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EMPLOYMENT AND WAGE ADJUSTMENTS DURING THE CRISIS PERIOD: EVIDENCE FROM WAGE DYNAMICS NETWORK (WDN) DATA FOR SLOVENIA

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EMPLOYMENT AND WAGE ADJUSTMENTS DURING THE CRISIS PERIOD: EVIDENCE FROM WAGE DYNAMICS NETWORK (WDN) DATA FOR SLOVENIA

Biswajit Banerjee,* Christopher Dunnett,† Mojca Lindič‡

ABSTRACT

The adequate functioning of the labour markets is especially important in the environment where countries cannot react to external shocks by adjusting their exchange rates. Analysing labour market flexibility is thus very important particularly in the case of the monetary union. This paper studies how Slovenian firms adjusted their labour costs during the global economic crisis in the period from 2010-2013, using WDN survey data and registry sources. The presence of downward base wage rigidity is confirmed by showing that more firms decreased their flexible wages and the number of permanent workers than base wages. Among the leading factors that had a negative impact on labour cost adjustments was the decrease in demand for firm's products and/or services. This study among others contributes to the field of knowledge by controlling also for firm exit as one of the adjustment strategies. Results on average show that younger firms and firms from construction sector were more likely to exit the market.

POVZETEK

Ustrezno delovanje trga dela je še posebej pomembno v primerih, ko se države zunanjim šokom ne morejo prilagoditi preko spremembe svojih menjalnih tečajev. Analiza fleksibilnosti trga dela je tako posebej relevantna v primeru monetarne unije. Analiza, predstavljena v članku, proučuje prilagajanje stroškov dela slovenskih podjetij v času gospodarske krize, oziroma v obdobju 2010-2013. Za potrebe analize so bili uporabljeni anketni podatki WDN in podatki registrskih virov. Rezultati potrjujejo rigidnost podjetij pri zmanjševanju osnovnih plač, saj so podjetja svoje stroške dela v povprečju raje prilagodila preko zmanjšanja variabilnih delov plač oziroma zmanjšanja števila zaposlenih, kot zmanjšanja osnovnih plač. Zmanjševanje stroškov dela je bilo še posebej prisotno v podjetjih, ki so se srečala z nižanjem ravni povpraševanja po svojih proizvodih oziroma storitvah. Prispevek članka predstavlja tudi analiza, ki kot eno izmed prilagoditev podjetij na krizo predpostavi izstop podjetja iz trga. Rezultati kažejo, da so trg v proučevanem obdobju v povprečju zapustila mlajša podjetja in podjetja iz dejavnosti gradbeništva.

Keywords: Wage Dynamics Network (WDN), labour market adjustment, crisis period, Slovenia.

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1. Introduction

Research and a broader understanding of labour market structures are particularly crucial among the members of a common currency, as the Eurozone. In a monetary union, countries cannot adjust exchange rates to smooth out external shocks to the economy, an option available to countries with independent monetary policy. As a result, flexible labour markets that can adequately adjust in order to smooth the effects of shocks are particularly important in countries that participate in a monetary union. However, both economic theory and contemporary research indicate the presence of various obstacles to more flexible labour markets, such as difficulties in downward adjustments in wages in both nominal and real terms, known as downward nominal wage rigidity and downward real wage rigidity, respectively. In the presence of downward nominal wage rigidity, it would be optimal for the economy to aim at keeping the level of inflation positive, albeit small, in order to facilitate adjustments in the real wages (Tobin, 1972). In contrast, if the inflation rate would be too low, the unemployment rate and output would be too high and too low, respectively, compared to the optimal (Akerlof et al., 1996). In addition, wage cuts are undesirable also for managers since they presume wage cuts would decrease workers' effort and productivity, and result in the best workers leaving the firm (Sila and Jesenko, 2011).

Since Slovenia is one of the Eurozone's members and since it was strongly affected by the recent economic crisis, we were motivated to study how Slovenian firms adjusted their labour costs over a period of economic downturn. After seeing a significant overlap between various modes of firms' adjustments, the main aim of the research was to analyse firms' employment and wage adjustments, and the combination of the two, during the period 2010 to 2013. With the purpose of simultaneously controlling for more than one type of the firms' labour cost adjustments, the multinomial logit method was applied in the empirical analysis. The study takes into account the third instalment of the European wide WDN survey (WDN3), the second completed in Slovenia, which is particularly helpful when it comes to analysing firm behaviour in the conditions of economic downturn.

Results on average show that a very important factor hindering firms' labour cost adjustment is the deterioration in the level of demand for firms' product and/or services. Firms, faced with a deteriorating demand for their products and/or services were more likely to cut their level of employment and/or wages. Conversely, firms that were more profitable were on average less likely to cut wages and employment. Finally, when taking into account also firm exit as one of the adjustment strategies during the crisis, results show that younger firms and firms from construction sector were on average more likely to exit the market.

This paper contributes to the field of research in several ways. In general, the paper provides important information for demonstrating the magnitude of various adjustment strategies during the crisis, and for analysing the impact of particular firm-level characteristics and shocks on firm behaviour. Such information can help to inform future policy debates, as it can reveal the firm-level characteristics affecting wage rigidity. In addition, the analysis empirically studies the adjustments of both, employment and wages, since the cross-tabulations between various adjustment variables showed a significant overlap in firms' labour cost adjustments. Furthermore, this study does not restrict itself to using only the WDN3 data, but also utilizes the data from other registry sources in order to augment the data in the study and check the consistency of the WDN3 survey. It is also important to note that the WDN3 survey only takes into account continuous firms, which already existed at the time of the beginning of the survey period in 2010 and until the collection of the data in 2014. The data does therefore not capture new entrants into the market during the period, or firms that ceased operations between 2010 and 2013. In the period between 2010 and 2013, 20.9% firms operating in 2010 have exited the market, while 33.2% of firms operating in 2013 have entered the

market. Therefore, it is not possible to generalize the conclusions of the WDN3 survey to those firms that either entered or exited the market during the period. However, in the model extensions, we contribute to the previous WDN analyses by taking into account also firms, which exited the market after 2010, using the data from other registry sources.

The rest of the paper is organised as follows. The next section presents the relevant literature, and is followed by a section presenting macroeconomic background and some relevant institutional features of Slovenia. Section four presents the survey and section five some descriptive statistics of the data. Different combinations of firms' modes of adjustment are presented in section six, while section seven introduces the estimation methods used. Results are presented in the section eight. The last section summarizes paper's main findings and concludes.

2. Literature review

This section reviews previous research in relation to economic theories that explain the phenomenon of downward wage rigidity. We also review studies that investigate those relevant firm-level factors included in the WDN3 survey that can help explaining firm behaviour in relation to adjustments to wages and employment headcount.

In an attempt to decrease labour costs due to changes in economic environment, firms can adjust their labour costs by changing their wages and/or employment. Firms can for example freeze or cut wages, decrease the number of their employees, freeze or reduce new hires, cut costs of recruiting, decrease the number of hours worked, etc. However, firms might be hesitant to cut wages even in an adverse macroeconomic environment. Contract theory for example hypothesizes that long-term employment contracts impede efficient adjustment of wages to macroeconomic developments in the short-term. In addition, since younger workers more often enter into short-term employment contracts, the wage rigidity is lower for these workers (Du Caju, Fuss, and Wintr, 2007). Furthermore, firms might keep wages above the levels dictated by the market wage hypotheses in order to discourage slacking, increase morale, prevent frequent worker turnover, and retain the most skilled and talented employees. As a result, firms can maximize efficiency in production processes by setting higher than equilibrium-level wages and avoiding costly wage cuts which might undermine employee effort (Yellen, 1984). Another theory hypothesises firms are prevented from firing current workers with high wages in order to hire incoming workers who will accept lower wages because of the threat of non-cooperation and obstruction from senior workers with newly hired employees (Lindbeck and Snower, 1988).

Results of the WDN1 survey, which was conducted in Slovenia in 2008 and referenced its questions to the period five years up to the year 2006, show a strong presence of wage rigidity among Slovenian firms. The survey was completed by 681 firms out of the sampled 3,000, giving a 22.7% response rate. Results also show that the wages were on average more rigid in Slovenia, compared to other European countries that were also included in the survey. Slovenian firms indicated they are reluctant to cut wages since they fear this would decrease workers' effort and induce the best workers to find a job elsewhere. However, it is also important to emphasize that the WDN1 survey was conducted prior the onset of financial crisis, while during the survey's reference period, Slovenia's economy experienced robust economic growth. Consequently, the observed downward wage rigidity could be the end result of firms not having incentives for cutting and/or freezing wages. Firms were also reluctant to offer significantly higher or lower wages to new employees, stating that the most important factor for determining wages of new comers being the wage level of existing workers (Sila and Jesenko, 2011). On the other hand, Banerjee, Vodopivec, and Sila (2013) found that Slovenian firms demonstrated significant flexibility in cutting labour costs in the onset of the financial crisis, especially in terms of variable pay components and employment. Similarly, in a preliminary study of the WDN3 survey for Slovenia, Jemec and Vodopivec (2016) confirmed the

decrease of the downward nominal wage rigidity during the crisis period. The authors find that firms mainly adjusted to the crisis by decreasing the number of employees, freezing new hiring or using flexible forms of work.

