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Topics in Labour Markets
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EDITORIAL

Knowledge of labour market conditions is essential to macroeconomic modelling and forecasting processes in the central bank. The slow recovery from the Great Recession calls for a deeper understanding of the underlying relationships between labour market indicators and economic activity. This edition of the Bulletin presents four articles that address labour market issues at the aggregate and firm levels.

The first two articles take a macroeconomic perspective. The first article empirically analyses labour market dynamics over business cycles in a group of more than 30 developed economies over time and identifies stable relationships between key labour market and economic variables. The second article explores alternative ways of incorporating labour market dynamics into the DSGE framework of the CNB's core prediction model and finds that more elaborate labour market models do not necessarily lead to an improvement in forecasting performance.

The last two articles draw on firm-level evidence. The third article estimates labour demand during the period 2000–2011 using balance sheet data. The last article presents evidence from an ad-hoc survey on wage- and price-setting practices conducted by the CNB in 2014 and investigates the main channels of adjustment by firms to the changing economic conditions in the aftermath of the Great Recession. The survey shows the presence of asymmetric wage adjustment, in particular downward nominal wage rigidity.

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IN THIS ISSUE

Empirical Analysis of Labour Markets over Business Cycles: An International Comparison[1]

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What can be said about labour markets in advanced countries over business cycles? Are the cyclical dynamics of labour market variables similar across countries and stable over time, or are the cyclical features of labour markets significantly varying in time and space? Our research aims at answering these questions. To fulfil this task, we collected labour market data for more than 30 advanced countries and applied a set of empirical methods. The empirical methods range from simple correlation analysis applied to various transformations of the data, through more involved frequency-domain statistical techniques, to modern methods such as dynamic factor analysis.

There are several reasons why this research may be important. First, one may be interested to know which cyclical features depend on countries' characteristics, such as culture or labour market regulation, and which are stable across countries and over time and can thus be considered relatively robust stylised facts. Second, the results can be used as empirical checks for structural macroeconomic models with explicit labour market blocks. Third, the results of the research can shed more light on the labour market developments observed in advanced countries after the Great Recession, i.e. whether the post-2009 period can be characterised by modified economic relationships or not.

Several noteworthy results emerge from our analysis. First, we find that Okun's Law (Okun, 1962), i.e. the negative relationship between output and unemployment, is remarkably stable at cyclical frequencies and the Great Recession did not break this law for the majority of countries. Second, the relation between average wages and output varies across countries and over time. Third, we find that only a few shocks are drivers of business cycle fluctuations in labour markets. Fourth, labour market regulation has some, but only rather limited, explanatory power for explaining differences in the cyclical features of labour markets in various countries.

[1] This article is based on Brůha and Polanský (2015).

We now describe these findings in more detail.

First, our analysis confirms that the strong and stable relationship between the output and unemployment cycles, known as Okun's Law (Okun, 1962), holds even during and after the Great Recession, and this result is consistent with those studies which explicitly aim at isolating cycles from data (e.g. Ball et al., 2013). While Okun's Law is stable and robust over cycles, we show that it appears to be less stable when the analysis is performed on growth rates. This worsening of the relationship is broadly in line with several studies, which – using raw growth rates – find a time-varying output-unemployment relation, especially during turbulent times such as the Great Recession.

These findings imply that interesting dynamics also occur at frequencies other than cyclical ones, and in particular that recessions are typically times of persistent change in the long-run level of unemployment (see also Owyang and Sekhposyan, 2012). The recent Great Recession is a typical recession from that perspective. This means that not only business cycles, but also trend components are important for the overall dynamics of labour market variables. Thus, for a deeper understanding of labour market dynamics, we also need to understand the long-run changes. This directly implies that other types of structural macroeconomic models than those used for analysing business cycles (such as New Keynesian DSGE models) are needed. One example of a structural model that can be used for understanding the recent changes in labour markets is the one by Jaimovich and Siu (2012), which proposes an explanation for long-run structural changes in labour markets.

