Labour market and price adjustment since the global financial crisis: Evidence from the survey of Czech firms

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Abstract

The paper investigates how Czech firms reacted to changes in economic conditions in the aftermath of the global financial crisis of 2008–2009 until 2013 and identifies specific patterns of employment, wage and price adjustment by firms. The results are drawn upon a survey of firms conducted within the third wave of the ESCB Wage Dynamics Network (WDN3). Overall, while changes in demand were both positive and negative over the period, the aggregate wage growth remained low although more firms experienced an increase in the average productivity over labour costs than a decline. Labour cost reduction was achieved mainly by reduction of new hires and individual layoffs. Main obstacles to hiring workers were uncertainty about economic conditions, high payroll taxes and a lack of labour with required skills. The frequency of wage changes was lower in 2010–2013 than before and was attributed by firms inter alia to stronger competition. Wage freezes and wage cuts were still in use, while wage growth was more likely observed in very small and large firms and firms with a foreign owner. The frequency of price changes in 2010–2013 compared to 2008–2009 remained unchanged for more than 80% of firms. More frequent price changes were due to stronger competition and volatility in demand, while exchange rate changes contributed to the higher frequency of price changes on foreign markets.

JEL Codes: C83, J31, J41, L11.
Keywords: Downward wage rigidity, price setting, survey data, wage setting.

Nontechnical Summary

The paper examines the adjustment of firms operating in the Czech Republic to changing economic conditions during the period 2010–2013 based on the survey conducted by the Czech National Bank in 2014. The survey was coordinated within the third wave of the European System of Central Banks Wage Dynamics Network (WDN3).

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

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

A change in the level of demand for products and services was the most important single factor affecting firms' activity between 2010 and 2013. During this period, about 43% of the surveyed firms experienced a decline in demand, while near 40% of firms reported a demand upswing. 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.

During 2010–2013, about 38% of firms adjusted to unfavourable economic conditions by reducing labour costs or altering its composition. Among those firms which had to significantly reduce labour costs, 61% of firms 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% of firms applied a reduction in working hours (out of which two thirds applied non-subsidised and one third subsidised reduction). Base wage freezes and cuts were used less frequently, applied by less than 20% and 4% of the total number of firms respectively.

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 it mainly to stronger perceived competition for the main product, more frequent price changes by main competitors, and more frequent changes in other input costs than labour. These three factors of higher frequency of price changes are common for both domestic and foreign markets. In terms of sectoral distribution, higher frequency of price changes is particularly observed in firms in construction and trade (on both markets). Labour intensive firms tend to change prices less often.

1. Introduction

Price and wage setting practices play key role in the transmission of monetary policy and external shocks into 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 realised in 25 EU countries including the Czech Republic. Drawing on the experience of the Czech survey of firms, this paper summarizes 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 paper also represents a follow-up to the evidence from the previous two waves of the survey.

To recapitulate briefly, a survey of firms was first conducted within the WDN in 17 EU countries, the Czech Republic including, between the second half of 2007 and the first quarter of 2008. The first wave survey provided detailed information on the determinants of wage and price setting practices of firms, the presence and sources of wage rigidity, and the reactions of firms to hypothetical shocks. The survey questions largely referred to firms' practices during the preceding five years, and to their expected reactions to *hypothetical* shocks – given favourable pre-crisis macroeconomic situation, negative shocks were relatively rare. A summary of cross-country evidence on price and wage adjustment in Europe was provided in the four articles published in the special feature section of Labour Economics (Druant et al., 2012; Bertola et al., 2012; Babecký et al., 2012; and Galuscak et al., 2012). Key findings of these four papers were summarised by Wasmer (2012) in his introduction to the special feature section.[1]

The survey was updated in June–September 2009, although across about half of the countries, to assess firms' responses to *actual* shocks and to investigate the main channels of the impact of the crisis on firms and on wage flexibility in a situation of an economic downturn. The same firms – those who survived – were contacted as those participating in the first survey. Results of the second wave survey revealed that labour cost reduction was the prevailing strategy used by firms (Fabiani et al., 2015). Despite the unprecedentedly strong shocks – deepest recession experienced since the WWII – firms practically did not adjust wages downward, opting to dismiss employees and use other margin of labour cost adjustment rather than to decrease base wages.

Regarding the Czech Republic, results of the first wave of the survey, which was conducted in the fall 2007, are described in Babecký, Dybczak, and Galuščák (2008). Wage changes were found to reflect past rather than expected inflation and were concentrated mainly in first months of the year. Although the evidence of downward wage rigidity was not widespread (which was also due to favourable macroeconomic conditions for the period 2002–2006 covered by the survey), efficiency wage models turned out to be of particular relevance for

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[1] More information on the WDN is available at network's web page:
www.ecb.int/home/html/researcher_wdn.en.html.

explaining wage rigidity, while implicit contract theory was found relevant in firms employing mainly high-skilled labour. The survey further suggested that prices were less rigid than wages, while the link between wage and price changes was weak.

Results of the second wave survey, conducted in June 2009, revealed that over half of the Czech firms surveyed had been strongly or very strongly affected by the 2008/2009 crisis in the form of lower demand. Above-average difficulties had been experienced by firms in manufacturing, exporters, and large firms. The survey results also indicated that nominal wage cuts had been extremely rare and that the frequency of nominal wage freezes had increased during the crisis of 2008/2009. Given the rigidity in base wages, firms had extensively used alternative cost-cutting strategies, for example cutting hours of work or employment and adjusting non-wage labour costs. Further details are provided in Hájková and Koprnická (2009, Box 3) and Babecký, Galuščák, and Lízal (2011, Section 5).

Since the economic downturn which started since the global financial crisis of 2008–2009 turned out to be more persistent than it was originally thought, a question arises as to which extent price and wage setting practices have been affected and what is the role played by alternative margins of labour cost adjustment. The third wave of the survey was conducted to answer these and other questions, including the magnitude of shocks and the ways firms reacted to unfavourable economic conditions. The main result, consistent through all three waves of the survey, is asymmetric wage adjustment, in particular the presence of downward nominal wage rigidity. Thus, even the strongest economic crisis did not induce a higher use of wage adjustment channels; firms rather adjusted the quantity of labour input than price.

The rest of the paper is organised as follows. Section 2 presents an overview of the recent macroeconomic and institutional situation in the Czech Republic. Section 3 describes the design of the third wave of the WDN survey. Section 4 provides the results organised along the three lines: (i) the impact of changes in the economic environment during 2010–2013 on Czech firms; (ii) the ways firms responded to these changes in terms of adjusting the employment and wages; and (iii) the role played by price setting and the frequency of price changes. For wage changes and price changes, a comparison of the results with the earlier survey evidence is provided. The last section concludes.

2. Macroeconomic and Institutional Background

In the Czech Republic the crisis, caused by a decline in external demand, peaked in 2009, when real GDP fell by a record 4.8% and employment shrank by 1.4% (Figure 1). For comparison, GDP decline in the European Union (28 countries) was 4.5% in 2009, although the average number masks substantial heterogeneity: a double-digit real GDP fall in the Baltic states, on the one side, and positive growth in Poland, on the other side. Following a short upturn in 2010–2011, another wave of slowdown came in 2012–2013, during which Czech GDP declined by 0.9% and 0.5% consecutively, compared to a 0.4% decline in EU-28 in 2012 followed by an upturn of 0.1% in 2013.

The unemployment rate in the Czech Republic has been fluctuating around 7% during 2009–2013. The difference between (growing) employment and (stagnant) unemployment in the years 2011–2013 results from an increase in the labour force participation rate observed since 2011.
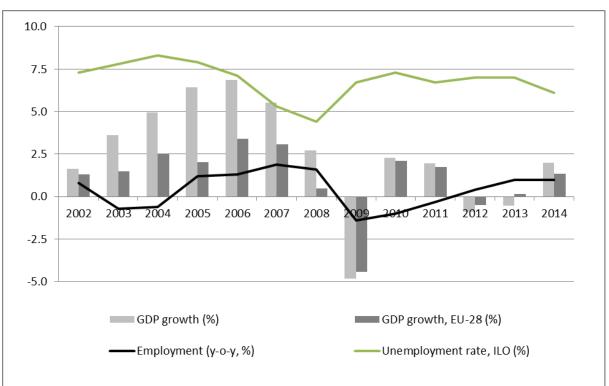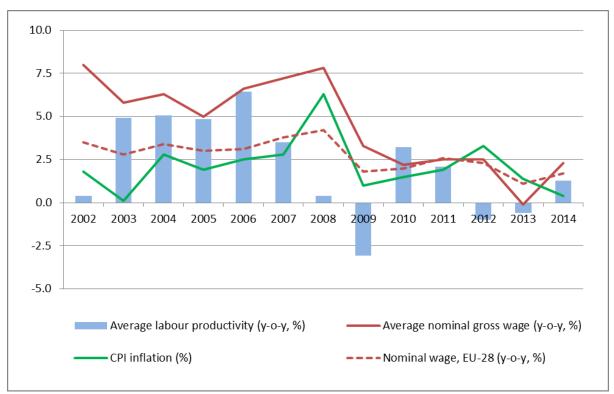
Figure 1: GDP, Employment and Unemployment, 2002–2014

Source: Czech Statistical Office; Eurostat (for GDP growth in EU-28).

Overall, since 2008 nominal wages followed inflation and were broadly in line with aggregate productivity defined as total output per employee: the two periods of a slowdown in nominal wage growth (from 7.8% in 2008 to 3.3% in 2009, and from 3.3% in 2012 to 1.4% in 2013) were also characterised by negative labour productivity growth (Figure 2). On average, nominal wage growth in the Czech Republic was about twice faster compared to the EU-28 through 2002–2008. In the aftermath of the 2009 crisis Czech nominal wages were growing at the similar rate of EU-28 in the range of 1.7–2.5%, except for the year 2013. The drop in

Czech wages in 2013 resulted mainly from bonuses reduction related in turn to the effects of tax optimisation in the late 2012 and earlier 2013: following the announcement of "solidarity" tax and other changes since January 2013, many companies in the business sector moved performance-related bonuses from 2013 to 2012q4 (CNB, 2014). Furthermore, although the survey questionnaire does not contain information on bonuses by year, the incidence of wage cuts, which has been asked, slightly increased in 2013 compared to 2012 (as it will be shown in Section 4 and Table 18), thus also contributing to the observed decline in aggregate wage growth in 2013.

Figure 2: Productivity, Wages and Inflation, 2002–2014

Source: Czech Statistical Office; Eurostat (for nominal wage growth in EU-28).

A number of European countries introduced reforms in the period after the crisis of 2008-2009 with the aim to increase the adjustment capability of labour markets. A part of the survey was therefore devoted to questions on how firms responded to institutional changes on the labour markets. In the following paragraphs we focus our description on two key elements on the Czech labour market – the minimum wage and the employment protection. We also describe an option for employees to reduce the hours worked by employees in a situation of temporary decline in sales.

Monthly minimum wage was moderately rising with inflation during 2002–2006, remained unchanged at the level of 8,000 CZK (about 295 EUR) through 2007–2012, and resumed an upward trend in 2013 reaching the level of 8,500 CZK (about 315 EUR) by 2014 (Figure 3, right axis). The ratio of the minimum wage to the average wage of full-time workers, however, remained virtually unchanged at the level of about 0.32 through the entire period. Compared with the EU-18 average of 0.38, the Czech minimum wage ratio is one of the

lowest in the group (Figure 3, left axis). Using regression analysis over the period 1994–2012, Pícl and Richter (2014) does not find a statistically significant impact of the minimum wage on aggregate unemployment in the Czech Republic.