Adjustments in labour costs were evident also in some other European countries, where studies as well find signs of wage rigidity. For example, Babecky et al. (2015), in an analysis of Czech firms' behaviour during the economic crisis, concluded that wage cuts were relatively rare in comparison to employment adjustments. Keeney and Lawless (2010), in their study of the Irish labour market, found that while decreases or freezes of base wages were relatively rare, cuts in flexible wage components were far more common as a method of adjustment. Finally, focusing on the influence of nominal wage rigidity by empirically studying wage and employment adjustment in 25 European countries during 2010-2013 using WDN3 dataset, Marotzke et al. (2016) also find the presence of wage rigidities. In addition, the authors find that downward wage rigidities have a negative influence on employment at the firm level.

When it comes to the effect of firm size on behaviour of firms, there exist different findings in the economic literature and competing views on whether smaller firms are less sensitive to external shocks than their larger counterparts (Fort et al., 2013). Working with Swedish data, Agell and Benmarker (2007) for example find the presence of a larger degree of nominal wage rigidity for larger firms. The authors attribute this phenomenon to the fact that larger firms are less able to monitor the effort of their employees and evaluate performance. Given that managers at larger firms are less capable to prevent workers from adjusting their effort in response to external wages, larger firms are more likely to pay their workers a higher efficiency wage. Other surveys have shown a more muted effect of firm size on adjustment (see for example Dias, Marques, and Martin, 2012, working with data on Portuguese firms, or Cervena, 2012, utilizing the WDN1 data for Slovakia).

Studies also find an important link between different types of collective agreements and wage rigidity. Messina et al. (2008) argue that firm-level collective agreements dampen the likelihood of real wage rigidity, which they contribute to the fact that unions negotiating at the firm-level can more easily adapt to a particular firm-specific conditions than collective agreements, negotiated at the sectoral or national level. In addition, Babecky et al. (2010), working with WDN1 data from across Europe, demonstrate that downward real wage rigidity is particularly salient in nations with highly unionized workforces and centralized wage-bargaining institutions, as unions can dispel the money illusion by giving their members information on future inflation, and focusing on maintaining real, as opposed to nominal, wages.

Other literature discusses the impact of firm sector on labour force adjustments such as employment and wage changes. Du Caju, Fuss, and Winttr (2012) analysed data compiled from Belgium firms between 1990 and 2002. Authors find that sectors which are more labour-intensive and competitive also have more downwardly rigid wages. Wages in the relatively labour-intensive construction sector were for example particularly rigid when measured in real terms, while the transport and storage sectors exhibit a low degree of real wage rigidity. In a study of the German labour market, Radowski and Bonin (2008) found that wage freezes are more common in services than manufacturing, while wage cuts are relatively less frequent. In part, this might be explained by the fact that in Germany, service providers are more likely to report concerns about worker turnover than manufacturing firms are.

Particularly relevant in the context of the Slovenian labour market is also the impact of shocks to demand for a firm's products and services. Jemec and Vodopivec (2016) found that decreases in demand increase probability of cutting wages and dismissing employees, where the effect is largest for firms that only dismiss workers. In addition, Toth and Valkova (2015), using the WDN3 survey data for Slovakia, found that shocks to demand are the most important determinants of labour cost

adjustments, when such adjustments are defined as cuts in base wages, bonuses, employment, and average hours worked per employees. The authors found that a shock to demand was a statistically significant determinant for all adjustments included in their model.

Our contribution to the existing literature is to investigate firms' labour cost adjustment over the period from 2010 to 2013 in Slovenia, illuminating important information about the structure of the Slovenian labour market in the context of economic theory and past empirical findings. This study also adds to the existing studies by examining both, employment and wage adjustment of firms in the context of economic downturn, in order to follow up on the findings of past WDN studies. Although Jemec and Vodopivec (2016) did a preliminary study using WDN3 data for Slovenia, their analysis mainly took into account descriptive statistics of the WDN3 dataset. This study will also not limit itself by using only the WDN3 survey data, but in order to control for additional factors and challenge the relevance and consistency of the survey data, it will also use other available data sources (i.e. the Agency of the Republic of Slovenia for Public Legal Records and Related Services (AJPES) and Statistical Office of the Republic of Slovenia (SORS)). Finally, the study will also control for firm exit as one of firms' adjustment strategies.

3. Macroeconomic background and some institutional features of Slovenia

Slovenia experienced a decade of strong growth in economic output and employment in the decade before the 2008 financial crisis and global economic slump. In the period from 2001 to 2007, Slovenian GDP grew an average of 4.4%. This period also saw an average increase in the employment and productivity (Jesenko, 2013).

The onset of the global financial crisis in 2008 and subsequent worldwide economic slump strongly affected Slovenia. According to Jemec and Vodopivec (2016), some of Slovenia's strong economic performance during the 2000s is attributable to the country's easy access to credit and the mispricing of risk in the market, making the country particularly vulnerable to external shocks in economic downturn. While Slovenia experienced positive growth in 2008, 2009 saw Slovenia's GDP drop 7.8%, making the economic contraction in the country well above the EU average drop of 4.4% (Eurostat, 2016). While Slovenia had a below average unemployment rate before the crisis within the EU, the increase in the unemployment rate was sharp but remained below the EU average. Over the period from 2008 to 2013, Slovenian labour market segmentation and increasing unemployment particularly affected young people, the elderly, low-skilled workers, and men. One of the main reasons for worsened employment prospects for males and the low-skilled is a large drop in construction and manufacturing activity, while for the young it was in their large share in temporary employment, lack of experience, and the reduction in the volume of student work (UMAR, 2014a). The crisis also greatly damaged the financial sector. Excessive credit growth coupled with poor oversight and risky lending left the largely state-owned banking sector particularly vulnerable, prompting the country's costly re-capitalization of the banks (OECD, 2015b). Faced with slumping demand and a financial crisis, public debt soared upwards during the crisis, with overall debt rising from 22% of GDP in 2008 to 83% in 2015 (Eurostat, 2016). While Slovenia's economy began to recover at the end of 2013, following a second dip into recession in 2012, a weak financial system, overly indebted corporate sector, and the broader economic environment in Europe hampered the return to a more robust growth and a structurally sound economy (OECD, 2015b).

In early 2010, in the midst of the economic downturn, Slovenia amended its minimum wage with the Minimum Wage Act, intending to have the minimum wage reflect increased costs of living in the country. The legislation increased the minimum wage by 23%. The increase more than doubled the number of minimum wage recipients (Laporšek, 2014), decreased the wage inequality, hampered the cost competitiveness of the economy, and increased the number of jobs lost (UMAR,

2014b). Especially hampered by the increase were young and low-skilled workers (Laporšek, 2014).

A dip back into recession in 2012 and increase in unemployment rate exposed some of the underlining weaknesses in the country's labour market structure. The OECD had previously criticized Slovenia's labour market institutions, and in 2012 described the country's labour market as excessively rigid, and preventing adjustment and growth (European Observatory of Working Life, 2013). Slovenia's high minimum wage relative to the median wage only enhanced perceptions of labour market rigidity. In addition, especially before 2013, there was also a high level of the labour market segmentation between workers on permanent contracts, and workers in temporary and less stable forms of employment (Jesenko, 2013), since the legislation highly protected permanent contract workers, while these protections were not extended to employees on temporary contracts. Concerns with labour market rigidity and unemployment gave impetus to push for important reforms to Slovenia's labour market. In 2013, Slovenia passed a labour market reform, including the Employment Relationship Act (ZDR-1) and the Labour Market Regulation Act (ZUTD), which key provisions were to cut the maximum notice period, to introduce redundancy pay for temporary contracts in order to lower the segmentation of the labour market, and introduce a cap for temping agency workers. While Slovenia had one of the most restrictive employment protection legislation (EPL) before the 2013 labour market reform, the 2013 labour market reform increased convergence of termination costs across contracts, leading to decreased duality between permanent and temporary contracts (OECD, 2015a, and OECD, 2014). The effects of the labour market reform were for example studied by Vodopivec, Laporšek, and Vodopivec (2016), who found that the new legislation resulted in increased probability of accessing a permanent contract after having a temporary contract or after being unemployed. In addition, the reform also improved the position of the most vulnerable groups in the labour market, i.e. the young and the elderly, by increasing an access to the permanent contracts for these groups.