Second, the cyclical relationship between output and real average wages is in a sense the polar opposite of Okun's Law. There are countries with a relatively strong relationship between output and wages, but there are also those with a weak or even negative relationship. Also, the lag/lead structure differs from country to country. We test the relationship for various definitions of wage statistics (national accounts and labour force surveys) and various deflators (real wages deflated by consumer price indexes, by consumption deflators, or by GDP deflators), but we fail to identify any systematic relationship among the variables that holds in a majority of countries in our database. The literature has offered various explanations for the lack of a robust relationship, aggregation bias being the dominant one. However, we were unable to test it using aggregate data. We tried to test the bias using sectoral-level data, but controlling for sectoral composition does not help in alleviating this puzzle.

Third, our analysis of labour market data using a dimension-reduction technique suggests that at business cycle frequencies, one shock typically explains about two-thirds of the dynamics of the

selected variables (output, consumption and the main labour market variables). Two orthogonal shocks seem to explain most of the overall cyclical dynamics in most countries. More specifically, the second dominant shock contributes to the explanation of the wage dynamics. This finding is an extension of what Andrle et al. (2016) have found for the case of the main macroeconomic aggregates: there is strong and predictable comovement of cyclical frequencies.

Fourth, the reader may ask whether differences in labour market institutions and regulation help explain the differences in the cyclicality of labour market variables. We contribute to this enquiry by investigating whether employment protection legislation helps explain these differences. Consistently with the literature, we find that labour market regulation has some, but rather limited, explanatory power. In other words, most of the differences in cyclical features across countries cannot be explained by these factors, according to our results.

So, what are the implications of our empirical findings for structural macroeconomic models? First, the fact that the cyclical comovement between output and unemployment survives the inclusion of the Great Recession in the sample means that it can be used for testing structural macroeconomic models with unemployment: these models should replicate the significant correlation between the two variables at cyclical frequencies. It seems that capturing the negative correlation between the output and unemployment cycles is much more important than capturing the moments among other pairs of labour market variables. Given the stability of Okun's Law across countries and over time, it is extremely unlikely that it would be due to sampling errors. This contrasts with some other moments (such as the cyclicality of wages), which might be country- or episode-specific and should thus be calibrated in such models with knowledge of the country concerned.

The stability of Okun's Law also implies that the cyclical parts of the two variables should be explained by the same shocks. It is unlikely that different sets of shocks can explain output and unemployment comovement, since this would destroy the stability of the cyclical relationship over time. This is a particular manifestation of our finding that there are one or two main factors that drive cycles in labour market variables. Nowadays, structural macroeconomic models typically exhibit a "rich" shock decomposition in the sense that a relatively high number of shocks are needed to span a significant part of the economic dynamics. Our analysis indicates that there are one or two key factors (fundamental shocks) in an economy that should explain the behaviour of key labour market variables. A misspecification test about the number of shocks – similarly to what Andrle et al. (2016) propose – should be carried out. Of course, more shocks are needed to capture the overall dynamics of labour markets. However, outside the two dominant

business cycle shocks, they should be either short-lived shocks that capture the high-frequency dynamics of the data (such as measurement errors, non-fundamental movements due to ephemeral idiosyncratic factors, or noise in the data due to changes in methodology) or long-run trends that explain slowly moving changes spanning several business cycles (such as declines in the labour share or in the participation rate due to labour market institutions).

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Labour Market Modelling within a DSGE Approach[2]

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The aim of our research was to compare and evaluate various ways of incorporating the labour market into the standard New Keynesian DSGE framework of the CNB's core prediction model (called the g3 model). Labour market variables are important indicators of economic activity and have the potential to improve the overall performance of the model. That is why we believe that changes to the model structure should take greater account of observed labour market variables (unemployment, employment, labour force, hours worked) in the determination of the position of the economy in the business cycle and, of course, in forecasting.

The majority of current DSGE models do not explicitly embed a labour market with unemployment linked to real economic activity. In "standard" New Keynesian DSGE models, movements in the labour market are captured by varying hours worked (intensive margin) or by the choice of whether or not to participate in the labour market at all (extensive margin). Many authors point out the limitations of that approach, as unemployment, which is not explicitly modelled, is an important indicator of aggregate resource utilisation and an important focus of the policy debate.