Figure 3: Minimum Wage at Current CZK Prices and Relative to Average Wages of Full-Time Workers, 2002–2014

Source: OECD.
Note: EU-18 (simple average): Belgium, Czech Republic, Estonia, France, Greece, Hungary, Ireland, Latvia, Lithuania, Luxembourg, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia (since 2005), Spain, United Kingdom.
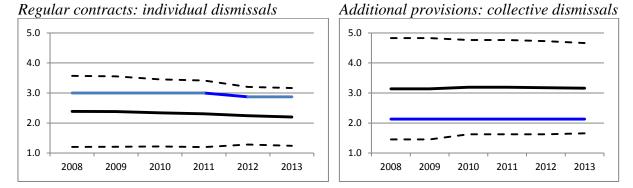
Regarding the employment protection measured as the OECD employment protection legislation index (EPL), in 2013 the strictness of EPL for regular contracts (*individual dismissals*) of 2.9 is above the EU-21 average of 2.2, strictness of EPL for additional provisions (*collective dismissals*) of 2.1 is below the EU-21 average of 3.2, and strictness of EPL for temporary employment (*fixed-term contracts and temporary work agencies*) of 2.1 is near the level of EU-21 average of 2.2 (see Figure 4).

The strictness of EPL did not change much over the period 2008–2013. The strictness of regulation of collective dismissals remained unchanged. The strictness of regulation of individual dismissals decreased marginally from 3.0 to 2.9 in 2012, reflecting a decrease in the index sub-component "Severance pay at 9 months tenure" from 3.0 to 1.0. The strictness of regulation of temporary employment first marginally increased from 1.9 to 2.0 in 2010, reflecting the specification of the types of work for which temporary work agency (TWA) employment is legal (an increase in regulation from 0 to 0.75), followed by the second increase from 2.0 to 2.1 in 2012. The later marginal increase masks two opposite direction changes: on the one hand, the revisions of the Labour Code implemented in 2012 lessened regulation in terms of the maximum cumulated duration of successive fixed-term contracts (a
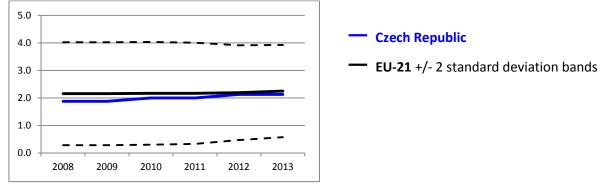
decrease from 3.0 to 1.0); on the other hand, the revisions increased regulation on the maximum number of successive fixed-term contracts (a rise from 0 to 3.0). Overall, the changes in the EPL index have been marginal during 2010–2013.

Figure 4: Strictness of Employment Protection Legislation, 2008–2014

Regular contracts: individual dismissals

Additional provisions: collective dismissals

Temporary employment (fixed-term contracts and temporary work agencies)

— **Czech Republic**

— **EU-21** +/- 2 standard deviation bands

Source: OECD.
Note: The indices vary from 0 to 6; a higher value means higher employment protection.
Series codes: EPR_V3 (individual dismissals), EPC (collective dismissals), EPT_V3 (temporary employment).
EU-21 (simple average): Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, United Kingdom.

Notice that the Labour Code stipulates measures allowed to be used by a firm in case of a temporary decline in sales or other barriers to work faced by the employer. One of the specific features of the Czech Labour Code is that temporary layoffs are not possible, but the employer has a possibility (as one of the alternative options) to apply a subsidised reduction of working hours (including reduction of overtime and working time accounts) – according to paragraph 209 of the Labour Code. The employee should receive compensation in the amount of at least 60% of the average earnings for the period when the work cannot be provided by the employer in a range of weekly working time.

Regarding wage adjustment, while firms have no legal restrictions to cut base wages or bargained wages, they rarely use this option. Evidence from the first wave survey points particularly to the efficiency wage explanation for downward wage rigidity in the Czech

Republic (Babecký et al., 2008). In other words, firms are reluctant to cut wages since a higher wage rate is believed to increase worker's effort.

3. Survey Description and Methodology

During the period May through September 2014 the CNB conducted the survey of firms on changes in the economic environment, employment, wage-setting and price-setting practices in 2010–2013. The survey was, for the third time, coordinated by the ESCB Wage Dynamics Network.

In the Czech Republic the targeted sample consisted of 5,146 firms selected as a stratified random sample from the business register, which we restricted to active firms in the business sector with 10 or more employees in the following industries: manufacturing, construction, trade, and business services (excluding financial intermediation).[2] We defined strata in 21 industry groups and 4 size categories: very small firms with 10 to 19 employees, small firms with 20 to 49 employees, medium-sized firms with 50 to 199 employees, and large firms with 200 or more employees. Within each stratum we drew randomly 9% of very small firms, 12% of small firms, 20% of medium-sized firms and 80% of large firms (details are provided in Table A1 in the Appendix).

The survey was launched in May 2014. Letters with instructions and the questionnaire were sent by regular mail. Firms were asked to download the questionnaire prepared in Excel from the CNB website and to return it if possible electronically. The end of data collection was the mid-September. The realised sample size is 1,011 firms, which correspond to the response rate of 20%. Overall, the response rate was higher for larger firms: only 13% for very small firms, 16% for small firms, 23% for medium firms, and 26% for large firms. Appendix A provides further details on the response rate by firm size and industry categories and describes the procedure for constructing sampling weights.

In the subsequent analysis we use employment-based weights in weighted summary statistics. The statistics are thus made to represent total employment in the population of firms in the selected industries of the business sector with 10 or more employees.

For regression analysis we employ the probit model:

$$\Pr(Y_i = 1 | X_i) = \Phi(X_i^{'} \beta_i) \qquad i = 1, 2, \dots, N \qquad (1)$$

where Y_i is a dummy variable capturing the occurrence of a particular outcome (Y_i equals one if the response of firm i fall into a certain category and zero otherwise), X_i is a vector of firm specific, institutional and other characteristics, Φ is the cumulative distribution function of the standard normal distribution, N is the number of firms and β_i is the vector of coefficients which capture the effect of the explanatory characteristics on the probability to observe outcome. Explanatory variables X_i are both discrete and continuous ones. The examples of

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[2] The sample was drawn independently from the previous rounds of the survey.

discrete characteristics are firm size (*very small*, *medium* and *large*; *small* being the control group) and ownership (*foreign owned*; *domestically owned* being the control group). Continuous characteristics include, for example, the share of bonuses in total wage bill and the share of labour costs in total costs.[3]

4. Results

This section summarizes the main results of the survey. We group the results into three main areas – (i) changes in the economic environment, (ii) firm's labour force adjustment and (iii) price setting – and we focus on survey questions, which we deem most interesting, in terms of new developments.

4.1 Changes in the Economic Environment

In this part we document the impact of changes in the economic environment during 2010–2013 on Czech firms. A motivation for this part of the questionnaire was to learn how large and persistent were shocks and financial constraints faced by firms, how much demand has changed since the beginning of the crisis, and how total costs and their individual components evolved. One enhancement compared to the first wave survey was to ask firms about *actual* shocks the firms faced, as compared to *hypothetical* shocks (e.g. what would the firm do in case of a hypothetical fall in demand). Thus we asked questions about how firms perceived *actual* changes in the level of and volatility of demand, the relevance of credit constraints and how components of labour costs, prices and demand evolved during the period.

According to the results, the impact of most recent recession was less severe than in 2008–2009. Nevertheless, regarding the questions asking firms to provide information retrospectively one should keep in mind that such responses are based only on the surviving firms, i.e. firms active at the time of conducting the survey. A potential bias stemming from firm closures was examined in Babecký, Galuščák, and Lízal (2015). The authors estimated firm-level labour demand for firms in manufacturing during 2002–2011 using both a balanced panel (firms active during the entire sample) and short panels (firms active in each consecutive year). In both cases labour demand elasticities were similar. The issue of firm closures in a larger sample of firms operating in the business sector during the period 2007–2013 is examined by Pospíšil and Schwarz (2015). No specific pattern of bankruptcy ratios across sectors of manufacturing, wholesale and retail, and construction is found (these are sectors overlapping with the WDN3 survey), on the other hand, practically no firms went bankrupt in the sectors of health, electricity and gas (these are sectors not covered by the WDN3 sample).

Results in Table 1 reveal that less than a fifth of firms experienced unchanged demand in 2010–2013, while around 40% of firms saw a decline in demand and around 40% of firms recorded a demand upswing. Other factors affecting firms which were under scrutiny of the

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[3] Endogeneity could represent an issue in some regressions. We select the explanatory variables in such a way as to minimize this issue. Given the overview character of this paper and the variety of specifications, we leave a proper formal treatment of the endogeneity for the follow-up specialized research topics.

survey have been the volatility or uncertainty of demand, access to external financing, the ability of customers to pay and meet contractual terms and the availability of supplies. The majority of firms recorded no change in these factors during 2010–2013 as other rows in Table 1 show. On the positive side, more firms experienced a decrease (30%) than an increase (18%) in the volatility of demand, while on the other hand, more firms saw a decrease (35%) than an increase (8%) in the customers' ability to pay and fulfilling the terms of contracts.

In Table 2 we report marginal effects from probit estimation capturing relevance of determinants behind positive developments in factors listed in Table 1: the increase in the level of demand, decrease in volatility of demand, increase in the access to external financing, increase in ability to pay by customers and increase in availability of supplies. The results show that the increase in the level of demand was seen particularly relevant among large firms, young firms and firms operating mainly on foreign markets. In contrast, firms in construction and foreign-owned firms were affected less likely by increasing demand. Other columns show coefficient estimates for other factors listed in Table 1. The results show, for example, that improved access to external financing was more relevant in firms selling mainly on foreign markets, while this factor was also relevant in explaining the increased ability of customers to pay and the increase in the availability of supplies.

Table 3 provides estimates of factors behind negative developments in the factors listed in Table 1. The results suggest that negative developments in terms of demand decrease, access to finance and ability of customers to pay were relevant in firms in construction. Some firms attribute the negative developments to strong competition, but they are seen less likely among young firms and firms operating on foreign markets.

The availability of credit is necessary for functioning of firms. The survey paid attention to how firms perceived the availability of credit to finance working capital, new investment and debt refinancing. In particular, the questions asked if the credit was not available, or if it was available, but the conditions such as the interest rate and other contractual terms were too onerous.[4] Results in Table 4 show that for the vast majority of firms the availability of credit is of no or of little relevance. Relevance of non-availability of credit for financing of working capital, new investment and debt was denoted by 12% to 14% of firms. More firms stated that although the credit was available, the conditions have been too onerous (16% to 19% of firms). This complies with the evidence from the Bank lending survey, according to which in recent years the Czech firms borrow less from banks and rely more on own and alternative forms of financing (CNB, 2015a,b).

Table 5 illustrates how total costs and their components evolved during 2010–2013. The majority of firms report an increase in total costs (56%), labour costs (58%) and financing costs (59%). It is noticeable that about 20% of firms experienced a drop in labour costs, financing costs or costs of supplies.