In many ways, Slovenia's economic and political institutions stand out from many of its peers joining the European Union in 2004 or later. To a degree higher than the other EU member states that joined the body in 2004 and later, interaction between various social partners seeks to resolve economic problems and coordinate economic developments (EIRO, 2016). In Slovenia, wage bargaining is highly structured. Up to 2005, trade unions, employers and the government negotiated the general wage agreement at the national level. However, bargaining at the national level for the private sector as a whole was cancelled in 2005, following employers' decision to withdraw from it. Additional collective agreements on the national level, which among others took into account wage adjustments, were signed in 2006 and 2008 but only on a temporary basis (Evidenca kolektivnih pogodb, 2016). Consequently, according to European Company Survey (ECS), 92% of Slovenian workers were covered by collective bargaining agreement in 2010 while the coverage has decreased to 69-78% in 2013 (EIRO, 2016). This data is consistent with the WDN3 survey data, which shows that the average share of employees covered by any collective pay agreement was 72% in 2013. Roughly 50% of firms applied a collective bargaining agreement at the firm level, while approximately 60% of firms applied a collective bargaining agreement outside of the firm; for example at the regional or sectoral level. The cross-tab between the two is presented in Table 1. Finally, according to the WDN3 survey, at least one employee was a member of a trade union in 14% of firms, while 47% of firms took part in an employers' association (Jemec and Vodopivec, 2016).

Table 1: Comparison of the membership in collective bargaining agreement at the firm level and outside of the firm (period: 2010-2013)

		Collective agreement outside of the firm (CA outside)		Total (CA inside)	
		No	Yes		
Collective agreement inside of the firm (CA inside)	No	Frequency	258	400	658
		Row percentage	39.2%	60.8%	100.0%
		Column percentage	53.9%	49.6%	51.2%
	Yes	Frequency	221	407	628
		Row percentage	35.2%	64.8%	100.0%
		Column percentage	46.1%	50.4%	48.8%
Total (CA outside)		Frequency	479	807	1,286
		Row percentage	37.3%	62.8%	100.0%
		Column percentage	100.0%	100.0%	100.0%

Source: BoS WDN3 survey

Note: Results are not weighted. Pearson's chi-squared test for the hypothesis that the rows and columns in a two-way table are independent, is 637.7 (Pr = 0.000).

Despite important institutional differences between European states, it should be noted that the external shocks faced by Slovenia during the economic downturn mimicked the shocks felt by other European countries. Unemployment rates across the continent on the whole increased in the wake of external shock as demand slumped and volatility increased. The uniform predilection to lay off workers in the early stages of the crisis indicates that layoffs were the primary adjustment strategy for firms across the European continent (Toth and Valkova, 2015). However, the institutional character of various labour markets in Europe saw varying adjustment strategies. While Latvia and Estonia were for example hit particularly hard with drops in GDP and unemployment in the beginning stages of the crisis, their flexible labour markets stood out for absorbing significant base wage cuts during the downturn. Both countries subsequently experienced a rapid economic recovery (see for example Malk, 2015, and Fadejeva and Krasnopjorovs, 2015). In contrast, other countries experienced patterns of wage rigidity. In Slovakia for example, collective agreements and wage rigidities played a crucial role in adjusting firms' labour costs and led to decreasing employment rather to cutting wages. This was also an important factor for the country's jobless recovery during 2010-2013 (Toth and Valkova, 2015).

4. The survey

The European System of Central Banks (ESCB) created the Wage Dynamics Network (WDN) in 2006 in order to study labour market characteristics throughout the member states of the European Union (EU). The first WDN survey (WDN1), which was undertaken also by the Bank of Slovenia, was completed in 2008, before the effects of the global financial crisis and resulting economic recession was fully felt. Slovenia did not participate in the second wave of the survey, which was carried out only in 11 countries. The questionnaires were shorter and mainly focused on firms' adjustments during the crisis (Fabiani et al., 2015). The third instalment of the European wide WDN survey (WDN3), the second completed in Slovenia, therefore has the potential to provide useful information when it comes to the behaviour of Slovenian firms during the crisis.

4.1 The WDN3 survey outline

The WDN3 survey asked firms questions related to both their individual behaviour and external market conditions, and largely concerned the period ranging from 2010 to 2013. Therefore, the

latest WDN3 survey provides us with the opportunity to study the structure and characteristics of the Slovenian labour market to an extent not previously available. The previous WDN1 survey was limited by both the timing of the survey, and several shortcomings in its design and implementation. As noted by Banerjee, Vodopivec, and Sila (2013), several critical shortcomings include a low response rate, poorly-worded questions, and insufficient implementation. In addition, the WDN1 survey suffered from mutually inconsistent responses to several questions, which can in part be explained by unclear survey questions and misinterpretation by the respondents. Banerjee, Vodopivec, and Sila (2013) concluded that these inconsistencies limited the usefulness of the data in drawing broader conclusions. Furthermore, the WDN1 was carried out before the onset of the economic crisis, limiting the survey's effectiveness as a tool for studying firm behaviour during economic downturns.

The WDN3 survey has sought to minimize the shortcomings of the previous WDN1 survey. The survey took a sample of 2,997 non-agricultural private-sector firms with at least 5 employees. The stratification was done by sector (two-digit NACE classification within sectors C-N) and firm size (firms were divided in class sizes by the number of employees; 5-9, 10-19, 20-49, 50-199, and 200+). The response rate of firms that fulfilled the entire survey in WDN3 (43%, i.e. 1,286 firms) was nearly twice as high as that of the WDN1 survey. Moreover, the WDN3 survey sought to correct the implementation problems that undermined the WDN1. In order to make the survey more comprehensible, a pilot study was conducted beforehand. In addition, a reminder was sent to those firms, which have not completed the survey in three weeks, whereas firms in strata with the lowest response rates were contacted individually. When presenting descriptive statistics and empirically analysing the survey, we take into account only those firms that completed the entire WDN3 survey.

As aforementioned, Slovenia's labour market was a subject to several significant legislative changes in the observation period, where questions regarding the minimum wage increase and the recent national legislation passed in 2013 have also been included in the WDN3 survey. Taking into account WDN3 survey data, Jemec and Vodopivec (2016) find that the share of minimum wage recipients increased from 8% to 11.3% after the minimum wage increase. The shares of minimum wage recipients varied substantially relating to firms' sector and size, where the highest shares were in the hotels and restaurants sector, administrative activities sector, and in small firms. With relation to the labour reform change, the respondents were asked whether the new market legislation and other market policy measures have affected their employment policies. Results show that the labour market reform affected only 14% of firms, which might be an indication that the new legislation has not been fully felt due to the short timespan between the implementation of the reform and implementation of the survey (Jemec and Vodopivec, 2016). While this paper will leave analysis of the particular effects of these reforms to later studies as the reforms were passed at the very end of the period covered by the WDN3 survey, the survey can provide important information to explain the impact of particular firm-level characteristics on various adjustment strategies such as wage freezes or wage cuts in a downward period of the business cycle.

4.2 The consistency checks of the WDN3 survey data

Despite the more thorough design and implementation of the WDN3 as compared to its WDN1 counterpart, it was necessary to check for potential inconsistencies in the data. The WDN3 survey data was again checked for potentially inconsistent responses, while answers were also cross-checked with annual firm-level information collected by AJ PES (i.e. balance sheet and income statements of firms). The consistency checks between the two datasets show that the majority of firms in the sample utilized the same adjustment with respect to employment, either decreasing or increasing employment. In addition, we also check whether the WDN3 sample reflects the population of Slovenian firms, which operated for the entire reference period, i.e. 2010-2013, by

using the AJPES dataset. When it comes to firm age, firm size, and industry, the comparison supports the overall consistency and representativeness of the WDN3 sample, despite small differences. Furthermore, the comparison also confirms that the proportion of firms either cutting or increasing average wages, or changing the employment, both in the WDN3 sample and those firms in the AJPES population, largely coincide, giving credence to the robustness of the sample data. Results on consistency checks are included in the Appendix.

5. Descriptive statistics

Taking firstly into account the WDN descriptive statistics across European countries, the results show that the overall share of firms that cut wages increased over the period from 2002 to 2013. In the first WDN survey, with the reference period 2002-2007, 2.3% of firms cut wages, in the second wave of the survey, with the reference period 2008-2009, the share increased to 3.1%, while in the last wave, with the reference period 2010-2013, the share increased to 4.6%. In the first wave, wages were cut the most in the Czech Republic, Lithuania, and Luxembourg, in the second wave in Estonia, Czech Republic, and Poland, while in the third wave, in Greece, Cyprus, and Croatia. Furthermore, the WDN3 survey also asked firms whether they have adjusted the number of workers, employed under a permanent or temporary contract. Especially the countries that were hit the most by the crisis answered it became less difficult to lay off workers during 2010-2013 (i.e. roughly 39% of Greek firms, and 29% of Spanish and Portuguese firms). Furthermore, firms were more likely to reduce permanent employment if they were faced with decreasing demand and difficulties to access finance. However, the latter shock had lesser impact on the adjustment of permanent workers than the former (Izquierdo et al., 2017).