Incorporating labour market imperfections into DSGE models is currently one of most discussed issues in the field of macroeconomic modelling. This research has intensified over the last decade, when a lot of authors have implemented a labour market with search and matching frictions introduced by Mortensen and Pissarides (1994) into the New Keynesian framework.

We considered simple data-driven modifications of the current labour market structure as well as more sophisticated theoretical concepts. First, various choices of observed labour market variables and their links to the rest of the model were taken into account. Different structural

[2] This article is based on Tonner et al. (2015).

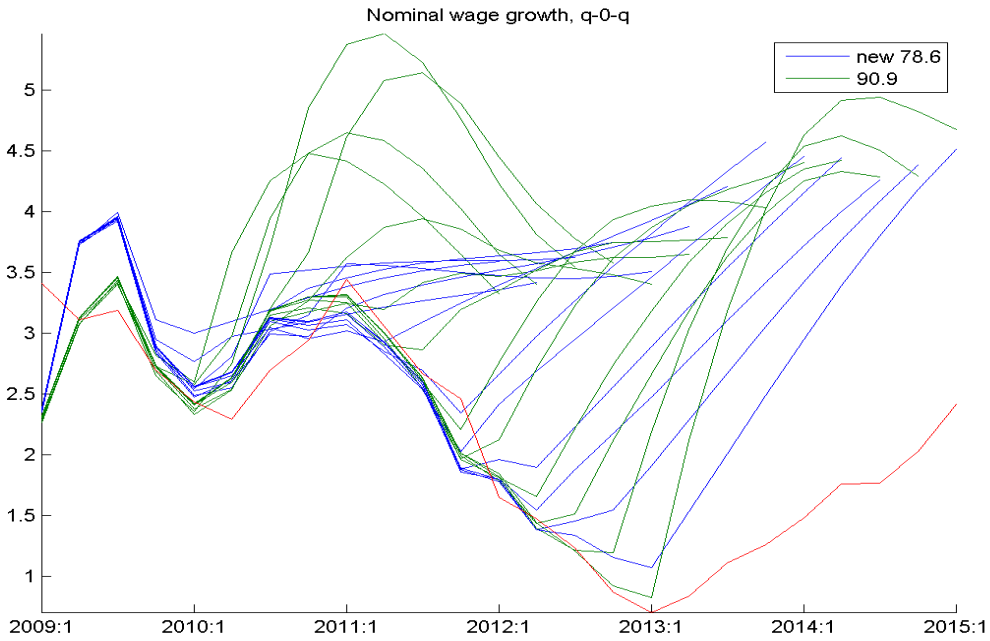
concepts introducing additional assumptions into the model were investigated next. Finally, we examined the properties of multiple search and matching concepts.

The main model selection criterion was the predictive ability for unemployment. At the same time, we required the model modification not to cause any significant deterioration in the predictive ability for the remaining observed model variables. In fact, we preferred model specifications that lead to an improvement in the overall predictive ability in comparison to the baseline model. We measured the predictive ability of alternative models with the use of in-sample simulation. Subsequently, we also checked other model properties such as shock decompositions and impulse responses. Finally, we assessed the magnitude and feasibility of the changes to the existing model structure with the aim of keeping the model as simple as possible.

We came to the conclusion that simple changes to the observable variables deliver only partial improvements in forecasting power for some variables while at the same time leading to a deterioration for the rest. Further, we found the concept based on Okun's law, which links unemployment and the GDP gap, to be very promising for predicting all model variables except consumption. Potentially, search and matching concepts could lead to improvements in the forecasting power, but the extent of the model change is substantial, making this approach unfeasible. The preferred type of modification, one that delivers a comparable improvement in the forecasting power while keeping the extent of the necessary model changes within acceptable bounds, is the concept of Galí et al. (2011), which links unemployment to the labour market mark-up. This concept achieved one of the lowest prediction errors for unemployment while leading to a moderate improvement in the predictive power for the remaining observed model variables in comparison to the baseline model. A necessary condition for obtaining such a result is to reduce employment elasticity in the model. This reduction is supported by the fact that the unemployment gap is on average about one-third of the size of the lagged GDP gap.

