



NÁRODNÁ BANKA SLOVENSKA
EUROSYSTEM

LABOR COST ADJUSTMENT

EVIDENCE FROM A SURVEY OF
SLOVAK FIRMS

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Labor Cost Adjustment

Working paper NBS

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Abstract

Building on a unique survey of how Slovak firms adjust wages and prices, this paper studies the reduction of labour costs in two forms: base wage cuts and alternative margins for labour cost reduction. Anecdotal evidence suggests that wage-cutting by firms occurs more frequently in Slovakia than in any other country and that the use of alternative margins for labour cost reduction is also quite prevalent in Slovakia. Regression results support the strong relationship between the use of alternative margins and wage rigidities. I find that the use of any alternative margin is on average 30% more likely in firms facing nominal wage rigidity than in firms with flexible wages.

JEL classification: J30, J50, E24, C81

Key words: nominal and real wage rigidity, alternative margins for labour cost cutting, survey evidence

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1. INTRODUCTION

Wage rigidities are often blamed for causing higher unemployment rates in Europe, compared to the U. S. (Nickell, 1997), however there is no abundance of empirical evidence. The usual argument is based on a premise that the labour market rigidities, such as minimum wages, collective agreements, and lay-off restrictions, prevent companies from cutting wages which leads to increased number of lay-offs, fewer firms in the market, or alternatively, smaller sized firms, than would be otherwise optimal. Another detrimental effect of wage rigidity is the fact that wage rigidity restricts adjustment to shocks within a currency union Mundell (1963). Finally, wage rigidity may also be the reason for price stickiness as documented by The Inflation persistence network (IPN) organized by the ESCB (Altissimo et al. (2006)).

A unique opportunity to study the wage rigidities, their implications and how labour costs are adjusted by Slovak firms was provided by a survey on wage and price setting behaviour conducted under the supervision of the National Bank of Slovakia and Wage Dynamics Network (WDN). A harmonized questionnaire was carried out by 20 national central banks between the end of 2007 and the first half of 2009 in order to deepen the understanding of wage-setting practices, the frequency of price and wage changes, and the linkages between the wage and price rigidities in EU context. Thus, it is possible to study not only the country-specific determinants and implications but, due to the harmonized questionnaire, also to compare the findings with practices in other countries.

Building on the collected survey data, in the second part of the project², I focus on reduction of labour costs in two forms - the base wage cuts and the use of alternative margins for labour cost reduction. I study whether the Slovak firms use alternative margins, such as changes in bonuses and non-pay benefits, changes in shifts, slowing down of promotions, recruiting new employees with lower wages and reducing number of employees and reorganization (including early retirement support) in order to lower their costs. Furthermore, I examine why firms tend to refrain from cutting base wages and look at the relationship between wage rigidities, alternative margins and base wage cuts.

The survey results suggest that the Slovak firms were able to cut base wages relatively more often than firms in majority of European countries. There may be several reasons, but anecdotal evidence seems to imply that Slovak firms would have preferred to cut wages even more often had it been possible. The evidence is quite strong for firms with majority of low skilled blue collar workers, i.e. firms where share of labour costs in total costs is relatively high and firms are subject to low profit margins. Such firms find legal restrictions to be quite an important aspect to consider when cutting base wages.

The anecdotal evidence is supported by the regression results. Indeed, the results of binomial probit regression confirm that firms with prevailing low skilled blue collar workers tend to cut base wages less often than firms with the majority of white collar workers. Other determinants that proved to be important are level of unionization (firm level agreements increasing the probability of wage cuts relative to firms with no collective agreements); wage rigidities, especially nominal wage rigidity which goes hand in hand with wage cuts; revenues; worker turnover; and perceived level of competition.

There are significant differences in the use of alternative margins across the regions and industries. From the correlation analysis we can conclude that the use of bonus cuts and de-

²The first part of the project aims at quantifying the incidence and identifying the determinants of nominal and real wage rigidities faced by Slovak firms. These results are reported in Červená (2012).



crease in non-pay benefits go often hand in hand. Second highest correlation is between the redundancy and reorganization and bonus cuts. It implies that, where possible, firms tend to combine firing workers that are not necessarily needed with a reduction of bonuses of the remaining workforce. The similar is true for redundancy and reorganization and cutting non-pay benefits. Another possible avenue for labour cost reduction seems to be the cutting non-pay benefits together with hiring cheaper new employees.

Results of binomial probit regressions suggest that firms with mainly blue collar workers (both low and high skilled) tend to use alternative margins less often than those that employ mostly white collar workers. Furthermore, results imply that the probability of the use of any alternative margin decreases with the increasing share of permanent workers. The level of unionization also matters as estimated coefficients are strong and significant. Firms that are covered by firm level of union membership use alternative margins significantly more often than those that are not covered at all. Unsurprisingly, the frequency with which firms use alternative margins decreases significantly with the growth of revenues. Firms with unchanged or rising revenues use margins much less often than the ones with decreasing revenues.

Finally, including wage rigidities as additional control variables helps to improve the fit of the model significantly. Moreover, I found strong relationship between nominal wage rigidity and the use of alternative margins. More concretely, firms that have frozen wages use some margin on average with 30% higher probability than firms with flexible wages. The highest effect is present for the decrease in bonuses followed by decrease in non-pay benefits and redundancy and reorganization. The results suggest that firms often turn to alternative margins to compensate for wage rigidity

This paper is organized as follows. Section 2 provides a short overview of the relevant literature. In Section 3 I discuss the survey, Slovak specifics and general findings that can be deduced from the data. Section 4 is dedicated to an overview of firms that cut the base wages and study of the determinants and reasons why they decided to take this step as opposed to firms that did not. To proceed further in this direction, in Section 5 I look at the alternative margins that might have been adopted by firms to lower the labour costs in situations when wage cuts are not possible. Section 6 concludes.

2. LITERATURE OVERVIEW

In the last decade, a considerable effort has been dedicated to both the theoretical and empirical research studying the reasons for wage rigidities and their implications for both the labour markets and monetary policy makers. Understanding wage rigidities is important as it has impact on a number of important aspects of the economy. First, it is important to understand it from the monetary policy perspective, as wage rigidity may lead to inflation persistence and reduce the efficiency of monetary policy tools. Tobin (1972) argues that if central banks set inflation rate targets too low, they may harm the labour markets and impair their functioning. Furthermore, moderate levels of inflation help overcome the problems with wage adjustment in firms with workers reluctant to undergo base wage cuts. Akelof et al. (1996) argue that if inflation is too low, downward nominal wage rigidity pushes wages above the optimal levels and causes higher unemployment. Thus, the second important perspective is the labour market perspective.



2.1 RECENT EMPIRICAL STUDIES

Are the overall labour costs rigid or do firms facing rigid wages turn to non-wage components of labour costs in order to accommodate new situation? Using the data from WDN survey of firms, Babecký et al. (2009) study whether European firms use margins such as changes in bonuses and non-pay benefits, changes in shifts, slowing down promotions, recruiting new employees with lower wages and encouraging early retirement. The results suggest that firms often turn to these margins in order to adjust labour costs in the face of adverse economic conditions. 61% of respondents claim that they had used at least one non-wage margin in the past and 56% used at least one of the margins proposed in the survey. However, adjustment of non-wage benefits varies significantly across countries and sectors and is also determined by the firm specifics.

Probably the closest of the recent empirical studies to the one presented here is Keeney and Lawless (2010). The authors investigate the wage setting behaviour of Irish firms with the help of data collected in WDN survey. They concentrate on the flexible wage components as means for labour cost reduction, wage rigidities, collective wage agreement coverage and wage cuts. They find that Irish firms rarely cut base wages (only 1.1%) and similar is true for wage freezes. The changes in flexible wage components are more common, suggesting that wages are indeed rigid in Ireland. However, as evidenced by data, the Irish labour market as a whole is not rigid and firms use other means to adjust the labour costs.