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[4] These two groups of questions were asked independently, and we present these results. However, there is a possibility to construct the consistent answers to the second group questions, conditional on the response of the first group questions that the credit was not available.

Table 6 shows how individual labour costs items evolved during 2010–2013. The majority of firms saw no change in working hours per employee (64%), the number of agency workers (72%) and other components of labour costs (76%). In each component of labour costs more firms experienced an increase than a decline. The most common change was an increase in base wages (53%), in flexible wage components (42%) and in the number of permanent employees (38% of firms). It is noticeable to see that 9% of firms cut base wages and 22% decreased bonuses over the surveyed period.

Results reported in Table 7 reveal that an increase in demand is the main factor associated with the increase in all considered labour costs components during 2010–2013. In addition, increasing employment was seen more likely among large firms (than in small firms), while firms with collective agreements more likely increased base wages, but less likely the number of permanent and temporary employees. Employment was used as a margin of adjustment among young firms and firms selling mainly on foreign markets, while foreign firms more likely increased base wages.

In Table 8 we report how prices and demand evolved during the period of 2010–2013. On the domestic market, more firms saw a decrease in demand (44%) than an increase (31%) and more firms experienced a price drop (36%) than price increases (28%). On the foreign market, more firms faced an increase (34%) than a decrease in demand (23%). As for the prices on foreign markets, the responses of firms are almost equally weighted: 24% of firms report a decrease and 22% an increase in prices. A finding that more firms faced an increase in demand on the foreign market compared to the domestic one could be used as a confirmation of the regression results reported in Table 2 that exporting firms experienced an increase in demand.

To understand the underlying mechanisms, it is important to see how firms' productivity evolved in comparison to labour costs, prices with respect to total costs, and other non-labour costs over labour costs. Table 9 reports that 44% of firms experienced an increase in the average productivity per employee as compared to labour costs per employee, while only 18% of firms reported a decline instead. The same holds for other non-labour costs as compared to labour costs (32% increase, 19% decline). As for prices in comparison to total costs, slightly more firms experienced a decline (32%) than an increase (29% of firms).

To sum up, the main messages of this section are the following. First, Czech firms faced both positive and negative changes in demand over the period 2010–2013. It is worth noting that only less than 20% of firms reported no change in demand, while roughly equal share of firms faced an increase in demand (40%) as well as a decline in demand (40%). Second, the majority of the firms reported an increase in total costs (56%) and their individual components. Third, the availability of credit did not represent an issue for the vast majority of firms (86–88% of firms depending on the type of credit).

4.2 Labour Force and Wage Adjustments

This part is devoted to the ways firms responded to changes in the economic environment. A motivation is to investigate how firms adjusted in terms of employment and wages, in particular those firms which reported a need to significantly reduce labour input during 2010–2013. Another motivation is to understand what the main obstacles to hiring workers are and whether the frequency of changes in base wages during 2010–2013 is different compared to the period before 2010.

Table 10 illustrates how many firms used particular measures among those of 38% of firms which significantly reduced the labour costs or changed their composition over 2010–2013. Summing up the responses *Moderately* and *Strongly* shown in the table, it follows that 61% of firms used a freeze or reduction of new hires, 55% used individual layoffs and 42% used non-renewal of temporary contracts at expiration. On the other hand, of no or marginal use (i.e. the sum of responses *Not at all* and *Marginally*) were the reduction of working hours (91% subsidised, 82% non-subsidised reduction), early retirement schemes (86%) and collective layoffs (84%).[5] The option of subsidised reduction of hours of work as described in Section 2 is thus seldom used by employers.

Results in Table 11 show that freezes of new hires were seen mainly among labour intensive firms, but less often among firms in services and young firms. Individual layoffs were more often used in large and labour intensive firms, but less likely among firms in trade. Large firms also used non-renewal of temporary contracts more often when they needed to reduce labour costs. A finding of the significant effects of labour-intensive firms on labour input adjustment could be attributed to the cost structure in labour-intensive firms, which offers – via wages – a substantial potential to lower the costs, but potentially at the expense of reduced production.

The results also indicate a strong negative relationship between the share of bonuses in wage bill and the application of the measures used to reduce labour (see Table 11, regressions (2) and (5), supported by the descriptive statistics in Table 6). This type of trade-off between employment reduction and flexible wage components may have been playing a crucial role during the recent adjustment of the Czech labour market.[6] In addition it is in line with the fact that those firms which treated the crisis first as a temporary phenomenon tried to avoid when possible employment cuts.

Table 12 shows which measures to adjust the labour input have been more or less difficult in 2013 than in 2010. It is interesting to see that for 28% of firms it was more difficult to hire workers and for 15% to adjust wages of incumbent workers. These two factors remain as the main reasons even after subtracting firms for which these factors were less difficult. Regression results reported in Table 13 further reveal that hiring difficulties were particularly noticeable among large firms and those firms which experienced a change in demand (either a

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[5] An examination of a combination of measures that was the most prevailing and for which firms could be a topic of follow-up research.

[6] A link between base wage adjustment, flexible wage components adjustment and employment adjustment will be examined in detail in a cross-country research project within the WDN3.

decline or an increase), while foreign-owned firms and high-skilled dominant firms had less difficulties in hiring workers. Also the environment of strong competition facilitated hiring of workers. The adjustment of wages does not reveal the presence of many systematic differences except for two factors – an increase in demand and being a very small firm – which are found facilitate wage adjustment.

One of the questions focused on the relevance of obstacles in hiring workers. Among the relevant factors listed in Table 14, 66% of firms named the uncertainty about economic conditions, 64% high payroll taxes, 60% insufficient availability of workers with the required skills and 56% firing costs. Other factors such as high wages or an access to finance received less attention. Statistics presented in Table 14 also suggests that other (including administrative) obstacles were more important for hiring workers that financial aspects.

Results in Table 15 show that uncertainty about economic conditions is seen as a relevant obstacle in hiring workers, particularly among firms with high-skilled workers and among labour intensive firms. The uncertainty is less often common among foreign-owned firms and firms in services. Insufficient labour as an obstacle in hiring workers is reported by larger firms, firms with high-skilled workers and exporting firms. This information correlates with a shortage of high-skilled workers and the mismatch between the training provided and vacant jobs in the Czech Republic (OECD, 2014; 2015).

Table 16 shows that firms have been adjusting base wages of employees less frequently during 2010–2013 than before 2010. In particular, 44% of firms changed wages once a year or more often in the period before 2010, but 36% of firms only did so during 2010–2013.

Table 17 shows the estimates of factors explaining why base wages are changed once a year or more often. The results are shown for the period 2010–2013 and for the crisis years of 2008–2009. In the last two columns we show for a comparison the results from the previous survey related to 2006 (Babecký, Dybczak and Galuščák, 2008). During 2010–2013, wage changes are more often seen in large firms, firms with collective agreements and foreign-owned firms. On the other hand, strong competition and firms in trade are associated with less frequent wage changes. These results also hold for the previous survey. Firm size was not a significant factor explaining the frequency of wage changes before 2010. In the years before the global financial crisis, the collective agreement was a stronger factor explaining a higher frequency of base wage changes than during 2010–2013. Some of these findings are consistent with predictions of the bargaining power theory. In particular, more frequent wage changes are observed in firms with a collective agreement (more bargaining power of employees), while less frequent wage changes are due to stronger competition (more power of employers).

Next, we ask if firms froze or cut base wages in each year over 2010–2013, by how much they cut wages and how many workers were affected. The results in Table 18 show that 20% of firms froze base wages in 2010, while the incidence of wage freezes decreased only slightly to 19% in 2011, 18% in 2012 and 15% in 2013. It seems that around 90% of workers were affected in firms by wage freezes. Other columns in Table 18 reveal that nominal wage

cuts had been less frequent, affecting about 3–4% of firms. The percentage of workers affected within these firms varied between 57% and 66% during the period under review and the average wage cut was quite large, amounting to 19% in 2010, 8% in 2011 and 10% in 2012 and 2013. On the other hand, the proportion of firms that did not freeze or cut base wage has been increasing from 77% in 2010 to 81% in 2013. This increase is rather small but it is in accord with improving economic situation in the country.

Table 19 shows that wage freezes have been less common among very small firms (in comparison to the reference group of small firms) in 2010 and 2013, among large firms in 2013, and also among foreign firms in 2011. Next, strong competition explains wage freezes in 2012 and 2013. Other columns in Table 19 are related to factors explaining wage cuts during 2010–2013. The results suggest that wage cuts were seen more likely in labour intensive firms and in 2010 and 2011 also among firms selling mainly on foreign markets. On the other hand, wage cuts are in some years less often seen among foreign-owned firms and firms in services. It should be noted however, that wage cuts have been used rarely so that the number of positive outcomes in regressions is low.

In Table 20 we report the estimates for firms which had no wage freezes or cuts in years between 2010 and 2013. The absence of wage freezes or cuts, or the positive wage growth, was seen mainly among very small firms, 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 and was less often seen among labour intensive firms and firms with a collective agreement. Negative coefficient estimate of collective agreement is due to the fact that during 2010–2013, wage pressures by trade unions had been muted.

In Table 21 we describe how the labour costs of newly hired workers compare with those of incumbent workers of similar skills. During 2010–2013, the labour costs of new workers were higher for 25% and lower for 10% of firms. In the period before 2010 the situation was just the opposite: 20% of firms reported lower costs of new workers and 8% higher costs of new workers. These results may be related to difficulties in hiring new workers in the more recent period (Table 12) and a lack of labour with the required skills (Table 14).

Overall, from this part of the questionnaire we have learned that during 2010–2013 about 38% of the surveyed firms adjusted to unfavourable economic conditions by reducing labour costs or altering its composition. For these firms we were able to identify the specific margins of labour input adjustment, the most important being freeze or reduction of new hires (61%), followed by individual layoffs (55%) and non-renewal of temporary contracts (42%). Noteworthy, the reduction of working hours was used by only 27% of firms, wage freezes and cuts being used even less frequently. Base wages were frozen in less than 20% of firms, while base wage cuts were applied even more rarely, by less then 4% of firms.

4.3 Price Changes

A motivation for the final part of the questionnaire is to present evidence on price setting and the frequency of price changes during 2010–2013 and in comparison with the period before

2010. Knowledge of the frequency of price changes (and it particular its change over time) is also of importance for the conduct of monetary policy, from the macroeconomic viewpoint.

Prior to presenting the results on price setting, Table 22 shows how the firms perceived the degree of competition on domestic and foreign markets. The results reveal that 83% of firms faced severe or very severe competition on domestic market and 88% on foreign markets. More firms faced weak or moderate competitive pressure on domestic (17%) than on foreign (12%) markets. It thus seems that firms perceived more severe competition on foreign than on domestic markets. By the same token, more firms on the domestic market viewed the degree of competition as weak or moderate in comparison with the foreign market. Notice that 4% of surveyed firms on domestic and 18% on foreign markets were not able to assess the degree of competition (we excluded such firms and rescaled the remaining responses in Table 22 so that the sum of responses in each raw equals 100%). Firms' inability to assess the degree of competition may be related to the price setting autonomy since the results from another question on price setting presented in Table 23 suggest that among 14% of firms operating on foreign markets the price is set by a parent company, while it is so for 10% of firms selling on domestic market. Also, as shown in Table 23, the percentage of firms who negotiate their prices individually is higher in case of the foreign market (40%) as compared to the domestic one (37%).