Descriptive statistics of the WDN3 for Slovenia show that the largest share of firms in the sample appertains to manufacturing firms (33%), followed by firms from business services (29%), and trade and transport (23%). The highest shares of firms in the sample by the number of employees belong to smaller firms with 5 to 9 employees and 10 to 19 employees. Finally, the majority of firms in the sample are older than 20 years (46%) (Table 2). As presented in the previous section, the WDN3 survey data is fairly representative. Therefore, the descriptive statistics tables show the unweighted results. For brevity, the rest of the descriptive statistics tables are included in the Appendix.

Table 2: Distribution of firms by sector, firm size, and firm age

	Frequency	Share
Firm size (number of employees)		
5-9	323	25.1%
10-19	303	23.6%
20-49	246	19.1%
50-199	256	19.9%
200+	158	12.3%
Total	1,286	100.0%
Firm age (years)		
<6	94	7.3%
6-10	213	16.6%
11-15	170	13.2%
16-20	212	16.5%
20+	597	46.4%
Total	1,286	100.0%
Sector		
Manufacturing	424	33.0%
Utilities	59	4.6%
Construction	134	10.4%
Trade and transport	295	22.9%
Business services	374	29.1%
Total	1,286	100.0%

Source: BoS WDN3 survey

Note: Results are not weighted.

Considering the wage adjustments in Slovenia across various firm characteristics, the results show that, on average, the base wages were more likely cut in smaller (32%) and older (55%) firms, firms from business services sector (34%), exporting firms (62%), and mostly domestically owned firms (94%). We also analyse labour cost adjustments with regard to changes in economic environment. In the WDN3 questionnaire, firms also answered how was their activity affected by the change in several factors during 2010-2013, where these factors included the change in the level of demand for firm's products and/or services, volatility of demand for firm's products and/or services, access to external financing through the usual financial channels, customers' ability to pay and meet contractual terms, and availability of supplies from firm's usual suppliers. In addition, firms also had to specify the magnitude of a change in a particular factor (i.e. strong decrease, moderate decrease, unchanged, moderate increase, or strong increase). By comparison with various changes in economic environment, base wages were on average cut in firms that were faced with decreasing demand for their products and/or services (84%), with the decrease in access to external financing (68%), with decreased volatility of demand (66%), and decreased customers' ability to pay (81%). Decrease in the availability of supplies does not show to have a significant link with the base wage cut, as the majority (70%) of firms that cut their base wages responded the availability of supplies did not change in the studied period. On the other hand, flexible wages were, on average, more likely cut in smaller (27%) and older firms (52%), firms from business services sector (33%), exporting firms (63%), and mostly domestically owned firms (87%). By comparison with various changes in economic environment, flexible wages were on average cut with the decrease in the level of demand for firm's products and/or services (85%), with the decrease in access to external financing (60%), with decreased volatility of demand (61%), and decreased customers' ability to pay (82%). As in the event of base wage cut, decrease in the availability of supplies does not show to have a significant link with the flexible wage cut.

Decrease in employment of permanent workers was in Slovenia on average more common among firms with 50-199 employees (24%) and older firms (54%), firms from the manufacturing sector (35%), exporters (65%), and mostly domestically owned firms (85%). In addition, the decrease in employment of permanent workers was also more prominent in firms, faced with decrease in the level of demand for their products and/or services (79%), and decreased access to external financing (60%), volatility of demand (60%), and customers' ability to pay (79%). Similarly as when taking into account adjustment of wages, decrease in the availability of supplies does not show to have a significant link with the permanent workers cut.

6. Firms' modes of adjustment

It is necessary to shed light on how firms adjusted to the crisis using changes in wages and employment, and whether the data fits the aforementioned theoretical assumptions from the literature review regarding the workings of labour markets. First, we tabulate a comparison of base wage changes and flexible wage changes. Economic theory and previous research, such as the work of Messina, et al. (2008) in a selection of European countries, has indicated that the presence of flexible pay components help ameliorate nominal wage rigidity. Accordingly, firms are overall more willing to cut flexible components such as bonus payments and overtime pay than base wages. This assumption was also supported by past observations of the Slovenian labour market by Banerjee, Vodopivec, and Sila (2013), and Sila and Jesenko (2011), as their analyses found that Slovenian firms demonstrated flexibility in cutting various components of the supplementary wage bill.

Adjustment of Slovenian firms to uncertain conditions through changes in labour costs is also supported by our analysis of the WDN3 survey. We find that many firms adjusted labour costs through reductions in the flexible components of the wage bill. Firms were more likely to cut flexible wage components than base wages. Out of all firms that decreased base wages, 76% of them also decreased flexible wages. However, out of all firms that decreased flexible wages, 47% of them also decreased base wages.

Table 3: Comparison of base and flexible wage adjustments (period: 2010-2013)

		Change in flexible wage (FW)			Total (BW)	
		Decrease	No change	Increase		
Change in base wage (BW)	Decrease	Frequency	175	53	3	231
		Row percentage	75.8%	22.9%	1.3%	100.0%
		Column percentage	46.9%	7.8%	1.3%	18.0%
	No Change	Frequency	178	480	46	704
		Row percentage	25.3%	68.2%	6.5%	100.0%
		Column percentage	47.7%	70.6%	19.7%	54.7%
	Increase	Frequency	20	147	184	351
		Row percentage	5.7%	41.9%	52.4%	100.0%
		Column percentage	5.4%	21.6%	79.0%	27.3%
Total (FW)		Frequency	373	680	233	1,286
			29.0%	52.9%	18.1%	100.0%
			100.0%	100.0%	100.0%	100.0%

Source: BoS WDN3 survey

Note: Results are not weighted. Pearson's chi-squared test for the hypothesis that the rows and columns in a two-way table are independent, is 637.7 (Pr = 0.000).

Next, we tabulate the comparison between base wage changes and changes in the number of permanent employees in firms. Again, according to the theories on wage rigidity in the economy, the results of the WDN3 survey in Slovenia make intuitive sense. Firms were more reluctant to cut

base wages than lay off permanent workers. Namely, while 32% of firms decreased the number of permanent workers, only 18% of firms decreased the level of their base wages.

Table 4: Comparison of permanent worker and base wage change (period: 2010-2013)

		Change in base wage (BW)			Total (PW)	
		Decrease	No change	Increase		
Change in permanent workers (PW)	Decrease	Frequency	134	203	70	407
		Row percentage	32.9%	49.9%	17.2%	100.0%
		Column percentage	58.0%	28.8%	19.9%	31.7%
	No Change	Frequency	79	357	112	548
		Row percentage	14.4%	65.2%	20.4%	100.0%
		Column percentage	34.2%	50.7%	31.9%	42.6%
	Increase	Frequency	18	144	169	331
		Row percentage	5.4%	43.5%	51.1%	100.0%
		Column percentage	7.8%	20.5%	48.2%	25.7%
Total (BW)		Frequency	231	704	351	1,286
			18.0%	54.7%	27.3%	100.0%
			100.0%	100.0%	100.0%	100.0%

Source: BoS WDN3 survey

Note: Results are not weighted. Pearson's chi-squared test for the hypothesis that the rows and columns in a two-way table are independent, is 196.8 (Pr = 0.000).

Subsequently, we compare changes in the employment of permanent workers, and flexible wage changes in the WDN3 survey sample. Firms are about equally willing to cut flexible wages (29% of firms in total) and decrease employment of permanent workers (32% of firms in total). This demonstrates that when it comes to adjustment strategies, firms use cuts in flexible wage components and layoffs roughly equally. On the other hand, firms are more willing to increase permanent employment (26% of firms in total) than flexible wages (18% of firms in total). In short, the results of Table 4 and Table 5 indicate that firms on average more likely decrease employment, compared to base wages, while they more likely increase employment than flexible wages.