According to Gertler and Senaj (2008) there were only three studies up to 2008 that estimated any sort of wage rigidity in the context of Slovakia. Namely Blanchflower and Oswald (2000), Huitfeldt (2001) and Babecký (2008). Gertler and Senaj (2008) was the first comprehensive paper studying rigid wages in the context of Slovakia. They chose two approaches and applied the methodology on both micro and aggregated data. They found that both the nominal and real (downward) wage rigidity is small and that the hourly compensations are rather flexible. Another more recent study Gertler (2010) also confirms their findings. Furthermore, Gertler (2010) finds that overall wage flexibility is driven by the wage flexibility of higher skilled employees while Červená (2012) finds that the base wages in Slovakia are more rigid than is the average in European Union and that the base wages of white collar workers are less flexible.³ This paper tries to reconcile the difference in the findings by looking also at firms that cut base wages and on the use of alternative margins for labour cost reductions, as well as on the relationship between these and wage rigidities.

3. DATA AND GENERAL OVERVIEW

Data used in this study were collected as part of a collective effort initialized by the Wage Dynamics Network organized under the ESCB. To be more specific, Wage Dynamics Network (WDN) is a research network made up of staff of European Union national central banks, as well as ECB with two main objectives. First, to identify the sources and features of wage and labour cost dynamics, that are most relevant for monetary policy. Second, to clarify the relationship between the wages, labour costs and prices, both at the firm and macroeconomic level. The objectives of the network were inspired by the finding of Inflation Persistence Network (IPN) that cross-sector differences in the frequency of price changes were highly negatively correlated with the labour share, suggesting that the wage and labour costs stickiness may be a driving

³Note however that Gertler (2010) is working with overall compensation of employees whereas Červená (2012) employs base wages and thus the difference in the findings.



element responsible for the slow adjustment of prices.

A survey group of the WDN network prepared a harmonized questionnaire which consisted of **core** and **non-core** questions. Core questions were obligatory for the countries taking part in the survey while non-core questions could be entirely skipped or modified. There were 20 countries that took part in the initial round of survey and 10 countries⁴ carried out a follow-up survey that aimed at identifying how firms reacted to the current crisis. Out of the 20 countries⁵, 17 conducted the survey in the first round between the end of 2007 and the first half of 2008 (i.e. before the onset of the current crisis), while three countries joined the network in the later stage and conducted the survey in the first quarter of 2009. These countries are, apart from Slovakia, Cyprus and Bulgaria.

Slovak survey was carried out under the supervision of National Bank of Slovakia by a market research company MVK. It was a face-to-face interview type survey in which 1,432 firms were interviewed. The response rate was rather high and reached impressive 56%. To be more specific, the final sample contains as many as 802 firms that cover 13.4% of employees in the economy. The original questionnaire was slightly modified with omitted blocks of questions regarding the entry wage setting, perceived easiness of labour cost adjustment and cost-cutting strategies.⁶ A number of questions was left out in order to make the questionnaire more straightforward and understandable for managers filling it out and thus to increase the response rate.

Overall, the questions in the questionnaire can be divided into three categories. First, firm specific questions that include questions on the level of unionization, number of employees, worker turnover (number of employees that left/joined the company in the last year), prevailing type of workforce (high/low skilled blue collar workers, white collar workers), shares of permanent/temporary contracts, tenure length of employees, share of labour costs, profits (compared to previous year), industry and region in which the firm operates. Second category is related to the wage setting behaviour of firms. There are questions related to the wage indexation to the past/present inflation, frequency and timing of wage adjustments, wage cuts/freezes and reasons for/against their use, and alternative margins for labour cost adjustment. Finally, the third category (which we will not discuss in this paper) are the questions concerning the price setting behaviour of firms. More specifically, the questions include queries about income shares (domestic, export EA, other), price setting principles, competition (implied and perceived), frequency and timing of price changes and the link between price and wage changes.

The following industries are present in the sample (employment weighted)⁷: *manufacturing* 46.92% out of which light industry 12.77%, heavy industry 14.51% and cars and machinery 19.64%, *energy* 3.59%, *construction* 5.28%, *trade* 13.22%, *financial intermediation* 8.43% and *business services* 22.57 %, including market services 20.78% and non-market services with 1.79%. Note that sectoral composition of the firms does not entirely reflect the true sectoral employment structure. Sectors such as agriculture, education and public services were intentionally not included. The sample is comprised of firms with more than 10 employees.

⁴Follow-up survey was conducted by Austria, Belgium, the Czech Republic, Estonia, France, Italy, Luxembourg, the Netherlands, Poland and Spain.

⁵First round countries include Austria, Belgium, the Czech Republic, Estonia, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Luxembourg, Netherlands, Poland, Portugal, Slovenia and Spain.

⁶Slovak questionnaire consists of 26 out of 41 questions in the original questionnaire. For further information on Slovak questionnaire, consult the Appendix.

⁷For more details on weighting scheme refer to the Appendix.



Table 1: Percentage of firms with collective pay agreement, by country

	Any	Firm	Higher	EPL
Austria	97.79%	23.42%	96.18 %	1.93
Belgium	99.39%	35.26%	97.88 %	2.18
Czech Republic	54.01%	51.44%	17.50 %	1.96
Estonia	12.14%	10.42%	3.45 %	2.10
Spain	100%	16.90%	83.10 %	2.98
France	99.94%	58.68%	98.80 %	3.05
Greece	92.55%	18.44%	85.88 %	2.73
Hungary	19.02%	18.98%	0 %	1.65
Ireland	72.45%	31.35%	68.28 %	1.11
Italy	99.64%	42.93%	99.55 %	1.89
Lithuania	24.45%	23.96%	0.88 %	NA
Netherlands	75.50%	30.05%	45.44 %	1.95
Poland	20.01%	18.69%	4.06 %	1.90
Portugal	62.15%	9.88%	58.95 %	3.15
Slovenia	100%	25.68%	74.32 %	2.51
Slovakia	57.37%	56.62%	19.15 %	1.44

Table presents percentages of firms that have any level of collective bargaining (firm, higher or both), firm level, and higher level collective bargaining, respectively. The last column refers to the index of overall strictness of employment protection as published in the OECD (2008). Data are employment weighted.

4. WAGE CUTS

Table 2 suggests that wage cuts have been relatively rare in most of the countries. However, this is not true for all of the available countries. We can include Slovakia, the Czech Republic and Lithuania among the notable exceptions. In what follows I will study wage cuts specifics for Slovakia. Anecdotal evidence may shed some light on the driving forces behind these cuts and possibly on the reasons why the wages in Slovakia have been cut so much more compared to other countries. Later, I will also run binomial probit regressions to study the firm characteristics and other underlying conditions that determine the incidence of wage cuts in Slovak firms.

Answers provided by firms participating in the survey show that substantial differences exist between firms in different sectors and regions. For instance, cars and machinery and energy industries experienced hardly any wage cuts over the period of the last five years. To be more specific, the incidence ranges somewhere between 1% and 2%. On the other hand, in the trade industry as much as 21% of firms experienced wage cuts. This industry is followed by construction with 12.6%, light industry with 10.4% and financial intermediation with 9.5% firms cutting wages⁸

In regional perspective, we can divide Slovakia into two categories. Regions with high and low levels of wage cuts and then Bratislava somewhere in the middle. In the first category, we can include Prešov region with astounding 28.7% of firms that experienced wage cuts, followed by Banská Bystrica with 13.9% and Košice with 11.4%. On the other side of the spectrum is Nitra

⁸Note that the numbers reflect only answers of firms that were still operational at the time of the survey. It is very likely that firms that were destroyed during the reference period cut wages more often before they were shut down.



Table 2: Percentage of firms that face NWR, RWR and cut wages, by country

	NWR	RWR	Weak Idx	Cuts
Austria	13.16%	9.82%	22.02%	3.00 %
Belgium	11.84%	98.23%	98.23%	3.10%
Czech Republic	26.55%	11.91%	59.05%	8.37 %
Estonia	21.66%	4.53%	53.77%	3.05 %
Spain	2.44%	54.81%	70.69%	0.06 %
France	7.05%	10.19%	32.26%	2.46 %
Greece	13.28%	21.47%	46.11%	NA
Hungary	5.90%	11.19%	31.52%	2.64 %
Ireland	8.72%	9.39%	31.39%	1.00 %
Italy	3.87%	1.72%	5.77%	0.71 %
Lithuania	19.82%	10.73%	48.57%	8.28 %
Netherlands	23.23%	0.00%	0.00%	1.43 %
Poland	9.86%	7.04%	29.97%	4.61 %
Portugal	14.95%	9.04%	50.91%	1.01 %
Slovenia	2.94%	23.53%	60.53%	2.45 %
Slovakia	20.89%	21.14%	60.64%	8.53 %

Table presents percentages of firms that face either nominal wage rigidity or real wage rigidity. In the third column there are firms that apply strict indexation to the inflation or have informal links to it. The last column refers to the percentage of firms that cut base wage in the last five years. Data are employment weighted.