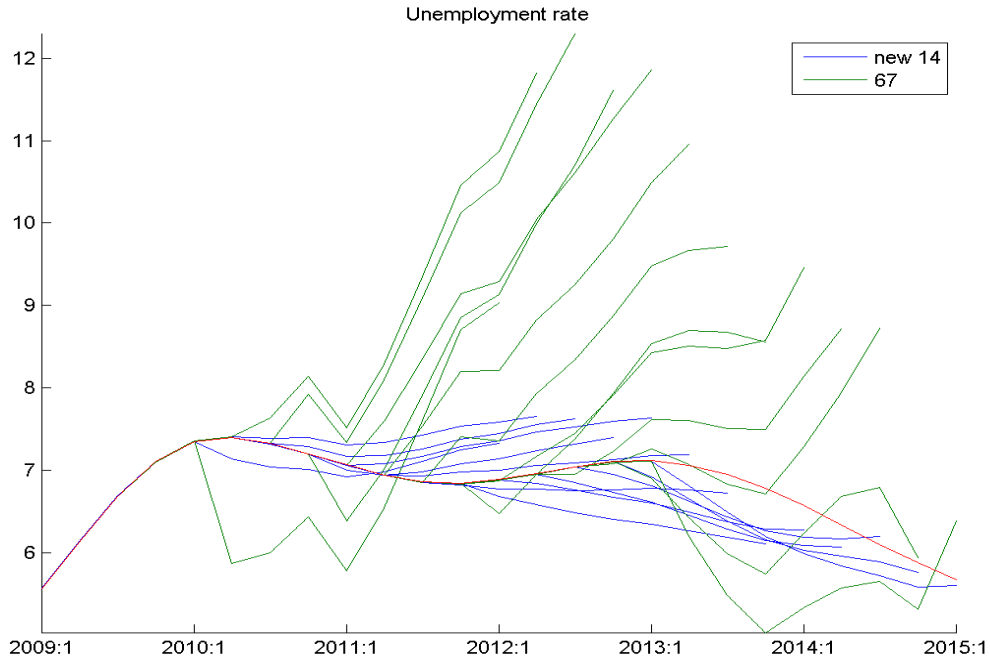
As a practical experiment, we considered the inflation pressures arising from nominal wages and the exchange rate during the crisis. The Czech National Bank started using the koruna exchange rate as a monetary policy instrument in autumn 2013, when interest rates had reached the zero lower bound and further easing of monetary policy was required. We found that the baseline model tends to forecast higher nominal wage growth and lower exchange rate depreciation than models with more elaborate labour market concepts. Thus, models with elaborate labour markets would probably have identified an even higher need for a weaker exchange rate in order to deliver the desired inflationary pressures than the baseline g3 model did.

Figure 1. In-sample simulation of nominal QoQ wage growth, Galí's mark-up model specification