The next question compares the competitive pressure on domestic and foreign markets in the period of 2010–2013 in comparison with the situation before the global financial crisis of 2008–2009. The results provided in Table 24 show that relatively more firms viewed an increase in competition (the sum of *Moderate* and *Strong*) in domestic (76%) than in foreign (73%) market. Again, 5% of firms on domestic and 18% on foreign markets were not able to provide an answer (those firms are excluded from Table 24 and the remaining responses are rescaled so that the sum of responses in each row equals 100%).

Relatedly to the questions on the degree of competition, the survey results indicate that 20% of firms on domestic and 16% on foreign market changed the frequency of price changes in 2010–2013 relative to the period before 2008–2009. Table 25 shows how important were specific factors in explaining either increase or decrease in the frequency of price changes. Responses are ranked in the order of importance on the scale from 0 (not important) to 3 (most important). On the domestic market, among the most important reasons for higher frequency of price changes are stronger competition for the main product (average score 2.0), more frequent price changes by main competitors (1.9) and more frequent changes in other input costs (1.6). The frequency in changes in other input costs is also the most often reason for less frequent price changes (average score 1.8), followed by changes in labour costs (1.5). Looking at the importance of specific factors in explaining more frequent relative to less frequent price changes, stronger competition explains the most part, followed by the volatility of demand and price changes by main competitors.

Stronger competition is also the main factor behind more frequent price changes on foreign markets (average score 2.0), followed by price changes by main competitors (1.8), changes in

other input costs (1.6) and exchange rate changes (1.4). The frequency of price changes by main competitors has the highest score in explaining less frequent price changes on foreign markets (average score 1.4). Looking at the average score of higher minus lower frequency, we see that the competition explains the most of the difference, followed by exchange rate changes and the frequency of changes in other input costs.

Table 26 confirms that in 2013 firms changed prices slightly more often on domestic than on foreign market. The results show that 38% of firms changed prices more often than yearly on a regular basis, while 35% of firms did so on foreign market. If asked on price changes whenever costs or demand conditions change, 51% of firms reported price changes more often than yearly on domestic and 50% of firms on foreign market.

Table 27 reports estimation results of factors behind the frequency of price changes on domestic and foreign markets. On domestic market, firms change prices more often in construction, trade and services[7], if they have a higher share of sales on foreign markets and face a strong competition[8]. Labour intensive firms change prices less often. The same factors explain the frequency of prices changes on foreign markets except for firms in services and for strong competition as those factors are insignificant. The last column in Table 27 shows results from the previous survey (Babecký, Dybczak and Galuščák, 2008). In 2006, firms in construction and trade changed prices more frequently, while more labour intensive firms and foreign-owned firms exhibited less frequent price changes. A finding that labour intensive firms change prices less often could be related to the cost structure, as mentioned in Section 4.2 in relation to Table 11.

Summarizing, the frequency of price changes during the period 2010–2013 compared to the period prior the crisis of 2008–2009 remained unchanged for more than 80% of surveyed firms. Those firms which increased the frequency of changes relate it mainly due to stronger perceived competition for the main product, more frequent price changes my main competitors and more frequent changes in other input costs than labour. Overall, firms in the sectors of construction and trade change prices more frequently compared to the firms in manufacturing and the sector of services.

5. Conclusions

In this paper we investigated how Czech firms reacted to changes in the economic environment during 2010–2013. The evidence presented is based on the survey of firms conducted in 2014 within the third wave of the wage dynamics network. The realised survey

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[7] The reason for higher frequency of price changes could be also related to a typical length of the contracts, which is longer in case of manufacturing (related to the process of production) compared to construction, trade and services.

[8] We have also experimented with an alternative measure of competition, which would not be based on firm's opinion (perceived competition) but objectively measured. Fro this purpose we constructed the Herfindahl-Hirschman Index, which serves as an indicator of competition among firms, for 2-digit industry groups based on registry data for each year in 2010–2013 and merged this indicator with the survey dataset. While we found weak correlation of the order 0.04–0.05 with the perceived competition, the HHI was not significant in regressions.

sample, which contains 1,011 firms, is made to be representative of total population of firms in the business segment of the economy with 10 or more employees in manufacturing, construction, trade and business services (excluding financial intermediation), covering 2,127 thousand employed persons, which represent about 43% of total employment. The key results reveal that both positive and negative demand shocks occurred during the surveyed period, firms used labour cost reduction to adjust to unfavourable economic condition, mainly by adjusting employment (via reduction of new hires and individual layoffs), while the use of hours adjustment was limited and even less frequent was the use of base wage adjustment.

If one message is to be transmitted it would be a finding of asymmetric wage adjustment, in particular downward nominal base wage rigidity. This result remains valid since the first wave of the survey conducted in 2007. To remind, one of the striking findings of the first two waves of the WDN survey was that nominal base wages remained sticky even at the beginning of the worst recession (Babecký et al., 2010; Fabiani et al., 2010, 2012). Thus, nominal wage rigidity is still a wide-spread phenomenon. This stylised fact could be used in favour of wage stickiness assumption in structural models.

The finding of persistent wage rigidities in changing economic conditions corroborates the results by Brůha and Polanský (2015) who find, based on macroeconomic evidence from the sample of the advanced European and OECD countries, stability of some relationships among labour market variables, such as Okun's law, over time including the crisis of 2008–2009.

The identified patterns of wage and price setting could be subsequently used to improve forecasting performance of macroeconomic models, by incorporating judgments into a structural framework, as proposed e.g. by Brůha et al. (2013). Proper accounting of wage dynamics is essential in macroeconomic forecasting, as wage dynamics affect inflation and its persistence. The importance of accounting for labour market variables in macroeconomic modelling is stressed by Tonner, Tvrz and Vašíček (2015) and information about the size of shocks and firms' adjustment obtained from the firm-level survey could be also used for model calibration and consistency checks.

The survey also opens directions for future research: one possibility is to check whether firms that experienced more credit restrictions were also the ones that had to make more adjustments in their labour force or that had to freeze or cut their wages. Furthermore, the data of the Czech survey of firms could be merged with those of similar surveys conducted by 24 EU central banks within the WDN3. The international dimension of the survey could generate rich follow-up research disentangling institutional and business cycle effects on wage and price setting and evaluating the efficiency of labour market reforms recently implemented in a number of EU countries.

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Tables

(i) Changes in the Economic Environment

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

(Please choose one option for each line)

	Strong decrease	Moderate decrease	No change	Moderate increase	Strong increase
The level of demand for your products/services	13.1	29.4	18.0	32.5	7.1
Volatility/uncertainty of demand for your products/services	6.8	22.8	52.7	14.6	3.1
Access to external financing through the usual financial channels	3.5	9.6	75.4	9.9	1.7
Customers' ability to pay and meet contractual terms	5.9	29.1	57.3	7.0	0.7
Availability of supplies from your usual suppliers	0.6	8.6	79.9	10.6	0.3

Source: Question 2.1 in the survey.

Table 2: Probit estimates – Strong or moderate increase in firm's activity during 2010–2013.

	Increase Level of demand	*Decrease* Volatility of demand	*Increase* Access to ext. financing	*Increase* Customers' ability to pay	*Increase* Availability of supplies
	(1)	(2)	(3)	(4)	(5)
Very small	**-0.114***	**0.132****	**-0.066*****	-0.005	-0.007
	[0.06]	[0.07]	[0.02]	[0.03]	[0.04]
Medium	0.031	0.001	-0.03	-0.008	-0.006
	[0.06]	[0.05]	[0.03]	[0.03]	[0.03]
Large	**0.146****	-0.076	0.011	-0.03	0.008
	[0.06]	[0.06]	[0.03]	[0.03]	[0.03]
Construction	**-0.297*****	**0.131***	-0.039	-0.018	0.019
	[0.05]	[0.08]	[0.03]	[0.03]	[0.04]
Trade	-0.085	**0.133****	0.063	0.033	0.006
	[0.06]	[0.06]	[0.04]	[0.04]	[0.04]
Services	-0.077	0.011	0.012	0.042	0.02
	[0.05]	[0.05]	[0.03]	[0.03]	[0.03]
High-skilled dominant	0.007	0.034	0.019	0.002	**0.047****
	[0.04]	[0.04]	[0.02]	[0.02]	[0.02]
Collective agreement	-0.072	**0.076***	0.037	0.018	0.036
	[0.04]	[0.04]	[0.03]	[0.02]	[0.03]
Share of bonuses in total wage bill	-0.131	**0.302****	**-0.259*****	0.026	-0.076
	[0.17]	[0.15]	[0.10]	[0.08]	[0.09]
Share of sales on foreign markets	**0.355*****	-0.055	**0.127*****	**0.113*****	**0.065***
	[0.07]	[0.06]	[0.03]	[0.03]	[0.03]
Strong competition	-0.092	**0.126*****	0.025	-0.031	0.015
	[0.06]	[0.05]	[0.02]	[0.03]	[0.03]
Age of the firm	**0.258*****	-0.067	-0.004	-0.021	-0.014
	[0.08]	[0.06]	[0.04]	[0.03]	[0.04]
Share of labour costs in total costs	-0.007	-0.04	-0.074	-0.028	0.01
	[0.10]	[0.08]	[0.05]	[0.05]	[0.05]
Foreign-owned	**-0.112*****	**-0.076****	**-0.117*****	**-0.056*****	-0.032
	[0.04]	[0.04]	[0.02]	[0.02]	[0.02]
Observations	730	727	724	729	729
Adjusted r2	0.142	0.0574	0.127	0.0639	0.0358

Note: *Marginal effects reported, *** significant at 1%, ** at 5%, * at 10%. Robust standard errors in brackets.*
Source: *Question 2.1a in the survey.*

Table 3: Probit estimates – Strong or moderate decrease in firm's activity during 2010–2013.