Table 3: Wage cuts by industry

	light	heavy	cars/mach.	energy	construction	trade	fin. intermed.	mrkt services	non-mrkt serv.	Total
Wage cuts	10.4%	4.5%	1.8%	1.1%	12.6%	21.0%	9.5%	8.7%	6.5%	8.5%
N	110	87	102	41	101	101	30	173	57	802

Data are employment weighted.

Table 4: Wage cuts, by region

	BA	TT	TN	NR	ZA	BB	PO	KE	Total
Wage cuts	6.1%	1.2%	3.0%	0.8%	2.0%	13.9%	28.7%	11.4%	8.5%
N	213	84	76	66	83	72	93	115	802

Data are employment weighted.



where only 0.8% of firms cut wages. Furthermore, firms with stable number of employees seem to cut wages less often than those that had larger inflow or outflow of workers during the year previous to the reference year. More specifically, the incidence of wage cuts is in respective cases 5% versus 8.5% or 9.9%. However, size of the firm itself does not seem to play any role.

One firm characteristic that seems to be rather important in determining wage cuts dynamics is the type of prevailing workforce. In the table below we can see the small incidence of wage cuts in firms employing mainly low skilled blue collar workers. Furthermore, firms with mostly white collar workers cut wages much more often than firms with majority of other types of workers. Such structure leads to a number of possible explanations of the phenomenon and I investigate their relevance below.

Table 5: Wage cuts, by prevailing type of workforce

	Major workforce			Total
	LS BC	HS BC	White	
Wage cuts	1.1%	7.7%	11.4%	6.8%
N	142	387	189	718

Data are employment weighted.

First of all, the reason behind the low percentage of firms with blue collar low skilled workers that opted for wage cuts might be the labour market legislation imposed in Slovakia. More specifically, in Slovakia there was a legally binding minimum wage of 268.87 euro per month in 2008.⁹ Furthermore, as documented Červená (2012) in Section 3 collective bargaining is present here more than in other CEE countries and there have been constant demands for further increases of minimum wage. Looking at the incidence of wage cuts in Slovakia and the imposed collective bargaining reveals that on average only 3.6% of firms that are covered by sector unions cut wages as opposed to 9.7% incidence of wage cuts in firms that are not covered by sector unions.

In order to examine the impact of collective bargaining on the incidence of wage cuts I turn to a survey question, where the firms were asked about the number of reasons preventing wage cuts and their relevance. The individual sub-questions were constructed so that they could be linked to the prevailing wage rigidity theories directly and thus cross checked with them.¹⁰ Questions posed include reasons such as 'legislation or collective agreement prevent it', 'effort would deteriorate', 'negative impact on workers morale', 'damaged reputation and problems with hiring workers in the future', 'most productive workers could leave', 'higher hiring/training costs', 'implicit contract would be violated', etc. Firms were asked to assign, depending on a level of importance of each item, values 1-4 to each of the sub-questions indicating the strength of their agreement with the statement.

Firms with a majority of low skilled blue collar workers that cut wages in the last five years tend to find the collective agreements and labour market legislation more important in preventing wage cuts than other firms. On the other hand, firms with the same prevailing type of workforce that did not cut wages find the reason approximately equally important as other firms that did not cut wages. This could suggest that the firms that have already cut the wages would cut them even further had it not been prevented by the labour market legislation.

⁹However, the average wage was 733.35 euro in the same year. Note that both amounts in euros were calculated using the official conversion rate used in 2009 during the currency changeover and not the actual exchange rate at the time.

¹⁰For further reference on these theories see Table 14 in the Appendix of Červená (2012).



Table 6: Labor regulation/collective agreements prevent wage cuts

	LS BC	HS BC	White	Total
Did not cut wages	1.50	1.52	1.56	1.52
Cut wages	1.93	1.13	1.22	1.20
Total	1.50	1.49	1.51	1.50
N	142	387	189	718

Table presents mean values of individual responses to the question: 'Labor market legislation or collective agreement prevent wage cuts'. Note that 0 stands for not relevant, 1 partially relevant, 2 relevant and 3 very relevant. Data are employment weighted.

Table 7: Share of labor costs of total firms costs

	LS BC	HS BC	White	Total
Did not cut wages	27.92%	30.69%	26.60%	29.16%
Cut wages	34.14%	40.81%	49.97%	43.27%
Total	27.99%	31.46%	28.94%	30.06%
N	142	387	189	718

Table presents mean values of the share of labour costs of the total costs for the firms with different prevailing type of workers. Data are employment weighted.

We can see that the labour market regulations and collective bargaining play an important role in preventing wage cuts in firms with prevailing low skilled blue collar workers. What about the share of labour costs on total firm costs? Do these play a role here? On average firms that cut wages spent larger share of total costs on labour costs. The difference between the share of labour costs on total firm's costs is especially large for firms with majority of white collar workers. The respective ratios are almost 50 percent in firms where the wages have been cut as opposed to 26.6% in firms where the wages remained the same or increased. It seems that firms are quite rational and attempt to cut wages where it is meaningful, i.e. in cases where the labour costs constitute a substantial part of the total costs. This falls in line with the fact that firms with majority of white collar workers cut wages more often than firms with majority of different types of employees.

Table 8: Wage cuts and revenues

	LS BC	HS BC	White	Total	N
Lower	4.08%	10.45%	6.38%	8.01%	179
Same	0.21%	9.36%	9.86%	7.12%	261
Higher	0.29%	5.05%	13.53%	6.11%	278
Total	1.13%	7.69%	11.41%	6.83%	718
N	142	387	189	718	

Table presents mean values of wage cuts for firms with different prevailing workforce and different levels of revenues compared to the previous year. Data are employment weighted.

Assuming that firms opt for wage cuts in bad times, level of revenues in the reference year relative to the previous year should also matter. However, as firms were asked about the wage cuts during a 5 year period and the information on revenues is available only for one year, the message may be incomplete. In the table below we can see that firms with majority of blue collar low skilled workers cut wages essentially only in cases where they suffered from decreased returns in the previous year. Similar is true for high skilled blue collar workers,

i.e. the incidence of cuts decreases with the increasing levels of revenues. Together with the observation that firms tend to cut wages mostly when labour costs are higher and our previous observation of binding minimal wages, it seems that lowering minimal wage could help firms employing low paid employees overcome problems in bad times rather than firing them.

Table 9: Reasons preventing wage cuts

Variable	Mean	N
Labour regulation/CB prevents it	1.541	756
It would reduce workers' effort	1.769	773
It would have negative impact on morale	1.87	771
It would damage firm's reputation	1.726	772
Most productive employees might leave	1.972	779
It may increase costs of hiring/training	1.845	785
Problems with attracting new workers	1.55	768
Implicit contract violation	1.194	713
Wage comparing with other workers	1.543	738

Data are employment weighted. The scale is as follows: 0 stands for not relevant, 1 for partially relevant, 2 for relevant and 3 for very relevant.

From the findings presented above we can infer that there are notable differences in the use of wage cuts with respect to the worker structure and other firm and institutional characteristics. Furthermore, some firms might have preferred to cut base wages but were unable to do so. We have already studied a number of reasons that might prevent wage cuts in firms with low skilled blue collar workers and how these reasons may differ from those firms with majority of different type of workers. However, we have not looked at broader spectrum of reasons for the economy as a whole. I do so in Table 9. In general, the fear of the most productive workers leaving the firm is considered to be the most relevant reason preventing wage cuts. It is followed by a negative impact on workers' morale and increased costs of hiring and training. All three of the indicated reasons suggest that firms in Slovakia mostly fear that reduction of base wages would lead to decreased productivity and increased costs. On the other hand, firms assign lower level of importance to the implicit contract violation, problems with attracting new workers and the fact that workers compare their wage with workers in other firms with similar duties. However, the differences are not very profound.