Table 5: Comparison of permanent worker and flexible wage change (period: 2010-2013)

		Change in flexible wage (FW)			Total (PW)	
		Decrease	No change	Increase		
Change in permanent workers (PW)	Decrease	Frequency	198	182	27	407
		Row percentage	48.7%	44.7%	6.6%	100.0%
		Column percentage	53.1%	26.8%	11.6%	31.7%
	No Change	Frequency	141	333	74	548
		Row percentage	25.7%	60.8%	13.5%	100.0%
		Column percentage	37.8%	49.0%	31.8%	42.6%
	Increase	Frequency	34	165	132	331
		Row percentage	10.3%	49.9%	39.9%	100.0%
		Column percentage	9.1%	24.3%	56.7%	25.7%
Total (FW)		Frequency	373	680	233	1,286
			29.0%	52.9%	18.1%	100.0%
			100.0%	100.0%	100.0%	100.0%

Source: BoS WDN3 survey

Note: Results are not weighted. Pearson's chi-squared test for the hypothesis that the rows and columns in a two-way table are independent, is 230.9 (Pr = 0.000).

7. Estimation methods

The WDN3 survey can provide important information for explaining the impact of particular firm-level characteristics on various modes of adjustment such as base wage cuts and layoffs in a downward phase of the business cycle. Our goal is to understand which firm-level characteristics and shocks on individual firms are responsible for particular firm behaviours during the economic crisis, especially as they relate to adjustments in wages and firm headcounts. This may prove useful when it comes to future policy debates, since the results can reveal firm-level characteristics that affect wage rigidity. In addition, following the results from the cross-tabulation tables, we see it is important to combine the analysis of both, employment and wage adjustments, as the cross-section of firms that have simultaneously adjusted both types of the labour costs is significant. The rest of the section presents the estimation methods used in the empirical analysis.

7.1 Basic model

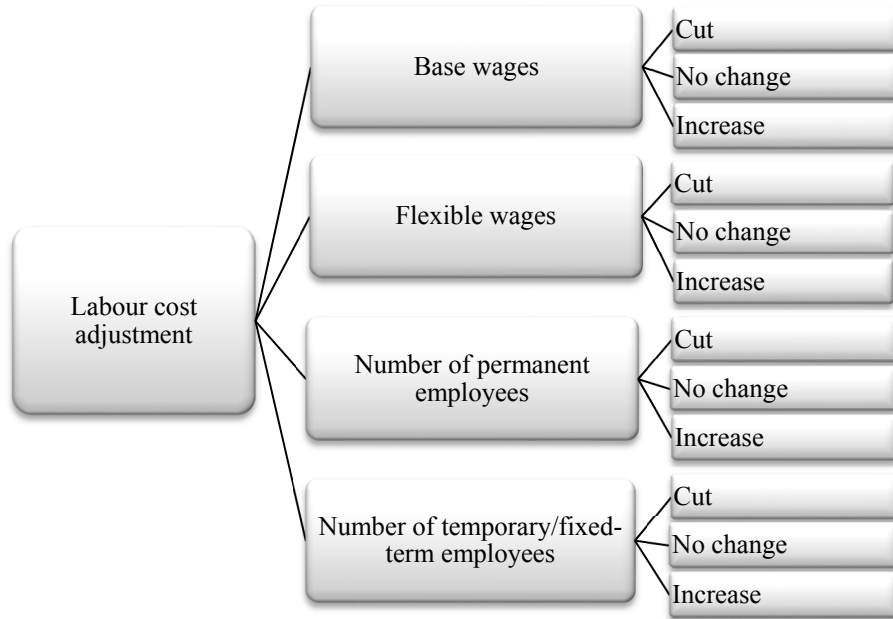
We assess the behaviour of Slovenian firms during the economic crisis by using regression analysis and studying the effects of various firm-level attributes and idiosyncratic firm-level shocks on changes in wages and employment over the period from 2010 to 2013.

As aforementioned, the cross-tabulations in the previous section show a strong overlap between different modes of adjustments. These results expose the importance of choosing the method, which would enable empirical analysis with multiclass problems; i.e. a situation where the dependent variable has more than two discrete options. Applying multinomial probit might be preferred over multinomial logit due to possibility of relaxing the independence of irrelevant alternatives (IIA) assumption, which is essential in the case of multinomial logit due to independent errors (see for example Long and Freese, 2014, Kropko, 2008, and Dow and Endersby, 2004). However, due to other important benefits of using multinomial logit over multinomial probit, we use the former in our analysis. More precisely, Dow and Endersby (2004) argue multinomial logit is simpler to use and has much less estimation problems than multinomial probit, which is frequently weakly identified. In addition, authors also argue the IIA assumption is in general not relevant nor restrictive. The latter is confirmed also by Kropko (2008), who compares both methods with various computer simulations and shows that multinomial logit delivers more accurate results than multinomial probit, even in the case when IIA is violated. As in Babecky et al. (2010), we use the Hausman test to test for IIA. The test supports the IIA assumption in almost all regression specifications, where there is no regression for which the IIA assumption could be unambiguously violated. The tests therefore confirm that multinomial logit is a suitable estimation method in a given framework. The use of the multinomial logit model was also utilized by other regression analyses of the WDN survey data, such as Babecky et al. (2010), and Jemec and Vodopivec (2016). Although the latter study also empirically analysed Slovenian WDN3 survey data by estimating relative probabilities of layoffs, wage cuts, or inaction, their main focus was on presenting the descriptive statistics of the dataset. As will be presented below, our analysis complements the analysis of Jemec and Vodopivec (2016) by including additional control variables from AJPES and by taking into account different combinations of adjustments in firms' labour costs. In addition, our analysis also implements various cross-tabulations between different modes of adjustment.

Given the covariates included in the model, different discrete adjustment outcomes were employed when applying the multinomial logit in the empirical analysis. When implementing regressions for various adjustments in the level of labour costs (i.e. base wage adjustment, flexible wage adjustment, permanent worker adjustment, and temporary worker adjustment), each of these variables are categorized into discrete adjustment outcomes of "Decrease", "No change", and "Increase", or "Decrease" and "No change or Increase", with one of the categories always used as the base category. Although the survey also asked respondents about the adjustment of the hours

worked, we have excluded this category from the empirical analysis since firms on average responded they did not adjust hours worked.

Image 1: Diagram of possible labour cost adjustments



The basic estimation applies the following model:

$$\begin{aligned}
 Adjustment_i = & \beta_0 + \beta_1 Size_i + \beta_2 Age_i + \beta_3 Sector_i + \beta_4 Demand_i \\
 & + \beta_5 Dom_demand_i + \beta_6 For_demand_i + \beta_7 Ownership_i \\
 & + \beta_8 Exporter_i + \beta_9 Agreement_inside_i \\
 & + \beta_{10} Agreement_outside_i + \beta_{11} ROA_i + \beta_{12} VAE_i + \varepsilon_i
 \end{aligned} \tag{1}$$

The dependent variable $Adjustment_i$ is defined as adjustment of employment and/or wages during the 2010-2013, according to the WDN3 survey. The explanatory variables are the following: $Size_i$ is the size category of a firm, measured as the number of employees in the year 2010 (SORS data), Age_i is the age of the firm in years since the founding of the firm, measured in 2010 (AJPEs data). Age of the firm was included in the analysis since in a study using Slovenian data, Banerjee and Jesenko (2015) emphasize the importance of controlling not only for firm size, but also for firm age, due to correlation between the two variables. $Sector_i$ is the industry sector of firms, measured by two-digit NACE classification codes within sectors and grouped in five categories ("Manufacturing" corresponds to the NACE sector C, "Utilities" to the sectors D and E, "Construction" to F, "Trade and Transport" to G and H, and "Business Services" to the sectors I to N) (SORS data). Furthermore, $Demand_i$ is an ordinal variable, showing whether firms indicated a strong or moderate decrease, no change, or a strong or moderate increase in the overall level of demand for their products and/or services, where a higher number of the variable corresponds to a more hindered level of demand (WDN survey data), Dom_demand_i is an ordinal variable, showing whether firms indicated a strong or moderate decrease, no change, or a strong or moderate increase in the level of domestic demand for their main product or service, where a higher number of the variable corresponds to a more hindered level of demand (WDN survey data), For_demand_i is an ordinal variable, showing whether firms indicated a strong or moderate decrease, no change, or a strong or moderate increase in the level of foreign demand for their main product or service, where a higher number of the variable corresponds to a more hindered level of demand (WDN survey data), $Ownership_i$ is a dummy variable, showing whether firms indicated mainly foreign ownership (WDN survey data), $Exporter_i$ is a dummy variable, showing whether a firm was exporter in 2010

(AJPES data), $Agreement_inside_i$ is a dummy variable, showing whether firms indicated applying a collective pay agreement at the firm level (WDN survey data), $Agreement_outside_i$ is a dummy variable, showing whether firms indicated applying a collective pay agreement outside of the firm (at the national, regional, sectoral, or occupational level) (WDN survey data), ROA_i is the rate of return on assets, calculated as a ratio between total profit and total assets in 2010 (AJPES data), and VAE_i is the value added per employee in a firm in 2010, where value added is calculated as the difference between net sales revenue or turnover and costs of goods, materials, and services (AJPES data). The last two variables were added to the analysis in order to contribute to the previous WDN studies, which usually did not control for firm profitability and productivity. Finally, ε_i is an error term. When cross-checking the WDN3 responses with the AJPES data on decline in financial ability, decline in customer ability to pay, and decline in input availability, we failed to find the correlation between the two datasets. Therefore, we have not included these control variables in the regressions.

