with more options to move towards wage bargaining at firm level and away from more centralised collective bargaining agreements which tie the firm to national, regional or sectoral wage agreements. Part of the motivation for this is to allow firms to negotiate wage agreements which are more closely related to the

[26] Again these changes in probability are compared to the situation when demand is unchanged.

specific economic conditions faced by the firm. Other results from the WDN survey have shown that reforms of collective bargaining agreements along these lines have made it easier for firms to adjust wages.[27] Accordingly, further reforms in this direction may be beneficial for euro area countries and could have the potential to reduce job losses in any future downturns.

[27] For example, the WDN Survey showed that Spanish firms perceived that it had become easier to adjust wages during the crisis and that this was at least partly connected to reforms of labour laws in Spain (for example, where the collective bargaining system was reformed to give firm-level agreements priority over any sectoral or regional agreements). See the box entitled "Firms perceptions of changes in the ease of labour market adjustment and the role of reforms in stressed euro area countries during the periods 2010-13 (based on the WDN3 survey)", in the article "New evidence on wage adjustment in Europe during the period 2010-13", *Economic Bulletin*, Issue 5, ECB, 2016.