However, cutting base wages is not the only possibility to reduce the labour costs. Apart from the wage cuts, firms can use a number of alternative margins for labour costs reduction, such as cutting bonuses or benefits, changes in shifts, outsourcing, etc. Below I look at a number of such margins and study whether firms that refrain from cutting wages use them as substitutes or rather they are used as complements to the wage cuts. I report only a number of margins that I consider the most relevant in a given situation. More specifically, I look at the shares of firms that applied the following alternative margins, 'decrease in bonuses', 'change in shift assignment', 'redundancy and reorganization' and 'outsourcing' with respect to the prevailing type labour force.

In Table 10 we can see four types of alternative margins and how they were used by firms in Slovakia with different types of prevailing workforce. Reduction of bonuses is a tool used rather often and even more so in combination with wage cuts. The same is true for redundancy and reorganization. In addition to these two alternative margins, we can see similar patterns also for changes in shift assignments and the use of outsourcing. All four approaches to labour cost reduction tend to exhibit higher incidence in firms with prevailing high skilled blue collar workers and white collar workers in firms that cut wages, as opposed to those that did not. The opposite is true for firms with majority of low skilled workers.



Table 10: Share of firms that applied given alternative margins

	LS BC	HS BC	White	Total
Reduction of bonuses				
Did not cut wages	0.33	0.29	0.21	0.29
Cut wages	0.17	0.88	0.55	0.73
Total	0.33	0.34	0.25	0.32
Change in shift assignment				
Did not cut wages	0.18	0.15	0.03	0.14
Cut wages	0.00	0.24	0.03	0.16
Total	0.18	0.16	0.03	0.14
Redundancy and reorganization				
Did not cut wages	0.44	0.48	0.38	0.45
Cut wages	0.43	0.87	0.68	0.78
Total	0.44	0.51	0.41	0.47
Outsourcing				
Did not cut wages	0.06	0.05	0.09	0.06
Cut wages	0.00	0.11	0.11	0.10
Total	0.06	0.05	0.09	0.06
N	142	387	189	718

Data are employment weighted.

Hitherto we have been studying particularly the reasons preventing the wage cuts and did not consider the fact that firms in Slovakia cut wages more often than was possible in other countries. To understand why this could happen I look at the reasons that firms indicated to be relevant when cutting or freezing wages. Unfortunately, there is no separate question for both events and thus we cannot separate the answers purely for the wage cuts (as there were 38 firms in the survey that both cut and froze wages). Still, we will at least get clearer picture of what might be at stake.

In the questionnaire, firms that replied that they have cut or frozen wages during a 5 year period were subsequently asked to indicate the main reason (i.e. only one positive answer per firm) for the action. In Table 11 we can see that reasons, other than decline in profits/sales, given by firms differ substantially depending on the prevailing type of workers. While firms with majority of low skilled blue collar employees indicate decline in profits and increase in costs as main reasons for wage cuts (as much as 78% of wage cuts/freezes due to these reasons, followed by the low performance of workers), large share (23.6%) of firms with high skilled blue collar workers thought that jobs were at risk. Finally, firms with prevailing white collar workers cut/froze wages often due to low performance of workers.

Table 11: Reasons for wage cuts and freezes

	LS BC	HS BC	WC	Total
Profits/sales fell	44.6%	43.3%	40.2%	43.0%
Costs increased	33.4%	8.9%	0.4%	12.4%
Jobs were at risk	8.5%	23.6%	4.3%	16.9%
Imposed by legislation/collective agreement	0.2%	0.0%	0.0%	0.0%
Low worker performance	13.4%	5.6%	33.2%	12.3%
Other	0.0%	18.6%	21.9%	15.3%
	26	80	33	139

Data are employment weighted.



4.1 RESULTS OF BINOMIAL PROBIT REGRESSION

Anecdotal evidence provides some insights into what was driving Slovak firms to cut base wages and which characteristics may be relevant for the incidence. In order to properly investigate the relationship between the wage cuts and a set of explanatory variables I run a number of binomial probit regressions. First of all, dependent variable takes values 0 and 1 conditional on whether a firm cut wages over the period in question. The dependent variable is then regressed against six sets of independent variables. I report the marginal effects at the mean value.

To start with, I chose a baseline scenario where the explanatory variables cover the basic firm characteristics. To be more specific, I control for prevailing type of labour force, share of labour costs in total costs, share of permanent workers, size of firm and industry. In the second step I control for the level of unionization as anecdotal evidence suggests that it may play a significant role. Finally, I run a number of different specifications in order to study additional determinants and to check for robustness of different specifications. Additional regressors include wage rigidities, level of revenue compared to previous year, worker turnovers and perceived competition.

Table 12 summarizes the regression results. In the first column, the baseline model, we can see that keeping other regressors constant, firms with prevailing low skilled blue collar workers face lower probabilities of wage cuts as opposed to the base category, i.e. firms with prevailing white collar employees. The result is highly significant and is in line with the anecdotal evidence provided previously. The same is true for firms with high skilled blue collar workers, however the result is not significantly different from the base category. Although not significantly, increasing share of labour costs induces increased probabilities of wage cuts and increasing share of permanent workers significantly decreases the probability. Size of the firm seems to be irrelevant. On the other hand, there are significant differences in probabilities of wage cuts between industries.

Adding collective bargaining as an explanatory variable improves the fit of the model and suggests that firms facing firm level collective bargaining tend to be subject to significantly higher probabilities of wage cuts than the reference category, i.e. firms without any level of collective bargaining. Thus, I keep the level of unionization as an additional control variable. This result may seem counterintuitive at the first glance. However, one possible explanation of the phenomenon may be that employees tend to establish firm level unions in firms that are more prone to cut wages in bad times. Another regressor that seems to be important is wage rigidity. The results suggest that wage cuts and wage freezes seem to go hand in hand, i.e. firms that have frozen wages (as opposed to firms without any wage rigidity) face significantly higher probabilities of wage cuts and the effect is strong. The similar is true for real wage rigidity as well, however to a much lesser extent and relative to the base category, the coefficient is not significantly different from zero. This is in line with a scenario where firms facing prolonged episodes of distress turn to wage freezes first and later to wage cuts if freezing wages was not sufficient. Note also the increase in the fit of the model.

Additional regressors include revenues relative to the revenues in previous year and worker flows, which enter the model significantly. In both specifications, the probability of wage cuts decreases with the revenue and with worker inflow. To be more specific, firms with both unchanged and increased revenues face lower probabilities of wage cuts as opposed to firms with decreased revenue. Also, firms with zero net flow of workers or net increase in the number of employees are less likely to face wage cuts. Finally, the probability of wage cuts is increasing