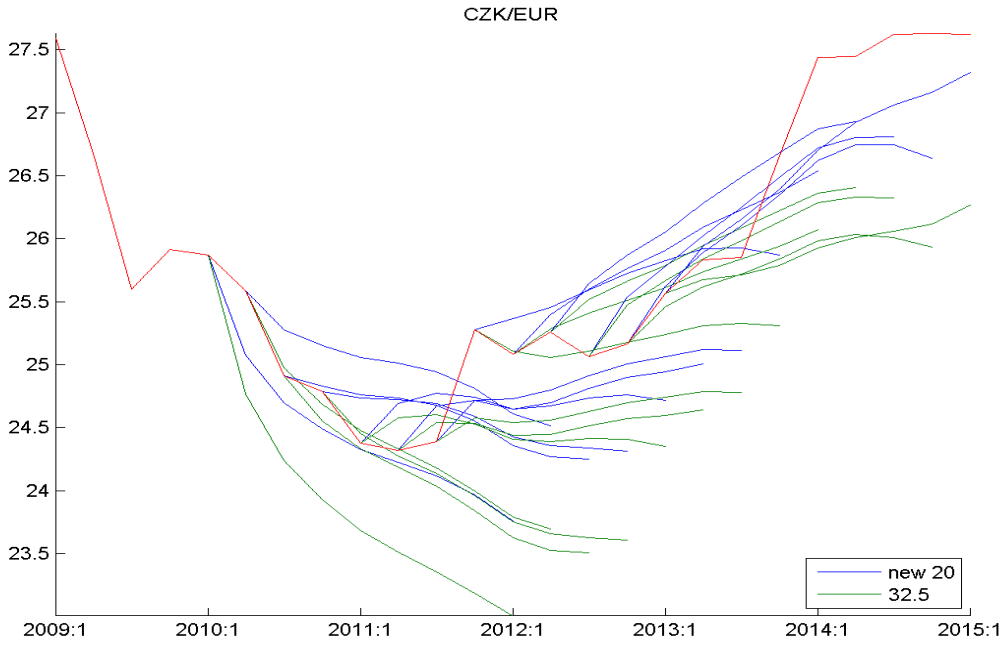
Note: The graph contains in-sample simulations of the quarterly growth rate of the nominal wage as calculated using the CNB's baseline g3 model (depicted in green) and its modification with the labour market according to Galí et al. (2011) (depicted in blue) together with the RMSE forecast error statistics of the eight-steps-ahead prediction. Historical data are depicted in red.

Figure 2. In-sample simulation of the unemployment rate, Galí's mark-up model specification



Note: The graph contains in-sample simulations of the quarterly growth rate of the unemployment rate as calculated using the CNB's baseline g3 model (depicted in green) and its modification with the labour market according to Galí et al. (2011) (depicted in blue) together with the RMSE forecast error statistics of the eight-steps-ahead prediction. Historical data are depicted in red.

Figure 3. In-sample simulation of the CZK/EUR exchange rate, Galí's mark-up model specification



Note: The graph contains in-sample simulations of the quarterly growth rate of the nominal CZK/EUR exchange rate as calculated using the CNB's baseline g3 model (depicted in green) and its modification with the labour market according to Galí et al. (2011) (depicted in blue) together with the RMSE forecast error statistics of the eight-steps-ahead prediction. Historical data are depicted in red.

Figures 1 to 3 contain in-sample simulations of the quarterly growth rate of the nominal wage, the unemployment rate and the nominal CZK/EUR exchange rate respectively. The simulations are calculated using the CNB's baseline g3 model and its modification with the labour market modelled according to Galí et al. (2011). The graphs also contain the RMSE forecast error statistics of the eight-steps-ahead prediction of the two model alternatives compared – lower values correspond to higher forecast accuracy. Figures 1 to 3 indicate that the model with an explicit labour market gives more accurate forecasts of the depicted variables at the CNB's forecast horizon.

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Firm-Level Labour Demand: Adjustment in Non-Crisis Times and During the Crisis[3]

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The sensitivity of employment to changes in real wages and sales – so-called labour demand elasticities – is one of the key parameters used in a number of DSGE models for policy making (Smets and Wouters, 2007; Gertler et al., 2008; Mackowiak and Wiederholt, 2011; Casares et al., 2014). Understanding the link between firm-level production and labour demand is also crucial for calibrating the macroeconomic models used for forecasting employment and unemployment. The main objective of this article is to test the hypothesis whether such structural parameters as labour demand elasticities are affected by changing economic conditions, specifically the recent economic and financial crisis. For this purpose we draw on the experience of Czech firms during the period 2000–2011, updating the results presented in Babecký et al. (2011), where the estimation period ended in 2009.

The most recent information we have on Czech firm-level labour demand elasticity dates from the first half of the 1990s (Basu et al., 2005). In particular, their estimates cover the period 1990–1993, and the short-term demand elasticity with respect to sales (at the end of their period, in 1993) is 0.5 while the long-term one is 0.9. The short-term employment elasticity with respect to wages is -0.6, but the long-term elasticity is insignificant (at -0.5).