As aforementioned, the consistency checks with the registry data from the whole population support the overall consistency and representativeness of the WDN3 sample. However, in order to accurately account for the distribution of firms by the number of firms in the population and to obtain more accurate estimates of labour market dynamics in the population of firms as a whole, we also control for firm-based probability weights.

7.2 Model extensions

In order to additionally challenge the representativeness of the WDN3 results, we run parallel regressions on the AJPES dataset. When constructing the sample of firms from the AJPES dataset, we take into account the characteristics of firms included in the WDN3 dataset, with the aim of having a representative sample of firms for comparing the regression results between the two datasets. Subsample of firms from the AJPES dataset therefore includes private-sector firms with at least 5 employees within the sectors C to N (i.e. using two-digit NACE classification codes).

The estimated model is the following:

$$Adjustment_i = \beta_0 + \beta_1 Size_i + \beta_2 Age_i + \beta_3 Sector_i + \beta_4 Demand_i + \beta_5 Ownership_i + \beta_6 Exporter_i + \beta_7 ROA_i + \beta_8 VAE_i + \varepsilon_i \quad (2)$$

The dependent variable $Adjustment_i$ is defined as an adjustment of employment and/or average wage level during the 2010-2013, according to the AJPES data, where the employment in AJPES dataset is measured as a full-time equivalent. In addition, it is important to mention that a change in the average wage level is not univocal as it could be due to decrease in wages, or due to the change in the structure or number of workers. The explanatory variables are the following: $Size_i$ is the size category of a firm, measured by the full-time equivalents, Age_i is the age of the firm in years since the founding of the firm, measured in 2010, $Sector_i$ is the industry sector of firms, measured by two-digit NACE classification codes, $Demand_i$ is an approximation of the WDN3 variable and is measured as a dummy variable, showing whether there was a decrease in the level of net sales between 2010-2013, $Ownership_i$ is a dummy variable, controlling whether firms had foreign or mixed capital ownership, $Exporter_i$ is a dummy variable, showing whether a firm was exporter in 2010, while ROA_i and VAE_i correspond to the rate of return on assets and the value added per employee, respectively, in a firm in 2010.

To additionally contribute to the field of research, we also take into account whether firms exited the market after the year 2010 and include this information as one of the modes of adjustment in the dependent variable. Market exit is measured if the firm has filed a balance sheet in 2010 but not in

the following years. In this specification, the variable "*Demand_i*" had to be excluded from the model since the change in demand level could not be calculated for firms that exited the market after 2010.

8. Results

8.1 Basic model

Results on base and flexible wage adjustments (Table 6) show that firms from construction and business services sectors are more likely to cut base and flexible wages, compared to firms from the manufacturing sector. In addition, hindered demand for firms' products and services also shows to have a significant role in cutting firms' base and flexible wages. On the other hand, foreign owned firms and more profitable firms seem to less likely cut base and flexible wages. Interesting findings emerge when comparing the results on the collective bargaining agreement. Firms that apply a collective pay agreement outside of the firm seem to more likely cut base wages, while on the other hand, firms that apply their collective agreement at the firm level seem to less likely cut base wages. These findings suggest that firms, which apply collective bargaining agreement at the higher level, were more likely to cut base wages and might indicate that collective agreements outside of the firm are looser and consequently give more leverage to firms for changing the wage level.

With relation to employment adjustments (Table 7), smaller firms are in general less likely to cut temporary employment and to cut both, permanent and temporary employment, compared to the biggest firms. These findings correspond with descriptive statistics, indicating that smaller firms have less leverage for decreasing their level of employment. Taking into account changes in employment by the sector, firms in utilities sector are less likely to cut temporary and permanent employment, compared to manufacturing firms. Decrease in the level for firms products and/or services has an important impact also on cutting firms' permanent and/or temporary employment. On the other hand, firms that are more productive are less likely to decrease permanent and temporary employment.

When taking into account overall labour cost adjustments (Table 8), results show that all firms by firm sizes were less likely to cut wages and/or employment, compared to the biggest firms. Here, wage cut was defined as cutting base or flexible wages, while employment cut was defined as cutting permanent or temporary employment. Compared to manufacturing firms, firms from utilities sector were less likely to cut both, wages and employment, while firms from construction and business services sectors were more likely to cut wages and employment. Again, firms that were subject to decreasing demand for their products and/or services were more likely to cut wages and employment, where both, decreased domestic and foreign demand for firm's main product play a role. Finally, more profitable firms were less likely to cut wages and employment.

Table 6: Labour cost adjustment of Slovenian firms during 2010-2013, base and flexible wages

	(1)	(2)	(3)
	Only base wage cut	Only flexible wage cut	Base and flexible wage cut
Size category (base: 200+)			
5-9	-0.010 (0.020)	-0.062 (0.040)	0.020 (0.042)
10-19	-0.012 (0.016)	-0.070* (0.043)	-0.019 (0.033)
20-49	-0.002 (0.019)	-0.040 (0.042)	-0.004 (0.038)
50-199	-0.005 (0.017)	-0.063* (0.038)	-0.009 (0.025)
Firm age (base: 20+)			
<6	0.035 (0.042)	-0.032 (0.047)	-0.030 (0.032)
6-10	0.001 (0.026)	-0.029 (0.044)	-0.021 (0.032)
11-15	-0.003 (0.023)	-0.022 (0.058)	-0.065*** (0.022)
16-20	0.020 (0.022)	0.000 (0.041)	-0.019 (0.029)
Sector (base: Manufacturing)			
Utilities	-0.007 (0.024)	-0.025 (0.075)	-0.060* (0.033)
Construction	-0.005 (0.017)	-0.018 (0.025)	0.130*** (0.048)
Trade and Transport	0.036* (0.020)	0.026 (0.033)	0.030 (0.029)
Bus. services	0.067*** (0.026)	0.017 (0.032)	0.087* (0.044)
Other explanatory variables			
Demand	0.001 (0.007)	0.065*** (0.016)	0.064*** (0.015)
Dom_demand	0.010** (0.005)	0.043*** (0.015)	0.023 (0.017)
For_demand	0.004 (0.007)	0.022 (0.019)	0.031** (0.015)
Ownership	-0.022** (0.011)	0.034 (0.036)	-0.052*** (0.019)
Exporter	0.021*** (0.007)	-0.015 (0.031)	0.017 (0.020)
Agreement_inside	-0.017** (0.008)	-0.015 (0.026)	0.021 (0.020)
Agreement_outside	0.020* (0.010)	0.024 (0.026)	0.005 (0.021)
ROA	-0.011 (0.057)	0.064 (0.116)	-0.414*** (0.154)
VAE	0.000 (0.000)	-0.001 (0.000)	0.000 (0.000)
Observations		1,005	
Pseudo R-squared		0.178	
Log-likelihood		-5,355	

Source: BoS WDN3 survey, AJPES, SORS

Notes: The table presents the marginal effects and their robust standard errors (in parentheses) after multinomial logit estimation, where the baseline was no change or increase in the dependent variable. *** p<0.01, ** p<0.05, * p<0.1. The explanation of the variables used in the model corresponds to the model (1).

Table 7: Labour cost adjustment of Slovenian firms during 2010-2013, permanent and temporary employment

	(1) Permanent employment cut	(2) Temporary employment cut	(3) Permanent and temporary employment cut
Size category (base: 200+)			
5-9	-0.013 (0.051)	-0.186*** (0.043)	-0.138*** (0.035)
10-19	-0.031 (0.041)	-0.198*** (0.043)	-0.086*** (0.025)
20-49	-0.041 (0.046)	-0.118*** (0.037)	-0.060*** (0.016)
50-199	-0.040 (0.040)	-0.104*** (0.033)	-0.020 (0.022)
Firm age (base: 20+)			
<6	-0.041 (0.039)	0.067 (0.074)	0.010 (0.043)
6-10	-0.005 (0.051)	0.104 (0.069)	-0.018 (0.028)
11-15	0.029 (0.069)	0.100 (0.076)	-0.029 (0.030)
16-20	0.005 (0.043)	0.013 (0.041)	-0.054* (0.032)
Sector (base: Manufacturing)			
Utilities	0.009 (0.075)	-0.113*** (0.031)	-0.047*** (0.017)
Construction	0.037 (0.041)	0.006 (0.041)	0.028 (0.023)
Trade and Transport	0.041 (0.043)	-0.088* (0.049)	0.005 (0.023)
Bus. services	0.006 (0.046)	0.025 (0.043)	0.013 (0.027)
Other explanatory variables			
Demand	0.063*** (0.017)	-0.009 (0.013)	0.046*** (0.010)
Dom_demand	0.005 (0.018)	0.024 (0.020)	0.055*** (0.014)
For_demand	0.010 (0.016)	0.033* (0.019)	0.044*** (0.011)
Ownership	-0.056 (0.035)	-0.078* (0.040)	-0.007 (0.029)
Exporter	-0.043 (0.036)	0.029 (0.033)	0.040** (0.020)
Agreement_inside	0.009 (0.023)	-0.024 (0.029)	-0.009 (0.020)
Agreement_outside	-0.012 (0.026)	0.011 (0.032)	0.002 (0.020)
ROA	0.075 (0.123)	-0.299* (0.158)	-0.465** (0.227)
VAE	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
Observations		1,005	
Pseudo R-squared		0.142	
Log-likelihood		-6,962	

Source: BoS WDN3 survey, AJPES, SORS

Notes: The table presents the marginal effects and their robust standard errors (in parentheses) after multinomial logit estimation, where the baseline was no change or increase in the dependent variable. *** p<0.01, ** p<0.05, * p<0.1. The explanation of the variables used in the model corresponds to the model (1).