Table 12: Wage cuts

	(1)	(2)	(3)	(4)	(5)	(6)
LS BC	-0.074*** (0.024)	-0.060*** (0.016)	-0.032*** (0.010)	-0.057*** (0.015)	-0.057*** (0.016)	-0.053*** (0.014)
HS BC	-0.044 (0.037)	-0.030 (0.024)	-0.012 (0.011)	-0.026 (0.020)	-0.027 (0.022)	-0.028 (0.020)
Labour costs (%)	0.001 (0.001)	0.001 (0.000)	0.000 (0.000)	0.001 (0.000)	0.001 (0.000)	0.001 (0.000)
Permanent (%)	-0.001** (0.000)	-0.001** (0.000)	-0.000 (0.000)	-0.001** (0.000)	-0.001** (0.000)	-0.001** (0.000)
Small	0.041 (0.048)	0.037 (0.045)	0.036 (0.042)	0.051 (0.053)	0.039 (0.045)	0.038 (0.043)
Medium	0.080 (0.057)	0.062 (0.047)	0.041 (0.036)	0.074 (0.053)	0.051 (0.044)	0.059 (0.044)
Large	0.034 (0.038)	0.012 (0.031)	-0.003 (0.020)	0.019 (0.029)	0.004 (0.032)	0.013 (0.027)
Heavy	-0.031 (0.020)	-0.028* (0.015)	-0.016* (0.010)	-0.025 (0.016)	-0.025 (0.016)	-0.024* (0.014)
Car&Machinery	-0.056*** (0.017)	-0.047*** (0.014)	-0.021** (0.010)	-0.045*** (0.014)	-0.045*** (0.014)	-0.041*** (0.013)
Energy	-0.042*** (0.011)	-0.033*** (0.009)	-0.015* (0.008)	-0.030*** (0.009)	-0.030*** (0.009)	-0.025** (0.010)
Construction	-0.017 (0.021)	-0.008 (0.021)	0.010 (0.022)	-0.004 (0.023)	-0.006 (0.021)	-0.002 (0.023)
Trade	0.078 (0.080)	0.078 (0.072)	0.065 (0.055)	0.076 (0.069)	0.081 (0.073)	0.074 (0.067)
Fin. intermed.	-0.024 (0.027)	-0.001 (0.033)	0.019 (0.038)	0.009 (0.038)	0.003 (0.035)	-0.001 (0.030)
Mrkt services	-0.038* (0.023)	-0.031* (0.017)	-0.010 (0.013)	-0.027* (0.016)	-0.028* (0.017)	-0.022 (0.017)
Non-mrkt services	-0.037*** (0.013)	-0.031*** (0.009)	-0.009 (0.015)	-0.027*** (0.010)	-0.029*** (0.009)	-0.026*** (0.009)
CB: firm		0.068** (0.029)	0.036* (0.020)	0.054** (0.023)	0.068** (0.028)	0.060** (0.025)
CB: both		-0.007 (0.021)	0.002 (0.015)	-0.002 (0.021)	-0.008 (0.020)	-0.005 (0.019)
NWR			0.173*** (0.041)			
RWR			0.007 (0.013)			
Revenue: same				-0.029* (0.017)		
Revenue: higher				-0.039** (0.018)		
Employees: same					-0.023* (0.012)	
Employees: inflow					-0.001 (0.014)	
comp: weak						0.063 (0.097)
comp: strong						0.075* (0.042)
comp: severe						0.135* (0.073)
Observations	761	756	756	756	756	756
Pseudo R-squared	0.203	0.253	0.426	0.273	0.260	0.270

Standard deviations in parentheses. Asterisks indicate levels of significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. First column presents the results of a baseline model. In subsequent columns it is augmented by level of unionization and then by a number of explanatory variables. I report marginal effects at mean values. Base categories for dummy variables are as follows. Workforce composition: white collar workers. Industry: light. Firm size: extra small. Collective bargaining: none. Wage rigidity: none. Revenues: decreased. Workforce: outflow. Perceived competition: none.



with the level of perceived competition. Note that results are robust to different specifications.

To summarize, the survey results suggest that Slovak firms were able to cut base wages relatively more often than firms in majority of European countries. There are a number of possible explanations for this, but anecdotal evidence seems to imply that Slovak firms might have cut wages even more often, had it been possible. The evidence seems to be quite strong for firms with majority of low skilled blue collar workers, i.e. firms where the share of labour costs vs total costs is relatively high and firms are subject to low profit margins. Such firms find legal restrictions to be quite an important aspect to consider when cutting base wages. From this perspective it seems valid to reconsider the value of minimum wage as it might help firms overcome bad times rather than firing employees.

Indeed, the results of binomial probit regression confirm that firms with prevailing low skilled blue collar workers tend to cut base wages less often than the firms with prevailing white collar workers. Other determinants that proved to be important are level of unionization (firm level increasing the probability as opposed to no collective bargaining); wage rigidities, especially nominal wage rigidity which goes hand in hand with wage cuts; revenues; worker flows and perceived level of competition.

5. ALTERNATIVE MARGINS

Finally, I investigate alternative means by which firms adjust labour costs in case of temporary shocks or rigid wages. As we have seen in previous sections, in most of the countries where the survey was conducted, wages were cut rather rarely. I will not discuss why this might be the case but note that it has been shown that in general, workers strongly oppose wage cuts.¹¹ In such situations firms must rely on other tools for adjusting labour costs in order to accommodate changing economic conditions. These include reduction of bonuses or benefits for employees, changes in shift assignments in order to reduce labour costs, encouragement of early retirement and subsequent replacement of workers by cheaper hires, redundancy and reorganization and slowing down of promotions.

Table 13 shows the extent of use of these alternative margins in different countries. As already noted by Babecký et al. (2009), the use of different margins varies substantially across countries. In general, firms in Lithuania, Estonia, Italy, Hungary and Slovakia used alternative margins more often than firms in other countries. While firms in Lithuania and Slovakia also cut wages relatively often, firms in Italy cut them very rarely, only in 0.71%. On the other hand, Portuguese firms were among those that cut wages very little and also used alternative margins the least frequently.

As for the specific margins, managers in Slovakia, Lithuania and Estonia seem to choose reduction of bonuses and benefits quite often. Firms in Slovakia also often adopt redundancy and reorganization, which includes support of early retirement. Note that this alternative covers only support of early retirement for most of the countries and thus Slovak results are not entirely comparable with the others. Change in shift assignments seems to go hand in hand with the slowdown of promotions in both Hungary and Italy. Italian, French and Belgian firms seem to rely mostly on labour force turnover by encouraging employees to retire early and subsequently replacing them by cheaper new hires.

Turning back to the Slovak data, we observe meaningful differences in the use of alternative margins both from sectoral and regional perspectives. In general, we can say that firms oper-

¹¹See the results of the Inflation Persistence Network or Wage Dynamics Network.



Table 13: Percentage of firms that used alternative margins, by country

	Bonuses	Benefits	Change shift	Slow promo.	Cheaper hires	Red&Reorg	Any
Belgium	18.36%	7.88%	7.17%	14.98%	26.41%	18.93%	45.97%
Czech Republic	32.23%	7.51%	11.1%	1.90 %	8.73%	8.90%	47.32%
Estonia	40.23%	20.52%	21.07%	6.22 %	16.15%	2.58%	73.70%
France	14.68%	6.12%	0.00%	15.39 %	39.00%	30.29%	58.60%
Greece	20.43%	13.39%	N/A	0.00%	N/A	0.00%	N/A %
Hungary	22.70%	11.89%	38.29%	35.07 %	26.54%	10.24%	67.22%
Ireland	16.86%	7.80%	15.99%	9.37 %	37.00%	9.81%	54.90%
Italy	25.62%	21.78%	26.03%	34.04 %	45.58%	20.24%	70.36%
Lithuania	40.99%	25.08%	19.81%	10.49 %	17.90%	2.68%	87.88%
Poland	22.77%	15.23%	11.87%	12.28 %	22.10%	9.51%	47.71%
Portugal	13.70%	8.44%	10.72%	14.00 %	16.21%	0.00%	39.47%
Slovenia	13.48%	12.79%	9.15%	18.94 %	15.78%	8.90%	52.18%
Slovakia	33.23%	23.04%	13.55%	8.40 %	10.41%	45.81%	63.37%

Table presents percentages of firms that used any of the specified alternative margins for labor costs reduction. Data are employment weighted.

ating in both light and heavy industries, together with firms in market services sector, reduce labour costs via the use of alternative margins more often than firms in other sectors. Moreover, it appears that this is achieved preferably by firm reorganization and letting go of excess employees, followed by reduction of bonuses and cheaper new hires. On the other hand, firms operating in the trade sector, together with firms in energy industry and construction, turn to alternative margins less often than is the country average. Of these sectors, the energy industry outperforms other sectors in the use of outsourcing and the trade sector in the use of cheaper new hires.

IFrom the regional perspective, there are two outstanding regions with both high and low frequencies of use of alternative margins. On the low end, there is Bratislava region, where only 46.2% of all firms use any of the alternative margins, followed by firms in Banská Bystrica region. On the high end, there is Nitra region where 88.9% of firms reported to employ alternative margins together with Žilina region with 82.6%. It is worthwhile to note the extensive (relative to other regions) use of benefits reduction in Nitra region. Also in this region and the Žilina region the percentage of firms that changed shift assignments is rather high.