The recent situation on Czech firms' demand side is largely unexplored. While the analysis of unemployment and the process of unemployment-vacancy matching has received quite substantial coverage in the literature – see, among others, Münich et al. (1999) on worker-firm matching, Jurajda and Münich (2003) on long-term unemployment, and Galuščák and Münich (2007) on structural and cyclical unemployment – all these studies focus primarily on the labour supply side and do not explore individual firm behaviour and firm-level data per se. Undoubtedly, the Czech labour market and firm behaviour have changed substantially since the early stages of

[3] This article is based on Babecký et al. (2015, 2011).

economic transition, for example due to large FDI inflows and entry into the European Union, and we need to know what the current link between production and labour demand is.

The demand for labour may also be skill-specific due to technical change and the possibility of labour-capital substitution. In particular, skill-biased technology change increases the relative demand for skilled labour (Acemoglu, 2002; Marquis et al., 2014; Michaels et al., 2014). This may also be relevant in the Czech Republic, as fast technical change and increased exposure to foreign competition due to EU membership have increased the weight of high-skilled products in exports.

In this respect, the contributions of our study are twofold. We primarily focus on testing how different the estimated labour demand elasticities are in "non-crisis times" versus the crisis period (2008–2010). Second, we present updated labour demand elasticities for the Czech Republic in 2002–2011 using firm-level data available from 2000.

Indeed, the economic and financial crisis of 2008–2010 provides a source of variation making it possible to get labour demand estimates not only at times of growth, but also during an economic contraction. The crisis, leading to an unprecedented 4.5% annualised decline in Czech real GDP in 2009, affected firms' sales already in 2008, while its effects on the labour market materialised fully by 2010. Thus, for a robustness check we employ three alternative definitions of the crisis period: 2008–2009, 2009 and 2009–2010. Are short-term "non-crisis" elasticities different from "crisis" ones? A fall in aggregate demand is one of the manifestations of the 2008–2010 crisis. Are firms really output demand constrained as well? An extension of the sample from 2000 to 2011 allows us to test these hypotheses.

For the purpose of the estimation we use a large panel of all manufacturing firms with 50 or more employees in 2000–2011 containing yearly balance sheet data and income statement information gathered by the Czech Statistical Office. While the dataset contains information on the number and wages of firms' own employees, we complement the dataset with firm-level information on workers hired through temporary work agencies (TWAs). The sample covers economically active firms with non-zero employment, wages and sales in a given year. We also have information on firms by the type of manufacturing industry, differentiating between own and TWA workers.

In our estimation of firm-level labour demand, we follow the approach of Basu et al. (2005). The empirical specification takes the form of a first-difference model where (the logarithmic difference of) the number of workers is specified as a function of its lagged values, real sales and real wages (present and lagged values), industry specific dummies and crisis dummies (including

the interaction terms with labour demand elasticities). The model is estimated using the instrumental variable technique.

We find that in non-crisis times, the short-term elasticity is in the range of -0.53 to -0.63 with respect to wages and 0.45 to 0.51 with respect to sales, depending on the crisis definition used. The long-term elasticities are close to or below unity, standing at -0.94 to -1.05 for wages and 0.82 to 0.89 for sales. Compared to the earlier estimates for the pre-1993 period (Basu et al., 2005), the current non-crisis long-term elasticities are broadly in a range typical for a market economy, that is, not far from unitary values. Similar to Basu et al. (2005) and other studies estimating labour demand, we find that the long-term elasticities are higher than the short-term ones.

On the other hand, we find a significant increase in the sales and wage elasticities (both short- and long-term) during the crisis period using the three alternative definitions of the crisis period, namely 2008–2009, 2009 and 2009–2010. This is in line with the view that firms became output demand constrained. A particularly pronounced increase in elasticities (as compared to the rest of the sample), reaching nearly double the short- and long-term values, is observed for 2009, the peak of the crisis. This suggests that the assumption of stable structural parameters in a number of DSGE and other macroeconomic models which use labour demand elasticities may not hold in a situation of changing economic conditions such as the recent crisis.