Table 8: Labour cost adjustment of Slovenian firms during 2010-2013, wages and employment

	(1)	(2)	(3)
	Wage cut only	Employment cut only	Wage and employment cut
Size category (base: 200+)			
5-9	-0.046 (0.044)	-0.221*** (0.050)	-0.155*** (0.044)
10-19	-0.077** (0.032)	-0.182*** (0.054)	-0.200*** (0.039)
20-49	-0.084*** (0.026)	-0.170*** (0.043)	-0.112*** (0.043)
50-199	-0.069*** (0.022)	-0.112** (0.050)	-0.121*** (0.043)
Firm age (base: 20+)			
<6	0.013 (0.051)	0.081 (0.065)	-0.059 (0.051)
6-10	-0.010 (0.047)	0.074 (0.076)	-0.009 (0.047)
11-15	-0.051 (0.042)	0.086 (0.089)	-0.026 (0.059)
16-20	0.028 (0.050)	0.036 (0.052)	-0.052 (0.046)
Sector (base: Manufacturing)			
Utilities	0.091 (0.117)	-0.039 (0.086)	-0.168*** (0.032)
Construction	0.025 (0.046)	-0.047 (0.057)	0.114** (0.049)
Trade and Transport	0.056 (0.044)	-0.082** (0.039)	0.020 (0.045)
Bus. services	0.083* (0.047)	-0.037 (0.055)	0.103* (0.057)
Other explanatory variables			
Demand	0.020* (0.012)	-0.003 (0.019)	0.144*** (0.023)
Dom_demand	0.036** (0.015)	0.011 (0.025)	0.065*** (0.020)
For_demand	0.017 (0.015)	0.024 (0.018)	0.076** (0.032)
Ownership	0.004 (0.035)	-0.023 (0.048)	-0.103*** (0.038)
Exporter	-0.001 (0.024)	-0.021 (0.041)	0.038 (0.036)
Agreement_inside	-0.018 (0.020)	-0.017 (0.026)	0.011 (0.036)
Agreement_outside	0.016 (0.024)	-0.014 (0.032)	0.048* (0.028)
ROA	0.046 (0.102)	-0.114 (0.256)	-0.487* (0.266)
VAE	0.000 (0.000)	0.000 (0.000)	0.000 (0.001)
Observations		1,005	
Pseudo R-squared		0.169	
Log-likelihood		-7,160	

Source: BoS WDN3 survey, AJPES, SORS

Notes: The table presents the marginal effects and their robust standard errors (in parentheses) after multinomial logit estimation, where the baseline was no change or increase in the dependent variable. *** p<0.01, ** p<0.05, * p<0.1. The explanation of the variables used in the model corresponds to the model (1).

8.2 Model extensions

In the model extensions, we add to the previous research by including also an option to exit the market as one of the adjustment strategies (Table 9 to 11). Results show that firms that exited the market were on average younger and from construction sector. These results correspond to the study of Banerjee and Jesenko (2015), who show that younger firms demonstrate a higher probability of exiting the market. Results also confirm that firms in construction sector were disproportionately hit during the recent crisis. On the other hand, results indicate it was less likely that firms would exit the market if they were of smaller size (5 to 9 employees), compared to the biggest firms, from utilities sector, compared to manufacturing firms, exporters, and more profitable.

Finally, we also check the consistency of the results for the whole population of firms, using the AJPES data. On average, these results are coherent with the results from the WDN3 survey. Results and comments of the consistency checks are included in the Appendix.

Table 9: Labour cost adjustment of Slovenian firms during 2010-2013 (including also firm exit as an adjustment strategy), wages

	(1)	(2)
	Average wage cut	Exit
Size category (base: 200+)		
5-9	0.185*** (0.046)	-0.049** (0.019)
10-19	0.148*** (0.049)	-0.029 (0.019)
20-49	0.119** (0.050)	-0.013 (0.019)
50-199	0.037 (0.045)	-0.006 (0.019)
Firm age (base: 20+)		
<6	-0.114*** (0.026)	0.114*** (0.021)
6-10	-0.083*** (0.028)	0.049** (0.021)
11-15	-0.077*** (0.022)	0.013 (0.014)
16-20	-0.062*** (0.022)	0.004 (0.010)
Sector (base: Manufacturing)		
Utilities	0.098 (0.064)	-0.033** (0.014)
Construction	0.047** (0.018)	0.069*** (0.017)
Trade and Transport	0.053** (0.024)	0.011 (0.008)
Bus. services	0.131*** (0.031)	0.011 (0.011)
Other explanatory variables		
Ownership	-0.029 (0.028)	0.027 (0.017)
Exporter	0.002 (0.019)	-0.027*** (0.008)
ROA	-0.273*** (0.074)	-0.123*** (0.037)
VAE	0.001*** (0.000)	0.000 (0.000)
Observations	7,979	
Pseudo R-squared	0.039	
Log-likelihood	-6,710	

Source: BoS WDN3 survey, AJPES, SORS

Notes: The table presents the marginal effects and their robust standard errors (in parentheses) after multinomial logit estimation, where the baseline was no change or increase in the dependent variable. *** p<0.01, ** p<0.05, * p<0.1. The explanation of the variables used in the model corresponds to the model (2).

Table 10: Labour cost adjustment of Slovenian firms during 2010-2013 (including also firm exit as an adjustment strategy), employment

	(1)	(2)
	Employment cut	Exit
Size category (base: 200+)		
5-9	-0.096*** (0.037)	-0.048** (0.020)
10-19	-0.072* (0.037)	-0.027 (0.020)
20-49	-0.070* (0.038)	-0.010 (0.019)
50-199	-0.070** (0.035)	-0.005 (0.019)
Firm age (base: 20+)		
<6	-0.210*** (0.027)	0.107*** (0.021)
6-10	-0.109*** (0.028)	0.046** (0.020)
11-15	-0.065** (0.029)	0.011 (0.014)
16-20	-0.073*** (0.026)	0.002 (0.010)
Sector (base: Manufacturing)		
Utilities	-0.086 (0.075)	-0.031** (0.015)
Construction	0.050 (0.038)	0.071*** (0.018)
Trade and Transport	0.037 (0.045)	0.013 (0.008)
Bus. services	0.081** (0.032)	0.012 (0.011)
Other explanatory variables		
Ownership	-0.043** (0.020)	0.028 (0.017)
Exporter	-0.070*** (0.017)	-0.027*** (0.008)
ROA	-0.455*** (0.099)	-0.112*** (0.038)
VAE	-0.001** (0.000)	0.000 (0.000)
Observations	7,979	
Pseudo R-squared	0.047	
Log-likelihood	-6,949	

Source: BoS WDN3 survey, AJPES, SORS

Notes: The table presents the marginal effects and their robust standard errors (in parentheses) after multinomial logit estimation, where the baseline was no change or increase in the dependent variable. *** p<0.01, ** p<0.05, * p<0.1. The explanation of the variables used in the model corresponds to the model (2).