Table 14: Percentage of firms that used alternative margins, by sector

	light	heavy	cars/mach.	energy	const.	trade	fin. int.	mrkt serv	non-mrkt	Total	N
Reduce bonuses	34.96%	48.31%	26.99%	23.24%	29.71%	27.36%	23.99%	36.87%	41.98%	33.23%	248
Reduce benefits	19.13%	25.70%	27.52%	10.68%	16.86%	25.41%	18.86%	23.40%	21.18%	23.04%	139
Change shifts	18.62%	14.65%	21.04%	0.78%	2.05%	4.28%	0.77%	18.47%	17.49%	13.55%	75
Slowdown/freeze promotions	16.85%	25.03%	2.04%	0.78%	3.08%	3.65%	0.77%	6.67%	5.15%	8.40%	55
Cheaper new hires	15.89%	13.05%	7.31%	0.28%	8.72%	23.61%	7.00%	3.63%	6.54%	10.41%	88
Redundancy/reorg., ER	56.13%	67.21%	51.28%	33.87%	30.34%	15.75%	35.85%	48.86%	41.63%	45.81%	326
Outsourcing	4.84%	6.80%	1.59%	10.40%	5.08%	0.20%	13.56%	9.18%	6.17%	5.75%	39
Any strategy (a-e,u)	71.14%	85.37%	61.14%	46.16%	51.07%	40.29%	54.53%	70.61%	53.04%	63.37%	485
N	110	87	102	41	101	101	30	173	57	802	

Data are employment weighted.

Table 15: Percentage of firms that used alternative margins, by region

	BA	TT	TN	NR	ZA	BB	PO	KE	Total	N
Reduce bonuses	23.32%	45.62%	28.06%	21.14%	43.16%	25.62%	43.00%	39.53%	33.23%	248
Reduce benefits	12.88%	22.65%	18.80%	58.53%	23.18%	14.16%	35.43%	21.75%	23.04%	139
Change shifts	6.69%	12.72%	16.50%	42.74%	21.80%	4.21%	13.05%	9.57%	13.55%	75
Slowdown/freeze promotions	2.65%	26.35%	6.75%	2.00%	7.31%	10.84%	8.01%	7.81%	8.40%	55
Cheaper new hires	3.32%	7.86%	8.16%	10.73%	16.37%	6.51%	31.70%	5.69%	10.41%	88
Redundancy/reorg., ER	35.88%	29.51%	44.13%	65.72%	69.44%	49.23%	31.42%	62.01%	45.81%	326
Outsourcing	8.77%	0.54%	5.23%	1.66%	11.38%	2.12%	1.71%	8.44%	5.75%	39
Any strategy (a-e,u)	46.21%	61.97%	61.71%	88.66%	82.55%	55.85%	69.43%	69.36%	63.37%	485
N	213	84	76	66	83	72	93	115	802	

Data are employment weighted.



Table 16: Percentage of firms that used alternative margins, by prevailing workforce

	Major work force				N
	LS BC	HS BC	White	Total	
Reduce bonuses	32.85%	33.81%	24.61%	31.60%	218
Reduce benefits	27.69%	21.67%	18.79%	22.57%	126
Change shifts	18.25%	15.92%	3.20%	13.79%	67
Slowdown/freeze promotions	12.38%	8.72%	7.21%	9.32%	51
Cheaper new hires	3.55%	12.98%	5.83%	9.08%	82
Redundancy/reorg., ER	44.44%	51.12%	41.47%	47.38%	298
Outsourcing	6.27%	5.40%	9.09%	6.41%	38
Any strategy (a-e,u)	64.08%	66.67%	54.06%	63.33%	432
N	142	387	189	718	

Data are employment weighted.

Finally, I look at the use of alternative margins from the prevailing workforce perspective. It appears that Slovak firms with prevailing white collar workers tend to reduce labour costs via the use of alternative margins less often than others. Quite naturally, the most notable differences are in the use of change in shift assignments. Also noteworthy are the differences in the reduction of bonuses and benefits. When it comes to blue collar workers, taking advantage of worker turnover appears to be a valid alternative for firms with high skilled blue collar workers, where redundancy and reorganization together with cheaper new hires dominate all the skill classes.

Table 17: Cross-correlation table

Variables	Bonus cuts	Non-pay benefit cuts	Change in shift assignments	Slowing/freezing promotions	New cheaper hires	Early retirement, red&outsour	Wage cuts	Wage freezes
Bonus cuts	-							
Non-pay benefit cuts	0.355	-						
Change in shift assignments	0.126	0.108	-					
Slowing/freezing promotions	0.175	0.196	-0.023	-				
New cheaper hires	0.132	0.263	-0.007	0.145	-			
Early retirement, red&outsour	0.27	0.22	0.186	0.164	0.137	-		
Wage cuts	0.261	0.230	0.079	0.084	0.206	0.168	-	
Wage freezes	0.283	0.259	0.082	0.192	0.130	0.222	0.349	-

Data are employment weighted.

However, the use of individual alternative margins is not mutually exclusive and these are often used as complements. In Table 17 we can see that the use of bonus cuts and decrease in non-pay benefits go often hand in hand. High correlation between the two margins is not surprising as these are among the most easily accomplished tasks in order to reduce labour costs. Also, there are no legal barriers. Second highest correlation between alternative margins is between the redundancy and reorganization and bonus cuts. It implies that, where possible, firms tend to lay-off workers that are not necessarily needed, in addition to reducing bonuses. The similar is true with redundancy and reorganization and cutting non-pay benefits. From



this we can deduce that cutting bonuses and benefits are used both as complements and substitutes. Another possible avenue for labour cost reduction seems to be cutting the non-pay benefits together with hiring cheaper new employees. For completeness, I also added wage cuts and wage freezes into the correlation table. Wage cuts are often accompanied by bonus cuts and reduction in benefits, followed by cheaper new hires. A similar pattern can be observed for wage freezes. The most profound differences are high correlation of wage freezes and slowing down of promotion and lower correlation with cheaper new hires. Furthermore, as indicated in previous section, wage cuts and wage freezes often go hand in hand.

5.1 RESULTS OF BINOMIAL PROBIT REGRESSION

From the analysis above we can see that there are notable differences in the use of alternative margins with respect to a number of dimensions studied. The differences do not only lie in the overall use of alternative margins but also in the margins employed. In what follows, I will present results of binomial probit regressions, where I am trying to investigate the determinants of the use of various alternative margins. I look at the number of firm and worker specific characteristics and study their importance for explaining the use of margins. Apart from these, I also study the relevance of wage rigidities (both nominal and real) in explaining the use of alternative margins. I try to establish whether firms turn to the alternatives in the face of rigid wages and thus adjust labour costs in times when it would not be otherwise possible.

First, I look at the use of any of the margins that we have been discussing so far. I run four regressions, starting from a baseline model, where I include the type of prevailing workforce, share of labour costs, share of permanent workers, firm size, industry and indicator variable whether a firm exports part of the production abroad as explanatory variables. In next steps I include the level of unionization and level of revenues as additional control variables. I provide the results of these regressions in Table 18.

In the first column, we can see that as opposed to what was suggested by the anecdotal evidence, if we control for firm and worker characteristics, firms with prevailing blue collar workers (both low and high skilled) tend to use alternative margins less often than those that employ mostly white collar workers. The share of labour costs in total costs does not seem to play a role. On the other hand, share of permanent workers enters the model highly significantly. The results imply that the probability of the use of any alternative margin decreases with the increasing share of permanent workers. Furthermore, it increases with size (for medium and large firms) and it is higher in firms that export at least part of their production.

Two additional regressors enter significantly. In the model augmented by collective bargaining we find that firms that are covered by firm level unions use alternative margins significantly more often than those that are not covered at all. The opposite is true for firms that are covered by higher level of collective bargaining, however not significantly, relative to the base category. Note that we have found qualitatively same results for the wage cuts, i.e. firms with firm level of collective bargaining cut wages more often and firms with higher level of unionization cut wages less often than those that are not covered by any collective agreements. Unsurprisingly, the frequency with which firms use alternative margins decreases significantly with the dynamics of revenues. Firms with flat revenues and even more firms with increased revenues use some margin much less often than those with decreased revenues.