Our results corroborate the findings of the survey on wage and price formation of Czech firms conducted in 2007 and 2009. In particular, the effect of the 2008–2009 global crisis was seen in the Czech Republic chiefly as a fall in external demand. Subsequently, the fall in demand obviously affected firms' demand for labour. In a situation of prevailing wage rigidities (both nominal and real), the bulk of the adjustment occurred via a reduction in prices, margins, output and costs. The cost reduction, in turn, was achieved mainly via adjustment of employment (both permanent and temporary), hours of work and non-labour costs. Of particular interest is that the estimated employment elasticities with respect to sales first increased in 2008–2009, reflecting large adjustment to employment and sales. This was followed by an increase in the employment elasticities with respect to real wages in 2009–2010, arguably due to limited variation in wages during the crisis.

We also find that employment decisions in firms are the same regardless of whether workers hired through TWAs are included, suggesting that firms take into account total employment when deciding on labour used in production. However, the dismissal of TWA workers is faster than that

of own employees (with either permanent or fixed-term contracts), as third-party hired workers are less costly to dismiss (there are no severance payments).

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Labour Market Adjustment since the Global Financial Crisis: Evidence from a Survey of Czech Firms[4]

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Price- and wage-setting practices play a key role in the transmission of monetary policy and external shocks to the economy. In order to understand whether and how wage- and price-setting practices have changed since the global financial crisis of 2008–2009, a survey of firms was conducted in 2014 within the European System of Central Banks Wage Dynamics Network (WDN3). The survey was implemented in 25 EU countries, including the Czech Republic.

Drawing on the experience of the survey of firms conducted by the Czech National Bank, this article summarises the main results on how firms operating in the Czech Republic reacted to changes in the economic environment during the period 2010–2013 and identifies specific patterns of labour market and price adjustment. The survey represents a follow-up to the two surveys conducted in 2007 and 2009 (details are provided in Babecký et al., 2008, and Fabiani et al., 2015).

Filled-in questionnaires were provided by 1,011 firms, corresponding to a response rate of 20%. The survey sample covers firms represented by active companies in the business segment of the economy with 10 or more employees in four sectors: manufacturing, construction, trade and business services (excluding financial intermediation). The survey design – stratified random selection of firms from the business register – makes the realised sample of firms representative in terms of total employment in the four selected sectors, covering 2,127,000 persons, or equivalently about 43% of total employment in the Czech Republic.

The results of the survey are presented along three dimensions: (i) the impact of changes in the economic environment during 2010–2013 on Czech firms; (ii) the ways firms responded to these

[4] This article is based on Babecký et al. (2015).

changes in terms of adjusting employment and wages; and (iii) the role played by price setting and the frequency of price changes. The period of 2008–2009 serves as the reference point for a number of survey questions.

(i) Changes in the economic environment in 2010–2013

Change in the level of demand for products and services was the most important single factor affecting firms' activity between 2010 and 2013 (Table 1). During this period, about 43% of the surveyed firms experienced a decline in demand, while almost 40% reported an upswing in demand. A decrease in demand was particularly noticeable among firms in construction, while an increase in demand was seen mostly among large firms, young firms (defined as firms aged five years or less) and firms operating mainly on foreign markets.

Table 1. How did the following factors affect your firm's activity during 2010–2013?

	Decrease	No change	Increase
The level of demand for your products/services	42.5	18.0	39.6
Volatility/uncertainty of demand for your products/services	29.6	52.7	17.7
Access to external financing through the usual financial channels	13.0	75.4	11.6
Customers' ability to pay and meet contractual terms	35.0	57.3	7.8
Availability of supplies from your usual suppliers	9.2	79.9	10.9

The second-largest factor affecting firms' activity was a decrease in customers' ability to pay and meet contractual terms, which was reported by 35% of firms, while only 8% of firms saw an improvement. On the positive side, more firms experienced a decrease (30%) than an increase (18%) in the volatility of demand. Regarding access to external financing and availability of suppliers, the majority of firms recorded no change in these factors during 2010–2013.