	Decrease Level of demand	*Increase* Volatility of demand	*Decrease* Access to ext. financing	*Decrease* Customers' ability to pay	*Decrease* Availability of supplies
	(1)	(2)	(3)	(4)	(5)
Very small	-0.006	0.047	0.088	-0.062	-0.018
	[0.07]	[0.06]	[0.05]	[0.06]	[0.03]
Medium	0.016	0.05	0.066	-0.017	0.019
	[0.06]	[0.05]	[0.05]	[0.06]	[0.04]
Large	**-0.115***	0.058	-0.02	**-0.134****	-0.016
	[0.06]	[0.06]	[0.04]	[0.06]	[0.03]
Construction	**0.198****	-0.034	**0.257*****	**0.154****	0.068
	[0.08]	[0.05]	[0.08]	[0.08]	[0.05]
Trade	0.086	**-0.104*****	0.058	**-0.095***	0.05
	[0.06]	[0.04]	[0.05]	[0.06]	[0.04]
Services	-0.067	**-0.105*****	0.038	**-0.086***	**-0.048***
	[0.05]	[0.03]	[0.04]	[0.05]	[0.02]
High-skilled dominant	-0.046	0.013	0.028	**0.085****	0.003
	[0.04]	[0.03]	[0.03]	[0.04]	[0.02]
Collective agreement	0.053	0.018	0.002	**-0.086***	-0.013
	[0.05]	[0.04]	[0.03]	[0.04]	[0.02]
Share of bonuses in total wage bill	0.174	-0.101	0.031	0.151	-0.049
	[0.17]	[0.13]	[0.11]	[0.16]	[0.09]
Share of sales on foreign markets	**-0.381*****	-0.006	-0.001	**-0.168*****	**0.076****
	[0.07]	[0.05]	[0.04]	[0.06]	[0.03]
Strong competition	**0.191*****	**0.068***	0.01	**0.140*****	0.01
	[0.05]	[0.04]	[0.04]	[0.05]	[0.03]
Age of the firm	**-0.246*****	**-0.127*****	**0.109***	**-0.136****	0.086
	[0.06]	[0.04]	[0.06]	[0.06]	[0.06]
Share of labour costs in total costs	-0.001	0.013	0.023	0.135	-0.029
	[0.10]	[0.08]	[0.05]	[0.09]	[0.06]
Foreign-owned	**0.078***	0.01	-0.028	-0.051	0.007
	[0.04]	[0.03]	[0.03]	[0.04]	[0.02]
Observations	730	727	724	729	729
Adjusted r2	0.109	0.0426	0.085	0.0763	0.0461

Note: *Marginal effects reported, *** significant at 1%, ** at 5%, * at 10%. Robust standard errors in brackets.*
Source: *Question 2.1b in the survey.*

Table 4: With regard to finance, please indicate for 2010–2013 how relevant were for your firm each one the following happenings? (Please choose one option for each line)

	Not relevant	Of little relevance	Relevant	Very relevant
Credit (any kind of credit, not only bank credit) was not available:				
credit to finance working capital	72.6	13.8	11.2	2.4
credit to finance new investment	71.1	14.6	11.5	2.8
credit to refinance debt	75.7	12.6	8.8	2.8
Credit (any kind of credit, not only bank credit) was available, but conditions (interest rate and other contractual terms) were too onerous:				
credit to finance working capital	63.6	17.9	15.4	3.2
credit to finance new investment	64.1	16.7	15.7	3.5
credit to refinance debt	69.2	15.0	12.6	3.3

Source: Question 2.3 in the survey.

Table 5: How did total costs and their components evolve during 2010–2013? (Please choose one option for each line)

	Strong decrease	Moderate decrease	No change	Moderate increase	Strong increase
Total operating costs	3.7	23.8	16.2	48.9	7.4
Labour costs	2.5	18.2	21.2	52.2	6.0
Financing costs	1.2	17.1	22.8	50.6	8.3
Costs of supplies (other than labour costs)	2.2	18.4	48.7	25.9	4.7
Other costs	0.0	6.4	64.4	15.5	13.7

Note: Labour costs: direct (wages, salaries) and indirect (social security contributions, severance pay, training, contributions to pension funds, etc.)
Source: Question 2.4 in the survey.

Table 6: Please indicate how each one of the components of labour costs listed below has changed during 2010–2013. (Please choose one option for each line)

	Strong decrease	Moderate decrease	No change	Moderate increase	Strong increase
Base wages or piece work rates	0.6	8.6	38.3	50.1	2.4
Flexible wage components (bonuses, fringe benefits, etc.)	5.0	16.7	36.9	38.3	3.2
Number of permanent employees	5.5	27.6	28.5	31.6	6.8
Number of temporary/fixed-term employees	3.9	17.8	48.5	25.6	4.3
Working hours per employee	1.1	11.6	63.6	21.4	2.4
Other components of labour costs	0.4	4.1	76.2	16.1	3.2
Number of agency workers and others (consultants, apprentices, etc.)	4.4	6.9	71.5	12.9	4.2

Source: Question 2.5 in the survey.

Table 7: Probit estimates – Determinants of an increase in labour costs during 2010–2013.

	Base wages	Flexible wage components	Permanent employees	Temporary employees	Agency workers	Working hours
	(1)	(2)	(3)	(4)	(5)	(6)
Very small	-0.051	-0.018	0.037	**-0.131****		**-0.095****
	[0.07]	[0.07]	[0.08]	[0.05]		[0.05]
Medium	-0.032	**0.134****	**0.204*****	0.073	-0.008	0.035
	[0.06]	[0.06]	[0.07]	[0.06]	[0.06]	[0.05]
Large	0.092	0.099	**0.268*****	**0.116****	**0.156*****	0.06
	[0.07]	[0.07]	[0.07]	[0.06]	[0.06]	[0.05]
Construction	**-0.154***	**-0.215*****	-0.073	-0.025		-0.077
	[0.08]	[0.07]	[0.08]	[0.07]		[0.05]
Trade	0.036	0.034	**0.235*****	0.04	**-0.101****	0.031
	[0.06]	[0.06]	[0.07]	[0.06]	[0.04]	[0.05]
Services	-0.043	**-0.109****	0.016	**-0.065**	0.048	-0.006
	[0.05]	[0.05]	[0.05]	[0.04]	[0.05]	[0.04]
High-skilled dominant	-0.005	0.001	0.025	**-0.067***	-0.026	-0.015
	[0.04]	[0.04]	[0.04]	[0.04]	[0.04]	[0.03]
Collective agreement	**0.104****	-0.008	**-0.214*****	**-0.091****	-0.006	0.026
	[0.05]	[0.05]	[0.04]	[0.04]	[0.04]	[0.04]
Share of bonuses in total wage bill	**-0.304***	**0.499*****	**0.281***	-0.166	-0.151	-0.178
	[0.17]	[0.16]	[0.15]	[0.16]	[0.14]	[0.14]
Share of sales on foreign markets	-0.002	0.074	**0.135****	0.041	**0.102***	0.081
	[0.07]	[0.07]	[0.07]	[0.06]	[0.06]	[0.05]
Strong competition	**-0.127****	-0.066	-0.054	0.006	0.02	-0.019
	[0.06]	[0.06]	[0.06]	[0.05]	[0.05]	[0.05]
New firms	0.025	0.07	**0.266*****	**0.119***	0.037	**0.153****
	[0.08]	[0.07]	[0.08]	[0.07]	[0.07]	[0.07]
Share of labour costs in total costs	0.066	0.154	-0.039	-0.048	-0.099	0.034
	[0.10]	[0.09]	[0.10]	[0.08]	[0.09]	[0.07]
Foreign-owned	**0.121*****	-0.058	-0.009	0.028	0.052	-0.002
	[0.04]	[0.04]	[0.04]	[0.04]	[0.04]	[0.03]
Increase in demand	**0.242*****	**0.237*****	**0.325*****	**0.226*****	**0.112*****	**0.156*****
	[0.04]	[0.04]	[0.04]	[0.04]	[0.04]	[0.03]
Decline in the access to external financing	-0.1	**-0.116****	-0.046	-0.046	-0.013	0.085
	[0.06]	[0.06]	[0.06]	[0.05]	[0.06]	[0.05]
Observations	718	720	713	708	511	714
Adjusted r2	0.118	0.117	0.179	0.118	0.152	0.0947

Note: Marginal effects reported, *** significant at 1%, ** at 5%, * at 10%. Robust standard errors in brackets.
Source: Question 2.5b in the survey.

Table 8: How did prices and demand for your main product/service evolve during 2010–2013? *(Please choose one option for each line)*

	Strong decrease	Moderate decrease	No change	Moderate increase	Strong increase
Domestic demand for your main product/service	12.5	31.0	25.5	27.4	3.6
Foreign demand for your main product/service	4.9	18.2	42.5	27.2	7.2
Prices of your main product/service in domestic markets	10.7	25.6	35.7	27.4	0.7
Prices of your main product/service in foreign markets	4.8	19.6	53.2	21.2	1.2

Note: Main product/service is the one that generates the highest fraction of firm's revenue.
Source: Question 2.6 in the survey.

Table 9: How did the following factors evolve in your firm during 2010–2013? *(Please choose one option for each line)*

	Strong decrease	Moderate decrease	No change	Moderate increase	Strong increase
Average productivity per employee (as compared to labour costs per employee)	1.6	16.4	38.4	41.5	2.1
Prices (as compared to total costs)	6.2	25.9	39.4	27.8	0.8
Other (non-labour) costs (as compared to labour costs)	1.1	18.1	49.1	29.8	1.9

Source: Question 2.7 in the survey.

(ii) Labour Force and Wage Adjustments

Table 10: Measures used to reduce labour input or alter its composition during 2010-2013. *(Please choose one option for each line)*

	Not at all	Marginally	Moderately	Strongly
Collective layoffs	76.1	8.1	13.2	2.6
Individual layoffs	12.0	33.0	48.0	7.0
Subsidised reduction of working hours (according to par. 209 of the labour code)	84.4	6.9	7.7	1.1
Non-subsidised reduction of working hours (including reduction of overtime, working time accounts, etc.)	68.6	13.3	14.8	3.3
Non-renewal of temporary contracts at expiration	30.3	27.9	33.0	8.8
Early retirement schemes	64.5	21.1	12.4	2.0
Freeze or reduction of new hires	19.8	19.5	38.9	21.9
Reduction of agency workers and others	63.5	10.4	10.5	15.6

Note: Answers provided by those firms which significantly reduced labour input (38% of the surveyed firms).
Source: Question 3.3 in the survey.

Table 11: Probit estimates – Measures used to reduce labour input during 2010–2013
(moderately and strongly)

	Collective layoffs	Individual layoffs	Subs. reduction of hours	Non-subs. reduction of hours	Non-renewal of temp. E	Early retirement	Freeze of new hires	Reduction of agency E
	(1)	(2)	(4)	(5)	(6)	(7)	(8)	(9)
Very small	-0.005	-0.197	-0.016	**-0.109****	-0.037		0.116	-0.031
	[0.08]	[0.12]	[0.05]	[0.05]	[0.14]		[0.10]	[0.11]
Medium	-0.094	0.029	-0.039	-0.064	0.145	0.056	0.095	0.037
	[0.06]	[0.10]	[0.05]	[0.06]	[0.11]	[0.10]	[0.09]	[0.10]
Large	-0.048	**0.210****	0.017	0.023	**0.285*****	0.066	0.157	0.124
	[0.07]	[0.10]	[0.06]	[0.07]	[0.11]	[0.09]	[0.10]	[0.10]
Construction	-0.024	0.010	-0.054	**-0.091****	0.066	0.056	0.042	**-0.151****
	[0.07]	[0.11]	[0.03]	[0.05]	[0.11]	[0.09]	[0.10]	[0.07]
Trade	**-0.110****	**-0.190***	**-0.074*****	**-0.085***	-0.149	0.018	-0.055	-0.058
	[0.05]	[0.11]	[0.03]	[0.05]	[0.11]	[0.11]	[0.11]	[0.09]
Services	0.033	0.136	**-0.091*****	**-0.179*****	-0.052	-0.051	**-0.190****	**-0.150****
	[0.06]	[0.08]	[0.03]	[0.04]	[0.09]	[0.06]	[0.08]	[0.06]
High-skilled dominant	-0.029	-0.014	-0.005	-0.016	-0.092	0.005	-0.033	0.010
	[0.05]	[0.07]	[0.04]	[0.05]	[0.08]	[0.06]	[0.07]	[0.06]
Collective agreement	0.075	0.039	-0.005	0.039	0.113	**0.256*****	0.042	-0.033
	[0.05]	[0.08]	[0.04]	[0.05]	[0.08]	[0.06]	[0.08]	[0.07]
Share of bonuses in total wage bill	-0.125	**-0.570***	-0.202	**-0.740*****	-0.087	0.113	0.192	0.308
	[0.20]	[0.30]	[0.14]	[0.23]	[0.29]	[0.21]	[0.28]	[0.25]
Strong competition	**0.134*****	0.176	0.035	**0.134*****	0.163	**0.125*****	0.182	**0.203*****
	[0.04]	[0.12]	[0.05]	[0.04]	[0.11]	[0.04]	[0.12]	[0.07]
Age of the firm	-0.013	-0.134		-0.046	0.013		**-0.357****	-0.046
	[0.10]	[0.19]		[0.10]	[0.17]		[0.14]	[0.13]
Share of labour costs in total costs	0.008	**0.364****	**0.125***	0.141	0.155	0.084	**0.323***	0.077
	[0.12]	[0.17]	[0.07]	[0.11]	[0.18]	[0.13]	[0.17]	[0.15]
Exporting firm	-0.028	-0.133	0.054	0.008	0.083	0.103	-0.063	0.017
	[0.06]	[0.09]	[0.05]	[0.06]	[0.09]	[0.07]	[0.09]	[0.08]
Foreign-owned firm	**0.104***	-0.080	-0.024	**-0.078***	-0.041	-0.067	0.041	-0.052
	[0.06]	[0.08]	[0.04]	[0.05]	[0.08]	[0.05]	[0.07]	[0.07]
Decline in demand	0.007	**0.124***	**0.065***	0.008	**0.125***	-0.011	0.040	-0.026
	[0.05]	[0.07]	[0.03]	[0.05]	[0.08]	[0.06]	[0.07]	[0.07]
Decline in the access to external financing	0.069	**0.171****	0.060	0.063	0.113	0.123	-0.007	**0.141***
	[0.07]	[0.08]	[0.06]	[0.07]	[0.09]	[0.08]	[0.08]	[0.09]
Observations	241	252	232	244	247	205	253	242
Adjusted r2	0.071	0.124	0.131	0.163	0.107	0.228	0.072	0.070