Finally, in Table 19 I present the results of regressions where I included wage rigidities as additional control variables. I do so for margins that have been used most often. It appears that wage rigidities help to explain the use of alternative margins and are a significant determinant.



Table 18: Alternative margins for labour cost adjustment, any margin

	Baseline	Unionization	Revenues	CB&revenues
LS BC	-0.128 (0.116)	-0.126 (0.108)	-0.116 (0.107)	-0.117 (0.103)
HS BC	-0.154 (0.097)	-0.155* (0.091)	-0.133 (0.088)	-0.140 (0.086)
labour costs (%)	0.000 (0.002)	-0.000 (0.002)	0.001 (0.002)	0.000 (0.002)
Permanent (%)	-0.006*** (0.002)	-0.006*** (0.002)	-0.006*** (0.002)	-0.006*** (0.002)
Small	-0.050 (0.074)	-0.063 (0.075)	-0.015 (0.074)	-0.034 (0.075)
Medium	0.045 (0.073)	0.011 (0.074)	0.076 (0.072)	0.040 (0.074)
Large	0.036 (0.093)	-0.052 (0.094)	0.079 (0.089)	-0.010 (0.093)
Heavy	0.128 (0.093)	0.124 (0.094)	0.123 (0.093)	0.115 (0.094)
Cars&Machinery	-0.122 (0.116)	-0.110 (0.114)	-0.102 (0.118)	-0.093 (0.116)
Energy	-0.207 (0.171)	-0.169 (0.178)	-0.168 (0.174)	-0.136 (0.179)
Construction	-0.218** (0.096)	-0.182* (0.099)	-0.205** (0.098)	-0.172* (0.100)
Trade	-0.161 (0.153)	-0.132 (0.137)	-0.149 (0.142)	-0.123 (0.130)
Fin. intermed.	-0.146 (0.170)	-0.057 (0.160)	-0.093 (0.161)	-0.023 (0.152)
Mrkt services	-0.110 (0.110)	-0.090 (0.112)	-0.083 (0.106)	-0.064 (0.109)
Non-mrkt services	-0.280** (0.124)	-0.289** (0.128)	-0.244* (0.129)	-0.257** (0.131)
Export	0.102 (0.080)	0.109 (0.075)	0.089 (0.078)	0.098 (0.075)
CB: sector		-0.305 (0.227)		-0.299 (0.230)
CB: firm		0.282*** (0.071)		0.265*** (0.070)
CB: both		0.013 (0.105)		0.002 (0.104)
Revenue: same			-0.186** (0.090)	-0.164* (0.089)
Revenue: higher			-0.223** (0.089)	-0.175** (0.086)
Observations	757	757	757	757
Pseudo R-squared	0.0821	0.137	0.101	0.148

Standard deviations in parentheses. Asterisks indicate levels of significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Dependent variable takes two values 0 and 1, depending on whether any of the alternative margins have been used by the firm. Base categories for dummy variables are as follows. Workforce composition: white collar workers. Firm size: extra small. Industry: light. Collective bargaining: none. Revenues: same.



Table 19: Alternative margins for labour cost adjustment

	Any	Bonus	Benefit	R&R
LS BC	-0.098 (0.101)	-0.020 (0.089)	0.066 (0.092)	-0.114 (0.102)
HS BC	-0.134 (0.083)	-0.016 (0.080)	-0.013 -0.079 (0.075)	(0.099)
labour costs (%)	0.001 (0.002)	-0.001 (0.002)	-0.000 (0.001)	0.005** (0.002)
Permanent (%)	-0.005*** (0.002)	0.004** (0.002)	-0.000 (0.001)	-0.003 (0.002)
Small	-0.034 (0.075)	-0.109* (0.060)	0.152 (0.100)	-0.064 (0.083)
Medium	0.029 (0.074)	-0.081 (0.068)	0.284*** (0.100)	0.077 (0.087)
Large	-0.045 (0.093)	-0.088 (0.088)	0.195** (0.080)	0.006 (0.106)
Heavy	0.121 (0.099)	0.079 (0.114)	0.006 (0.091)	0.073 (0.101)
Cars&Machinery	-0.048 (0.116)	-0.124 (0.094)	0.134 (0.105)	-0.086 (0.105)
Energy	-0.099 (0.173)	0.026 (0.178)	0.002 (0.174)	-0.112 (0.174)
Construction	-0.134 (0.104)	0.070 (0.103)	0.079 (0.104)	-0.228*** (0.079)
Trade	-0.115 (0.126)	0.004 (0.109)	0.161 (0.129)	-0.347*** (0.086)
Fin. intermed.	0.018 (0.152)	0.087 (0.159)	0.065 (0.174)	-0.101 (0.160)
Mrkt services	-0.029 (0.113)	0.046 (0.104)	0.079 (0.099)	-0.072 (0.114)
Non-mrkt services	-0.222* (0.134)	0.214 (0.145)	0.107 (0.138)	-0.192* (0.115)
Export	0.082 (0.075)	0.114* (0.063)	0.003 (0.062)	0.134* (0.081)
CB: sector	-0.266 (0.241)	-0.068 (0.237)		-0.361*** (0.101)
CB: firm	0.256*** (0.071)	0.182** (0.075)	0.153** (0.068)	0.149* (0.081)
CB: both	-0.014 (0.106)	-0.131 (0.082)	-0.013 (0.082)	0.146 (0.104)
Revenue: same	-0.144* (0.087)	0.045 (0.079)	-0.116* (0.062)	0.019 (0.088)
Revenue: higher	-0.121 (0.083)	-0.053 (0.076)	-0.102 (0.066)	-0.009 (0.087)
NWR	0.303*** (0.061)	0.459*** (0.070)	0.346*** (0.074)	0.279*** (0.077)
RWR	0.021 (0.082)	0.092 (0.081)	0.091 (0.066)	-0.145* (0.085)
Observations	757	757	752	757
Pseudo R-squared	0.192	0.200	0.176	0.169

Standard deviations in parentheses. Asterisks indicate levels of significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Dependent variable takes two values 0 and 1, depending on whether given margin has been used by the firm. Workforce composition: white collar workers. Firm size: extra small. Industry: light. Collective bargaining: none. Revenues: same.



The results suggest that firms that have frozen wages tend to use alternative margins much more often than firms with flexible wages. Note that the estimated coefficients are rather high, implying that the effects are strong. For example, we see that on average firms facing nominal wage rigidity cut bonuses with almost 46% higher probability than firms with flexible wages. The results are also highly significant. This implies that Slovak firms with rigid wages are not passive and indeed use alternative margins to accommodate shocks and to reduce labour costs.

In summary, there are significant differences in the use of alternative margins across regions and industries. From the correlation analysis we can conclude that the use of bonus cuts and reduction of non-pay benefits go often hand in hand. The second highest correlation is observed between the redundancy and reorganization and bonus cuts. It implies that, where possible, firms tend to lay-off workers that are not necessarily needed, in addition to reducing bonuses. The similar is true for redundancy and reorganization and cutting non-pay benefits. From this we can deduce that cutting bonuses and benefits are used as complements by some firms and as substitutes by others.

Results of binomial probit regressions suggest that firms with prevailing blue collar workers (both low and high skilled) tend to use alternative margins less often than those that employ mostly white collar workers. Furthermore, results imply that the probability of the use of any alternative margin decreases with the increasing share of permanent workers. The level of collective bargaining also matters as estimated coefficients are strong and significant. Firms that are covered by firm level unions use alternative margins significantly more often than those that are not covered at all. Unsurprisingly, the frequency with which firms use alternative margins decreases significantly with the dynamics of revenues. Firms with flat and increased revenues use margins much less often than those with decreased revenues.