(ii) Adjustment of wages and employment

During 2010–2013, about 38% of firms adjusted to unfavourable economic conditions by reducing, or altering the composition of, labour costs. Among those firms which had to significantly reduce their labour costs, 61% used a freeze or reduction of new hires, 55% used individual layoffs and 42% used non-renewal of temporary contracts at expiration, while only 27% applied a reduction in working hours.

Base wage freezes and cuts were used less frequently. The results in Table 2 show that in 2010 20% of firms froze base wages, but in the following years the incidence of wage freezes gradually decreased, reaching 15% in 2013. In those firms, around 90% of workers were affected by wage freezes. The other columns in Table 2 reveal that nominal wage cuts were less frequent, affecting about 3–4% of firms. The percentage of workers affected within these firms varied between 57% and 66% during 2010–2013 and the average wage cut was quite large, amounting to 19% in 2010, 8% in 2011 and 10% in 2012 and 2013.

Table 2. Over 2010–2013, did you freeze or cut base wages in a given year? (Please indicate in which years)

	Wages were frozen (unchanged in nominal terms)		Wages were cut (decreased in nominal terms)			Wages were neither frozen nor cut
	YES	% Workers affected	YES	% Workers affected	Average wage cut, %	YES
2010	19.8	92.4 %	3.6	64.1 %	18.9 %	76.6
2011	18.7	87.6 %	3.2	56.6 %	8.3 %	78.1
2012	17.7	92.2 %	3.1	59.9 %	10.2 %	79.2
2013	15.4	86.6 %	3.9	65.6 %	10.2 %	80.8

On the other hand, as the last column in Table 2 shows, the proportion of firms that did not freeze or cut base wages increased from 77% in 2010 to 81% in 2013, in accord with the improving conditions in the economy. Table 3 reports common characteristics for firms which had no wage freezes or cuts in 2010–2013. An absence of wage freezes or cuts, or positive wage growth, was seen mainly among very small firms (in all years), in large firms (in 2012 and 2013) and among foreign-owned firms (in 2010 and 2011). On the other hand, positive wage growth was hampered by strong competition (in 2010, 2012 and 2013) and was seen less often among labour-intensive firms (2011–2012) and firms with a collective agreement (2012–2013).

Table 3. Factors related to wage growth during 2010–2013

	2010	2011	2012	2013
Very small firms (10 to 19 employees)	**(+)**	**(+)**	**(+)**	**(+)**
Large firms (200 and more employees)			**(+)**	**(+)**
Strong competition	**(–)**		**(–)**	**(–)**
High share of labour costs in total costs		**(–)**	**(–)**	
Collective agreement			**(–)**	**(–)**
Foreign-owned firms	**(+)**	**(+)**		

Note: Probit estimates of base wage growth (details are provided in Table 20 in the paper). The table shows those factors which are different from the reference category (manufacturing, small firms – 20 to 49 employees) at the 10% level of statistical significance.

(iii) Price setting and the frequency of price changes

Lastly, the frequency of price changes over 2010–2013 compared to the period before 2008–2009 remained unchanged for more than 80% of firms. Those firms which increased the frequency of price changes attribute this mainly to stronger perceived competition for their main product, more frequent price changes by their main competitors, and more frequent changes in input costs other than labour. These three factors of higher frequency of price changes are common to both domestic and foreign markets. In terms of sectoral distribution, higher frequency of price changes is observed particularly in firms in construction and trade (on both markets). Labour-intensive firms tend to change prices less often.

To conclude, while Czech firms faced both positive and negative changes in demand during 2010–2013, aggregate wage growth remained low, although more firms experienced an increase in average productivity over labour costs than a decline. Labour cost reduction was achieved mainly by reduction of new hires and by individual layoffs, while the use of adjustment of hours worked was limited and the use of base wage adjustment was even less frequent.

The finding of asymmetric wage adjustment, in particular downward nominal base wage rigidity, remains valid since the first wave of the survey conducted in 2007 (Fabiani et al., 2010). Thus, nominal wage rigidity is still a widespread phenomenon. This stylised fact could be used in support of the wage stickiness assumption in structural models.

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