Note: Marginal effects reported, *** significant at 1%, ** at 5%, * at 10%. Robust standard errors in brackets.
Source: Question 3.3 in the survey.

Table 12: Have any of the following actions become more or less difficult in 2013, compared to the situation in 2010? (Please choose one option for each line)

	Much less difficult	Less difficult	No change	More difficult	Much more difficult
To lay off employees (collectively)	2.1	2.4	91.6	3.3	0.7
To lay off employees (individually)	2.0	4.5	83.9	9.2	0.5
To dismiss employees for disciplinary reasons	1.9	4.5	88.1	4.2	1.2
To hire employees (cost of recruitment, including administrative costs)	1.8	6.8	63.9	24.7	2.8
To adjust working hours	1.6	4.2	87.3	6.7	0.3
To move employees to positions in other locations	1.2	3.5	88.6	5.9	0.7
To move employees across different job positions	1.4	7.0	84.6	6.6	0.5
To adjust wages of incumbent employees	0.9	7.2	76.7	13.8	1.4
To lower wages at which you hire new employees	1.4	8.0	81.6	8.0	1.0

Source: *Question 3.4a in the survey.*

Table 13: Have any of the following actions become more or less difficult in 2013, compared to the situation in 2010?

	To hire employees		To adjust wages	
	More difficult	Less difficult	More difficult	Less difficult
	(1)	(2)	(3)	(4)
Very small	-0.060	**-0.044***	**-0.130***	0.028
	[0.06]	[0.03]	[0.03]	[0.05]
Medium	0.087	0.030	-0.036	0.022
	[0.06]	[0.04]	[0.04]	[0.04]
Large	**0.131**	0.039	-0.010	0.005
	[0.06]	[0.04]	[0.04]	[0.03]
Construction	-0.084	0.011	-0.039	0.075
	[0.06]	[0.04]	[0.05]	[0.06]
Trade	0.059	0.013	0.006	0.024
	[0.06]	[0.03]	[0.05]	[0.04]
Services	0.011	-0.005	-0.014	0.028
	[0.05]	[0.02]	[0.04]	[0.03]
High-skilled dominant	-0.047	**0.043**	-0.022	-0.007
	[0.04]	[0.02]	[0.03]	[0.02]
Collective agreement	0.008	-0.017	0.008	-0.011
	[0.04]	[0.02]	[0.03]	[0.02]
Share of bonuses in total wage bill	0.188	-0.030	0.020	-0.060
	[0.15]	[0.08]	[0.12]	[0.09]
Strong competition	-0.047	**0.044**	-0.041	0.012
	[0.05]	[0.02]	[0.05]	[0.03]
Age of the firm	0.051	0.007	0.004	-0.023
	[0.07]	[0.04]	[0.06]	[0.04]
Share of labour costs in total costs	0.056	0.027	0.009	-0.015
	[0.08]	[0.05]	[0.07]	[0.05]
Exporting firm	0.035	-0.012	0.030	0.051
	[0.05]	[0.02]	[0.04]	[0.03]
Foreign-owned firm	0.012	**0.048**	-0.022	0.010
	[0.04]	[0.02]	[0.03]	[0.02]
Decline in demand	**0.094***	0.052	0.030	0.056
	[0.05]	[0.03]	[0.04]	[0.04]
Increase in demand	**0.124**	0.049	-0.025	**0.063***
	[0.05]	[0.04]	[0.04]	[0.04]
Decline in the access to external financing	0.018	0.044	0.052	0.000
	[0.05]	[0.04]	[0.05]	[0.03]
Observations	667	667	664	664
Adjusted r2	0.047	0.068	0.032	0.025

*Note: Marginal effects reported, *** significant at 1%, ** at 5%, * at 10%. Robust standard errors in brackets.*
Source: Question 3.4a in the survey.

Table 14: How relevant is each of the following factors as obstacles in hiring workers with a permanent, open-ended contract? (Please choose one option for each line)

	Not relevant	Of little relevance	Relevant	Very relevant
Uncertainty about economic conditions	16.5	17.4	45.3	20.8
Insufficient availability of labour with the required skills	18.5	21.1	38.9	21.5
Access to finance	32.6	28.8	32.3	6.3
Firing costs	23.5	20.5	35.0	20.9
Hiring costs	33.5	36.0	27.2	3.3
High payroll taxes	20.0	16.1	34.2	29.8
High wages	22.7	34.8	35.3	7.2
Risks that labour laws are changed	25.5	35.6	27.3	11.6
Costs of other inputs complementary to labour	31.2	35.4	27.1	6.3
Other	66.7	6.7	16.7	9.9

Source: *Question 3.5 in the survey.*

Table 15: Probit estimates – How relevant is each of the following factors as obstacles in hiring workers with a permanent, open-ended contract? *Relevance of obstacles in hiring permanent workers (relevant or very relevant)*

	Uncertainty condition	Insufficient labour	Access to finance	Firing costs	Hiring costs	High payroll taxes	High wages	Risks laws are changed
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
Very small	-0.023	-0.043	0.022	**-0.136****	-0.079	-0.020	**-0.119***	0.008
	[0.07]	[0.07]	[0.06]	[0.07]	[0.06]	[0.07]	[0.06]	[0.06]
Medium	0.002	**0.106***	**-0.087**	**-0.105***	-0.027	-0.018	-0.089	-0.055
	[0.06]	[0.06]	[0.06]	[0.06]	[0.05]	[0.06]	[0.06]	[0.06]
Large	-0.020	**0.121****	**-0.109***	-0.044	0.030	-0.046	0.007	-0.035
	[0.06]	[0.06]	[0.06]	[0.06]	[0.06]	[0.06]	[0.06]	[0.06]
Construction	0.107	-0.060	**0.125***	0.044	**0.174****	-0.016	**0.157****	**0.126***
	[0.07]	[0.08]	[0.07]	[0.07]	[0.08]	[0.07]	[0.08]	[0.08]
Trade	-0.026	-0.028	0.054	-0.003	-0.006	0.019	0.085	-0.007
	[0.06]	[0.06]	[0.06]	[0.06]	[0.06]	[0.06]	[0.06]	[0.06]
Services	**-0.199*****	**-0.109****	-0.01	**-0.160*****	-0.038	**-0.095***	-0.037	**-0.109****
	[0.05]	[0.05]	[0.05]	[0.05]	[0.05]	[0.05]	[0.05]	[0.05]
High-skilled dominant	**0.083****	**0.155*****	0.01	-0.023	-0.019	-0.003	**0.085****	-0.061
	[0.04]	[0.04]	[0.04]	[0.04]	[0.04]	[0.04]	[0.04]	[0.04]
Collective agreement	**-0.085***	-0.034	0.047	0.027	-0.050	-0.003	0.008	-0.044
	[0.05]	[0.05]	[0.05]	[0.05]	[0.04]	[0.05]	[0.05]	[0.05]
Share of bonuses in total wage bill	-0.195	0.238	-0.085	0.239	-0.061	-0.075	-0.013	0.064
	[0.15]	[0.17]	[0.16]	[0.17]	[0.15]	[0.16]	[0.17]	[0.16]
Strong competition	0.083	0.010	0.016	0.087	0.010	0.071	0.055	-0.056
	[0.06]	[0.06]	[0.06]	[0.06]	[0.05]	[0.06]	[0.06]	[0.06]
Age of the firm	-0.124	0.060	0.082	-0.026	0.066	-0.044	**0.199*****	0.051
	[0.08]	[0.07]	[0.07]	[0.08]	[0.07]	[0.07]	[0.07]	[0.07]
Share of labour costs in total costs	**0.166***	0.057	0.108	**0.240****	0.105	0.152	**0.347*****	0.114
	[0.10]	[0.09]	[0.09]	[0.10]	[0.09]	[0.10]	[0.10]	[0.09]
Exporting firm	0.033	**0.144*****	-0.022	0.031	**0.098****	0.044	0.030	0.050
	[0.05]	[0.05]	[0.05]	[0.05]	[0.05]	[0.05]	[0.05]	[0.05]
Foreign-owned firm	**-0.122*****	**-0.144*****	**-0.071***	-0.046	-0.023	**-0.178*****	-0.050	**-0.142*****
	[0.04]	[0.04]	[0.04]	[0.04]	[0.04]	[0.04]	[0.04]	[0.04]
Decline in demand	**0.090***	-0.085	0.005	0.004	-0.031	0.019	0.040	0.064
	[0.05]	[0.05]	[0.05]	[0.06]	[0.05]	[0.05]	[0.05]	[0.05]
Increase in demand	-0.032	**-0.129****	-0.076	-0.009	-0.040	-0.082	-0.016	-0.005
	[0.05]	[0.06]	[0.05]	[0.06]	[0.05]	[0.05]	[0.06]	[0.06]
Decline in the access to external financing	0.064	0.064		0.073	0.052	0.031	0.063	0.002
	[0.05]	[0.05]		[0.06]	[0.05]	[0.06]	[0.06]	[0.06]
Observations	711	713	720	710	711	714	710	711
Adjusted r2	0.081	0.065	0.039	0.033	0.022	0.044	0.043	0.040

*Note: Marginal effects reported, *** significant at 1%, ** at 5%, * at 10%. Robust standard errors in brackets.*
Source: Question 3.5 in the survey.