Finally, including wage rigidities as additional control variables helps to improve the fit of the model significantly. Moreover, I find strong relationship between nominal wage rigidity and the use of alternative margins. More concretely, firms that have frozen wages use any margin on average with 30% higher probability than firms with flexible wages. The highest effect is present for the decrease in bonuses followed by decrease in non-pay benefits and redundancy and reorganization. The results suggest that firms often turn to alternative margins to compensate for wage rigidity.



6. CONCLUSION

Understanding wage rigidities, their absence and means how to achieve higher flexibility of labour costs is important also in the context of monetary policy setting. As suggested by the findings of Inflation Persistence Network, rigid wages may play an important role in the higher inflation persistence in Europe as opposed to the United States. The study presented here builds on a previous paper Červená (2012) where I tried to determine the extent to which Slovak base wages are rigid and what are the determinants for both nominal and real wage rigidity. There I conclude that the base wages in Slovakia are more rigid than is the average in the European Union and that the incidence of wage rigidities is closely related to the prevailing type of workforce (blue collar workers), level of unionization and the use of bonuses. To explain the differences in the findings compared to conclusions of Gertler and Senaj (2008) and Gertler (2010) I focus on firms that managed to adjust labour costs when necessary and study the use of alternative margins for labour cost adjustment.

Survey data suggest that firms in Slovakia managed to cut base wages more often than in any other country and in addition to that the use of alternative margins for labour cost reduction is also quite prevalent. Apart from looking at the anecdotal evidence, I run binomial probit regression to study the determinants of wage cuts and the use of alternative margins for labour costs reduction. Regression results suggest that the type of prevailing workforce matters. Firms with prevailing low skilled blue collar workers cut wages less often and do not turn to alternative margins as often as firms with prevailing white collar workers. Note that these firms faced lower probabilities of wage rigidities than firms with white collar workers. Coverage by collective bargaining is also a significant determinant. Firms that are covered by firm level unions face increased probabilities of both types of wage rigidities, cut wages and also use alternative margins more often than firms that are not covered by any level of collective bargaining. Unsurprisingly, wage rigidities, occurrence of wage cuts and the use of alternative margins decreases with growing revenues. Furthermore, firms facing nominal wage rigidity cut base wages more often than those with flexible wages. The same is true for the use of alternative margins. More specifically, firms with rigid base wages use alternative margins considerably more often than those with flexible wages and estimated coefficients are very high. This suggests that adopted definitions of wage rigidities only capture certain aspects of wage rigidities and do not account for others. However, the results of this paper confirm that the findings are in line with Gertler and Senaj (2008) and Gertler (2010) who conclude that wages in Slovakia are rather flexible.

APPENDIX

REAL GDP GROWTH IN SLOVAKIA

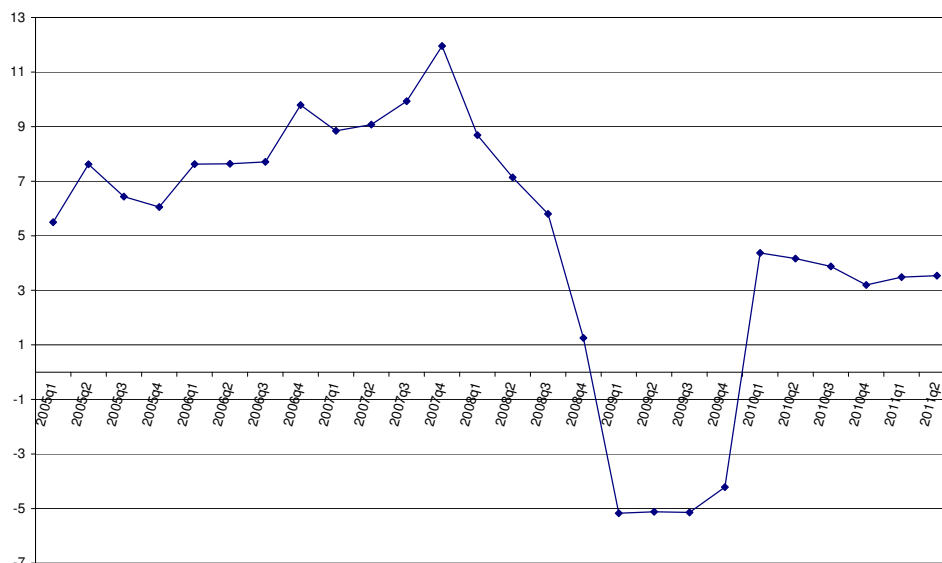


Figure 1: GDP growth in Slovakia, year-on-year

QUESTIONS AND VARIABLE DEFINITIONS

Base wage is defined as direct remuneration excluding bonuses (regular wage and salary, commissions, piecework payments).

Freeze in base wage occurred if base wage remains unchanged in nominal terms from a pay negotiation to the next.

Questions used for the creation of the dependent variable

Real wage rigidity: Does your firm have a policy that adapts changes in base wages to inflation?

- No
- Yes

Real wage rigidity: If yes, please select the options that best reflect the policy followed:

Wage changes are automatically linked to:

- past inflation
- expected inflation

Although there is no formal rule, wage changes take into account:



- past inflation
- expected inflation

Nominal wage rigidity: Over the last five years, has the base wage of some employees in your firm ever been frozen?

No

Yes (indicate for what percentage of your employees)

Table 20: Variable definitions

Variable	Definition
Perceived competition	Self defined competition capturing firm's perception regarding the intensity of product market competition. Ranges from none to severe.
Implied competition	Inferred from the question on whether firms follow the price changes of their competitions. Ranges from none to severe.
Exporting firm	Dummy taking the value of firms report having revenues from exporting activity.
Share of labour cost	Proportion of total costs that are due to labour costs.
Nominal wage rigidity	Downward nominal wage rigidity - 1 if firms have frozen wages in the last five years.
Strict indexation	Indicates whether firm's wages are automatically linked to past or expected inflation.
Formal /informal indexation	indicates whether firm's wages are automatically or informally linked to past or expected inflation.
Only outside agreement	Firms apply only an agreement concluded outside the firm.
Only firm agreement	Firms apply only an agreement concluded within the firm.
Firm and outside agreement	Firms apply both firm and outside agreement.
Worker turnover	Indicates whether the number of employees is stable, increasing or decreasing.
Bonus	Indicates whether firms use bonuses on the top of base wages.

Table 21: Descriptive statistics

Variable	Mean	Std. Dev.	N
Size	3.557	0.714	802
Share of permanent workers	85.262	19.692	802
Nominal wage rigidity	0.209	0.407	802
Real wage rigidity	0.211	0.409	802
Share of labour costs in total costs	29.764	18.069	761
Use of bonuses	0.947	0.224	763
Exporting firms	0.661	0.474	792
Perceived competition	3.214	0.753	802
Implied competition	2.931	0.734	758

EMPLOYMENT ADJUSTED SAMPLING WEIGHT

Employment adjusted sampling weight aims at ensuring that the sample represents employees in the population in addition to adjusting for the unequal probability of firms ending up in the realized or final sample. Formally, the employment adjusted sampling weight is a product of three individual weights:



$$w_l = w_1 w_2 w_3.$$

w_1 adjusts for the unequal probability of firms being included in the intended sample and is defined as follows:

$$w_1 = \left(\frac{N_h}{n_h^*} \right),$$

where N_h is a population of firms within each stratum and n_h^* is the intended gross sample of firms within each stratum.

w_2 adjusts for non response

$$w_2 = \left(\frac{n_h^*}{n_h} \right),$$

where n_h is the realized sample of firms within each stratum, i.e. the actual number of firms that receive and reply to the questionnaire.

The product of w_1 and w_2

$$w_1 w_2 = \left(\frac{N_h}{n_h} \right)$$

corrects for the unequal probability of firms being included in the realized sample.

w_3 adjusts for differences in the average firm size (in the population) across different strata

$$w_3 = \left(\frac{L_h}{N_h} \right),$$

where L_h is the population employment in each stratum.

By combining the expressions for w_1 , w_2 and w_3 , we obtain the following expression for the employment adjusted weight

$$w_l = \left(\frac{L_h}{n_h} \right).$$

Therefore, the employment adjusted weight is equal to the population employment in each stratum divided by the number of firms, in each stratum, in the realized sample.



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