Table 16: How frequently was the base wage of an employee belonging to the main occupational group in your firm (largest group in 3.2) typically changed in your firm?
(Please choose one option for each line)

	More than once a year	Once a year	Between one and two years	Every two years	Less frequently than once every two years
Before 2010	1.0	43.2	21.0	5.9	29.0
During 2010–2013	1.6	34.1	20.6	6.0	37.7

Note: The answers are rescaled so that the sum in each row is 100% following the exclusion of category Never/Not applicable, which originally had 14.0% of responses for the period before 2010 and 16.2% for the period 2010–2013 .
Source: Question 4.6 in the survey.

Table 17: Probit estimates – Base wage changes once a year or more often

Dataset:	WDN3 c4.6			WDN1 q9(a,b,c)	
Reference period:	2010-2013		2008-2009	2006	
	(1) c4_6b_binary	(2) c4_6b_binary	(3) c4_6a_binary	(1) q9_binary	(2) q9_binary
Very small	-0.027	-0.015	-0.072		
	[0.07]	[0.07]	[0.07]		
Medium	0.039	0.026	-0.081	0.019	0.02
	[0.06]	[0.06]	[0.06]	[0.07]	[0.07]
Large	**0.130****	**0.109***	0.002	0.11	0.072
	[0.06]	[0.06]	[0.06]	[0.07]	[0.07]
Construction	-0.044	-0.012	**-0.149****	0.097	0.084
	[0.07]	[0.07]	[0.07]	[0.07]	[0.07]
Trade	**-0.100****	**-0.102****	**-0.120****	-0.056	-0.066
	[0.05]	[0.05]	[0.06]	[0.08]	[0.08]
Services	-0.018	-0.018	-0.043	0.049	0.027
	[0.05]	[0.05]	[0.05]	[0.06]	[0.07]
High-skilled dominant	0.041	0.037	0.063	0.053	0.055
	[0.04]	[0.04]	[0.04]	[0.07]	[0.08]
Collective agreement	**0.164*****	**0.174*****	**0.243*****	**0.217*****	**0.239*****
	[0.04]	[0.04]	[0.05]	[0.05]	[0.05]
Share of bonuses in total wage bill	0.141	0.136	0.27	**-0.502*****	**-0.518*****
	[0.16]	[0.16]	[0.17]	[0.19]	[0.19]
Share of sales on foreign markets	0.057	0.036	0.028	0.062	0.06
	[0.06]	[0.06]	[0.07]	[0.08]	[0.08]
Strong competition	**-0.151****	**-0.149****	**-0.136****	0.067	0.08
	[0.06]	[0.06]	[0.06]	[0.10]	[0.10]
Share of labour costs in total costs	-0.036	-0.036	-0.171	-0.051	-0.038
	[0.09]	[0.09]	[0.10]	[0.13]	[0.13]
Foreign-owned firms	**0.239*****	**0.249*****	**0.290*****	**0.156*****	**0.149*****
	[0.04]	[0.04]	[0.04]	[0.05]	[0.05]
Observations	721	713	713	352	350
r2_p	0.187	0.193	0.179	0.145	0.168

Note: Marginal effects reported, *** significant at 1%, ** at 5%, * at 10%. Robust standard errors in brackets.
Source: Question 4.6 in the survey.

Table 18: 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

Source: Question 4.7 in the survey.

Table 19: Probit estimates – Wage freezes and wage cuts over 2010–2013

	Wages were frozen				Wages were cut			
	2010	2011	2012	2013	2010	2011	2012	2013
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Very small	**-0.105****	-0.066	-0.062	**-0.083****	-0.013	-0.011	**-0.013****	-0.007
	[0.04]	[0.04]	[0.04]	[0.03]	[0.01]	[0.01]	[0.01]	[0.01]
Medium	-0.001	0.009	0.015	-0.022	-0.006	-0.001	-0.008	-0.002
	[0.05]	[0.05]	[0.05]	[0.04]	[0.01]	[0.01]	[0.01]	[0.01]
Large	-0.036	-0.04	-0.069	**-0.105****	-0.018	-0.012	**-0.021***	-0.024
	[0.05]	[0.05]	[0.05]	[0.04]	[0.02]	[0.01]	[0.01]	[0.02]
Construction	-0.006	0.028	0.006	0.029			0.034	0.058
	[0.06]	[0.06]	[0.06]	[0.06]			[0.03]	[0.04]
Trade	0.026	0.016	0.042	0.016	-0.004	0.017	0.012	0.028
	[0.05]	[0.05]	[0.05]	[0.04]	[0.01]	[0.02]	[0.02]	[0.03]
Services	0.033	0.001	0.001	0.005	**-0.026*****	0.001	**-0.013****	-0.019
	[0.04]	[0.04]	[0.04]	[0.04]	[0.01]	[0.01]	[0.01]	[0.01]
High-skilled dominant	-0.008	-0.022	-0.005	-0.027	-0.019	-0.01	**-0.022****	-0.01
	[0.03]	[0.03]	[0.03]	[0.03]	[0.01]	[0.01]	[0.01]	[0.01]
Share of sales on foreign markets	0.059	-0.047	-0.041	-0.031	**0.022***	**0.025*****	0.016	-0.003
	[0.05]	[0.05]	[0.05]	[0.05]	[0.01]	[0.01]	[0.01]	[0.02]
Strong competition	0.052	0.056	**0.079****	**0.058***		0.011		
	[0.04]	[0.04]	[0.04]	[0.03]		[0.01]		
Share of labour costs in total costs	0.035	0.047	0.094	0.016	**0.057****	**0.052*****	**0.047*****	**0.058****
	[0.08]	[0.07]	[0.07]	[0.07]	[0.03]	[0.02]	[0.02]	[0.03]
Collective agreement	0.006	0.036	0.05	0.045	-0.007	0.001	0.011	0.013
	[0.04]	[0.04]	[0.04]	[0.04]	[0.01]	[0.01]	[0.01]	[0.02]
Share of bonuses in total wage bill	0.06	-0.08	-0.081	0.032	0.033	0.026	0.017	-0.009
	[0.13]	[0.13]	[0.13]	[0.12]	[0.03]	[0.02]	[0.03]	[0.04]
Foreign-owned firms	-0.045	**-0.064****	-0.008	-0.037	**-0.025****	-0.008	**-0.017***	-0.016
	[0.03]	[0.03]	[0.03]	[0.03]	[0.01]	[0.01]	[0.01]	[0.01]
Observations	685	692	699	694	543	631	612	608
Adjusted r2	0.016	0.026	0.024	0.034	0.147	0.133	0.171	0.119

Note: Marginal effects reported, *** significant at 1%, ** at 5%, * at 10%. Robust standard errors in brackets.
Source: Question 4.7a in the survey.

Table 20: Probit estimates – Wage growth over 2010–2013

	Wages were neither frozen nor cut			
	2010	2011	2012	2013
	(1)	(2)	(3)	(4)
Very small	**0.132***	**0.088**	**0.090**	**0.092**
	[0.04]	[0.04]	[0.04]	[0.04]
Medium	0.006	-0.007	0.003	0.034
	[0.05]	[0.05]	[0.05]	[0.04]
Large	0.075	0.074	**0.113**	**0.149***
	[0.05]	[0.05]	[0.05]	[0.05]
Construction	0.056	-0.017	-0.026	-0.091
	[0.06]	[0.06]	[0.06]	[0.07]
Trade	-0.011	-0.022	-0.04	-0.039
	[0.05]	[0.05]	[0.05]	[0.05]
Services	0.024	-0.004	0.015	0.008
	[0.04]	[0.04]	[0.04]	[0.04]
High-skilled dominant	0.035	0.054	0.051	0.052
	[0.04]	[0.04]	[0.04]	[0.03]
Share of sales on foreign markets	-0.077	0.014	0.034	0.031
	[0.06]	[0.05]	[0.05]	[0.05]
Strong competition	**-0.084**	-0.056	**-0.092**	**-0.073***
	[0.04]	[0.04]	[0.04]	[0.04]
Share of labour costs in total costs	-0.119	**-0.136***	**-0.158**	-0.077
	[0.08]	[0.08]	[0.08]	[0.07]
Collective agreement	-0.019	-0.06	**-0.081***	**-0.075***
	[0.04]	[0.04]	[0.04]	[0.04]
Share of bonuses in total wage bill	-0.143	0.001	0.011	-0.025
	[0.14]	[0.13]	[0.13]	[0.13]
Foreign-owned firms	**0.072**	**0.071**	0.025	0.046
	[0.04]	[0.03]	[0.04]	[0.03]
Observations	685	692	699	694
Adjusted r2	0.0322	0.0327	0.0375	0.0517

Note: Marginal effects reported, *** significant at 1%, ** at 5%, * at 10%. Robust standard errors in brackets.
Source: Question 4.7b in the survey.

Table 21: How did the labour cost of a newly hired worker compare with that of similar (in terms of experience and task assignment) workers at your firm?

	Much lower	*Lower*	*Similar*	*Higher*	*Much higher*
Before 2010	2.0	17.7	72.2	7.9	0.3
During 2010–2013	0.3	9.8	65.2	24.8	0.0

Source: Question 4.8 in the survey.

(iii) Price Changes

Table 22: How would you characterise the degree of competition on domestic and foreign markets for your main product? (Please choose one option for each line)

	Weak	Moderate	Severe	Very severe
Domestic markets	3.2	14.2	40.9	41.8
Foreign markets	1.1	10.4	42.5	45.9

Note: The answers are rescaled so that the sum in each row is 100% following the exclusion of category Not applicable, which originally had 4.0% of responses for domestic markets and 17.8% for foreign markets.
Source: Question 5.4 in the survey.

Table 23: In 2013, how was typically set the selling price of your main product or service in domestic and foreign markets? (Please choose one single option in each column, which best describes your situation)

	Domestic market	Foreign markets
There is no autonomous price setting policy because:		
- the price is regulated	2.0	0.7
- the price is set by a parent company / group	9.9	14.1
- the price is set by the main customer(s)	7.8	7.3
The price is set following the main competitors	13.2	12.7
The price is set fully according to costs and a completely self-determined profit margin	28.7	22.8
The prices is negotiated with individual customers	36.5	40.0
Other	1.9	2.5
Total	100	100

Source: Question 5.1 in the survey.

Table 24: Compared to the situation before the crisis of 2008–2009, how has the competitive pressure for your main product on domestic and foreign markets changed in the period 2010–2013? (Please choose one option for each line)

	Strong decrease	Moderate decrease	No change	Moderate increase	Strong increase
Domestic markets	0.6	4.5	19.2	31.6	44.1
Foreign markets	0.5	2.3	23.9	34.7	38.6

Note: The answers are rescaled so that the sum in each row is 100% following the exclusion of category Does not apply, which originally had 4.5% of responses for domestic markets and 18.2% for foreign markets.
Source: Question 5.5 in the survey.

Table 25: Over 2010–2013, did you change the frequency of price changes with respect to the period before 2008–2009?

a) Domestic market	**YES (go to 5.3a, 5.3b)**	20.2	**NO (go to 5.4)**	79.8
b) Foreign markets (consider the prevailing currency from 5.2b) **YES (go to 5.3a, 5.3b)**		15.5	**NO (go to 5.4)**	84.6

5.3a – If recently you changed prices <u>more</u> frequently, higher frequency because of:		**5.3b – If recently you changed prices <u>less</u> frequently, lower frequency because of:**	
Please attach a ranking in order of importance to the factors listed below (0 non important to 3-most important)			
Domestic market prices			
More volatile demand	1.4	Less volatile demand	0.8
More frequent changes in labour costs	0.9	Less frequent changes in labour costs	1.5
More frequent changes in other input costs	1.6	Less frequent changes in other input costs	1.8
Stronger competition for the main product	2.0	Weaker competition for the main product	1.3
More frequent price changes by main competitors	1.9	Less frequent price changes by main competitors	1.4
Exchange rate changes	1.1	Exchange rate changes	0.9
Foreign market prices (consider the prevailing currency from 5.2b):			
More volatile demand	1.2	Less volatile demand	1.0
More frequent changes in labour costs	0.8	Less frequent changes in labour costs	1.1
More frequent changes in other input costs	1.6	Less frequent changes in other input costs	1.1
Stronger competition for the main product	2.0	Weaker competition for the main product	0.7
More frequent price changes by main competitors	1.8	Less frequent price changes by main competitors	1.4
Exchange rate changes	1.4	Exchange rate changes	0.6

Source: Question 5.3 in the survey.

Table B26: In 2013, how and how often did you typically change the price of your main product on domestic and foreign markets? *(Please choose one option per column, the one that best describes the situation in your firm)*

		On a **regular** time pattern		Whenever **costs** and/or **demand conditions** changed (please select the most typical frequency change)	
		Domestic	**Foreign**	**Domestic**	**Foreign**
More frequently than once a year:	Daily	2.6	1.6	5.3	3.8
	Weekly	4.7	2.2	3.4	2.3
	Monthly	10.7	8.5	13.8	10.7
	Quarterly	10.3	12.6	14.4	14.4
	Half-yearly	9.9	10.2	13.7	18.5
Once a year		42.1	46.4	30.1	31.2
Between one and two years		10.3	8.5	9.8	10.5
Less frequently than once every two years		9.4	10.0	9.4	8.8
Total		100	100	100	100

Note: Domestic*: Domestic market prices;* Foreign*: Foreign market prices (considering the prevailing currency). The answers are rescaled so that the sum in each column is 100% following the exclusion of categories Never and Don't know, the sum of which originally varied between 14% and 29% of responses depending on the market and time pattern.*
Source: Question 5.6 in the survey.

Table 27: Probit estimates – The price is typically set more often than yearly in 2013

	2013 WDN3				2013 WDN3				2006 WDN1
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)
Very small	-0.081	-0.092	-0.069	-0.079	-0.052	-0.057	-0.054	-0.064	
	[0.06]	[0.06]	[0.07]	[0.07]	[0.09]	[0.09]	[0.10]	[0.10]	
Medium	-0.047	-0.058	-0.046	-0.057	-0.045	-0.047	-0.057	-0.062	0.1
	[0.06]	[0.06]	[0.06]	[0.06]	[0.08]	[0.08]	[0.08]	[0.08]	[0.12]
Large	-0.069	-0.069	-0.068	-0.065	0.008	0.009	-0.003	-0.004	0.035
	[0.06]	[0.06]	[0.06]	[0.06]	[0.08]	[0.08]	[0.08]	[0.09]	[0.11]
Construction	**0.293***	**0.272***	**0.268**	**0.247**	**0.343***	**0.334***	**0.345***	**0.334***	**0.332**
	[0.10]	[0.10]	[0.10]	[0.11]	[0.19]	[0.20]	[0.19]	[0.19]	[0.15]
Trade	**0.466***	**0.455***	**0.457***	**0.447***	**0.509***	**0.512***	**0.507***	**0.511***	**0.536***
	[0.06]	[0.07]	[0.07]	[0.07]	[0.08]	[0.08]	[0.08]	[0.08]	[0.09]
Services	**0.132**	**0.116***	**0.137**	**0.123***	0.067	0.063	0.074	0.068	-0.118
	[0.06]	[0.06]	[0.06]	[0.07]	[0.08]	[0.08]	[0.09]	[0.09]	[0.11]
High-skilled dominant	-0.019	-0.022	-0.019	-0.023	-0.001	-0.001	-0.008	-0.01	-0.044
	[0.05]	[0.05]	[0.05]	[0.05]	[0.05]	[0.05]	[0.06]	[0.06]	[0.14]
Share of sales on foreign markets	**0.149**	**0.177**	**0.143**	**0.173**	**0.127***	**0.141***	0.126	**0.139***	0.029
	[0.07]	[0.07]	[0.07]	[0.07]	[0.08]	[0.08]	[0.08]	[0.08]	[0.11]
Strong competition	**0.131***	**0.119**	**0.129***	**0.118**	0.047	0.046	0.036	0.034	0.105
	[0.05]	[0.05]	[0.05]	[0.05]	[0.07]	[0.07]	[0.07]	[0.08]	[0.13]
Share of labour costs in total costs	**-0.448***	**-0.462***	**-0.465***	**-0.483***	**-0.712***	**-0.702***	**-0.705***	**-0.690***	**-0.380***
	[0.11]	[0.11]	[0.11]	[0.12]	[0.15]	[0.15]	[0.15]	[0.15]	[0.21]
Foreign-owned firms		-0.007		-0.012		-0.015		-0.011	**-0.114***
		[0.05]		[0.05]		[0.05]		[0.06]	[0.07]
Decline in demand		0.094		0.098		-0.038		-0.048	
		[0.06]		[0.06]		[0.07]		[0.07]	
Increase in demand		0.018		0.027		-0.053		-0.062	
		[0.06]		[0.07]		[0.07]		[0.07]	
Decline in the access to external financing		0.061		0.076		0.002		0.007	
		[0.07]		[0.07]		[0.09]		[0.09]	
Strong increase in total costs			-0.028	-0.03			0.041	0.046	
			[0.10]	[0.10]			[0.13]	[0.13]	
Observations	535	531	528	524	380	379	373	372	249
Adjusted r2	0.129	0.139	0.126	0.137	0.151	0.152	0.15	0.151	0.176

Note: *Marginal effects reported, *** significant at 1%, ** at 5%, * at 10%. Robust standard errors in brackets.*
Source: *Question 5.6 in the survey.*

Appendix A

Response Rate and Sampling Weights

Table A1 shows the targeted sample, actual responses and the response rate by strata, which are formed by firms belonging to 21 industry groups across 4 size classes.

Table A1: Sample size and response rate

Industry group	NACE2\size		Targeted sample					Responses					Response rate (%)				
			10-19	20-49	50-199	200+	Total	10-19	20-49	50-199	200+	Total	10-19	20-49	50-199	200+	Total
1	10-12	C	29	44	61	85	219	5	6	8	15	34	17	14	13	18	16
2	13-15	C	17	27	30	29	103	4	5	8	14	31	24	19	27	48	30
3	16-18	C	41	38	38	39	156	6	6	8	8	28	15	16	21	21	18
4	19-23	C	40	56	91	158	345	8	10	31	49	98	20	18	34	31	28
5	24-25	C	84	92	108	134	418	13	17	29	42	101	15	18	27	31	24
6	26-27	C	28	34	45	102	209	6	6	12	25	49	21	18	27	25	23
7	28	C	29	42	72	106	249	3	9	22	28	62	10	21	31	26	25
8	29-33	C	45	65	84	195	389	3	14	20	58	95	7	22	24	30	24
9	41-43	F	190	151	97	61	499	20	19	24	22	85	11	13	25	36	17
10	45	G	48	41	31	15	135	4	6	7	6	23	8	15	23	40	17
11	46	G	225	176	105	87	593	28	27	11	10	76	12	15	10	11	13
12	47	G	107	64	41	102	314	12	8	9	28	57	11	13	22	27	18
13	49-51	H	59	57	59	50	225	11	8	13	14	46	19	14	22	28	20
14	52-53	H	12	13	17	30	72	1	2	3	7	13	8	15	18	23	18
15	55	I	20	24	18	13	75	4	5	0	0	9	20	21	0	0	12
16	56	I	78	45	20	18	161	3	3	4	1	11	4	7	20	6	7
17	58-61	J	15	13	10	20	58	4	3	4	3	14	27	23	30	15	22
18	62-63	J	36	36	32	44	148	4	12	9	12	37	11	33	28	27	25
19	68	L	51	36	20	11	118	12	6	6	1	25	24	17	30	9	21
20	69-75	M	122	89	63	50	324	18	14	16	16	64	15	16	25	32	20
21	77-82	N	47	58	88	142	335	5	9	16	23	53	11	16	18	15	16
	Total		1323	1201	1130	1491	5146	174	195	260	382	1011	13	16	23	26	20

Source: CNB WDN3 survey, May–September, 2014.

Using the data on the number of questionnaires across 21 industries and 4 size classes, we merged several adjacent industry groups to increase the number of observations within strata and constructed weights correcting for (i) unequal probability of selection of firms into the targeted sample, (ii) non-response rate, and (iii) differences in the average firm size (in the population) across different strata. In this way the weights – called employment weights, Wl – allow us to calculate sample averages representing all workers in the population of firms:

$$Wl = (1/sampling\ probability)*(1/response\ rate)*average\ firm\ size\ in\ each\ stratum \quad (1)$$

Notice that the product of the first two terms in the right-hand side of (1) is referred to in the literature as firm weights, Wb.

$$Wb = (1/sampling\ probability)*(1/response\ rate) \quad (2)$$

Using the notations that N_h is the population of firms in each stratum h, n^*_h is the number of firms in the targeted sample within each stratum, n_h is the number of firms in the realised sample in each stratum and $\overline{l_h}$ is the average firm size in the realised sample, expression (1) can be written as:

$$w_l = \left(\frac{N_h}{n^*_h}\right)\left(\frac{n^*_h}{n_h}\right)\overline{l_h} \tag{3}$$

where the first term corrects for unequal sampling probability of firms, the second term adjusts for non-response, and the last term corrects for employment, assuming that the average size of the firms in a particular stratum in the realised sample is equal to the average firm size in the same stratum in the population of firms.[9]

Table A2 provides information on how percentages of firms in specific draws correspond to the distribution of categories of firm. Although the number of very small and small firms is high (about 25 thousand in total population of firms) they employ only about 500 thousand employees, which is less than a quarter in the overall sample covering 2,127 thousand employees. We have designed the sampling probabilities in such a way as to obtain representative samples across the main four size categories of firms (in terms of employment): very small, small, medium and large. This is the same procedure that we followed during the first wave of the survey (Babecký, Dybczak and Galuščák, 2008).

Table A2: Percentage of firms in specific draws and the distribution of categories of firms

	Very small (10-19)	Small (20-49)	Medium (50-199)	Large (200+)	Total
Total population of firms					
Number of firms	14,700	10,008	5,650	1,864	32,222
Share in Total (%)	46	31	18	6	100
Targeted sample					
Draws: Percentage of total number of firms in population in a given size category	9	12	20	80	
Number of firms	1,323	1,201	1,130	1,491	5,146
Share in Total (%)	26	23	22	29	100
Responses					
Number of firms	174	195	260	382	1,011
Response rate (%)	13	16	23	26	20
Share in Total (%)	17	19	26	38	100
Number of employees (using employment weights)	189,617	307,793	613,106	1,016,519	2,127,036
Share in Total (%)	9	14	29	48	100

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[9] We use this approximation as the exact firm size is not reported in the Czech Statistical Office business register.