Table 11: Labour cost adjustment of Slovenian firms during 2010-2013 (including also firm exit as an adjustment strategy), wages and employment

	(1) Only average wage cut	(2) Only employment cut	(3) Average wage and employment cut	(4) Exit
Size category (base: 200+)				
5-9	0.160*** (0.040)	-0.133*** (0.038)	0.034 (0.034)	-0.051** (0.020)
10-19	0.131*** (0.049)	-0.104*** (0.036)	0.027 (0.037)	-0.031 (0.020)
20-49	0.097* (0.051)	-0.099*** (0.035)	0.028 (0.034)	-0.014 (0.020)
50-199	0.053 (0.044)	-0.060* (0.032)	-0.010 (0.032)	-0.006 (0.020)
Firm age (base: 20+)				
<6	-0.053*** (0.014)	-0.144*** (0.027)	-0.083*** (0.019)	0.103*** (0.022)
6-10	-0.064*** (0.013)	-0.090*** (0.023)	-0.036 (0.024)	0.043** (0.020)
11-15	-0.062*** (0.015)	-0.053** (0.022)	-0.030 (0.022)	0.008 (0.014)
16-20	-0.056*** (0.014)	-0.063*** (0.022)	-0.019 (0.023)	0.001 (0.010)
Sector (base: Manufacturing)				
Utilities	0.122* (0.066)	-0.082 (0.081)	-0.016 (0.018)	-0.034** (0.015)
Construction	0.020 (0.025)	0.016 (0.029)	0.022 (0.020)	0.069*** (0.017)
Trade and Transport	0.036*** (0.014)	0.017 (0.025)	0.013 (0.026)	0.011 (0.008)
Bus. services	0.053*** (0.020)	-0.002 (0.030)	0.075*** (0.023)	0.010 (0.011)
Other explanatory variables				
Ownership	0.000 (0.021)	-0.013 (0.026)	-0.029* (0.016)	0.028 (0.018)
Exporter	0.017 (0.012)	-0.052*** (0.013)	-0.016 (0.015)	-0.028*** (0.008)
ROA	0.066* (0.035)	-0.074 (0.094)	-0.376*** (0.089)	-0.114*** (0.039)
VAE	0.001*** (0.000)	-0.001*** (0.000)	0.000 (0.000)	0.000 (0.000)
Observations			7,979	
Pseudo R-squared			0.040	
Log-likelihood			-11,598	

Source: BoS WDN3 survey, AJPES, SORS

Notes: The table presents the marginal effects and their robust standard errors (in parentheses) after multinomial logit estimation, where the baseline was no change or increase in the dependent variable. *** p<0.01, ** p<0.05, * p<0.1. The explanation of the variables used in the model corresponds to the model (2).

9. Conclusions

This paper examined the overall structure of Slovenian labour market by observing the nature of firms' adjustment strategies over the crisis period. It is important to study the level of labour market flexibility, especially in a monetary union, where countries cannot adjust their exchange rates to smooth out external shocks. Instead, these shocks can be adjusted through the flexible labour market, which is particularly relevant in the periods of economic downturn. We perceive overall firm adjustments when it comes to changes in components of the wage bill and employment headcount, and analyse the composition of these adjustments in the Slovenian labour market. This study analysed results from the WDN3 survey for Slovenia, which was conducted in 2014 and largely concerned firms' labour cost adjustment to the market conditions during the economic downturn, focusing especially on the period between 2010 and 2013. Our paper aims to illuminate those firm-level characteristics and idiosyncratic shocks that influence firms' adjustment choices, particularly during downward turns in the business cycle. The paper contributes to the understanding and functioning of the Slovenian labour market, and adds to broader studies on labour markets in Europe and elsewhere. In addition, the study extends its research scope in relation to parallel Wage Dynamics Network (WDN) studies by including also other administrative sources to the analysis and by taking into account an option to exit the market as one of the adjustment strategies.

The results of cross-tabulations show that firms were on average more reluctant to cut base wages than flexible wages or permanent employment. Results also demonstrate relative flexibility in cutting flexible components of the wage bill, such as bonuses and overtime pay. Firms utilized cuts in flexible wages and layoffs with similar frequency, although they were more likely to increase employment than flexible wage components. Meanwhile, firms that undertook anomalous adjustment strategies, such as by cutting base wages while increasing employment, were sufficiently rare. These findings confirm the presence of downward base wage rigidity in Slovenian firms, support the reliability of the WDN3 survey dataset, and fit the results of past research in Europe and elsewhere. Finally, the results from cross-tabulations also indicate it is important to combine both adjustments of the labour costs in an empirical analysis, i.e. the adjustment of wages and employment, since the cross-section of firms using both adjustments is significant.

Results of the multinomial logit on average show that, when controlling for firm size, all firms were on average less likely to cut wages and/or employment, compared to the biggest firms, which employ more than 200 employees. These findings suggest that smaller firms have less leverage in adjusting their labour costs, compared to the biggest firms, especially when it comes to adjusting the employment. On the other hand, firms in construction sector and business services were more likely to cut employment and wages than manufacturing firms. These results might indicate that firms from construction sector and business services are on average more labour intensive compared to firms in other sectors, and were therefore more likely to adjust their labour costs during the crisis. Furthermore, very significant for firms' labour cost adjustment is also the deterioration in the level of demand for firms' products and/or services. Results show that firms, faced with decreases in the level of demand for their products, are more likely to cut wages and employment. Instead, firms that are more profitable are on average less likely to cut wages and employment. Finally, when taking into account also an option to exit the market as one of the adjustment strategies, the results on average show that younger firms and firms from construction sector were more likely to exit the market, while smaller firms, exporters, and more profitable firms were less likely to drop out of the market. Results thus confirm that firms from construction sector were over-proportionally affected by the crisis in Slovenia.

The study also brings some policy implications. Since results indicate that one of the leading factors that influence adjustment of firms' labour costs during economic downturn is the increase in the

level of demand for firms' products and/or services, it would be important for firms to minimise this risk by dispersing their operations to various markets. Firms could for example achieve this through the production of various products or through operating in different countries. The latter is confirmed also by the finding that exporting firms were less likely to drop out of the market during the economic downturn.

In order to contribute to these results, it would be interesting to estimate the labour demand for Slovenia in the future studies, since estimating labour demand is important for policy making (Babecky, Galuščak, and Lizal, 2011), and since the latest results show the relationship between employment and GDP has changed substantially during the crisis (ECB Economic Bulletin, 2016). In addition, it would also be noteworthy to test the effect of survivorship bias in the future by including an estimate of the probability of survival when empirically estimating the WDN3 data. These findings could assist in the future WDN survey rounds and add to the previous results of the WDN studies.

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Appendix

Appendix A: The consistency checks of the WDN3 survey data

We examined consistency in WDN3 responses by comparing the WDN3 survey responses to the AJPES data when it comes to firms' reported employee headcount and changes in the number of workers employed by firms between the years 2008 and 2013 (changes in number of employees in the WDN3 survey apply to 2008-2013 period). The comparison between WDN3 and AJPES data is shown in the Table A1 below. The majority of firms in the sample (more than 80%) were recorded in both datasets as utilizing the same adjustment, either decreasing or increasing employment. Differences in calculating employment numbers between the AJPES and WDN3 data likely account for some of the seemingly inconsistent recordings between the AJPES and WDN3 data. While the WDN3 survey asked respondents to list a specific number of employees of various categories (i.e. permanent contract or fixed-term contract workers) the AJPES data estimates the average employment number for a given year by the total working hours of the period. Given the differences in data collection and interpretation between the AJPES and WDN3 data, it is likely safe to ignore comparatively small discrepancies when it comes to employees. We can also expect the WDN3 data to slightly overestimate the number of employees at a firm relative to the AJPES data, as WDN3 does not distinguish between part-time and full-time workers in calculating firm-level headcounts. However, large discrepancies between the WDN3 survey and AJPES data for sampled firms are relatively insignificant.

Table A1: Employment adjustment (comparison of the WDN3 data and AJPES data for the firms in the WDN sample, period: 2008-2013)

Employment change (AJPES data)	Employment change (WDN3 data)			AJPES total
	Decrease	No change	Increase	
Decrease	32.5%	2.7%	8.6%	43.8%
No change	2.3%	2.0%	3.0%	7.3%
Increase	6.4%	3.3%	39.2%	48.9%
WDN3 total	41.1%	8.1%	50.8%	100.0%

Source: BoS WDN3 survey, AJPES

Some inconsistencies were discovered when it came to the number of workers employed by the firms in question in 2008 and 2013, and the changes in the number of workers employed within particular firms between 2008 and 2013 between the AJPES and WDN3 data. This is shown below in Table A2 and A3, respectively. There existed some firms that recorded far different numbers of employees in the WDN3 survey and in the AJPES data in 2008 and 2013, indicating the possibility of response error for these respondents. As expected, AJPES data tends to underestimate headcounts relative to WDN3, with the largest share of observations showing slightly smaller headcounts for the AJPES data than the WDN3.

Table A2: Difference in employment for firms in the WDN sample (comparison of the WDN3 data and AJPES data, period: 2008-2013)¹

Employment difference for firms in the WDN sample (WDN data/AJPES data)	2008	2013
<= -10	14.7%	16.6%
>-10 & <0	42.3%	39.6%
0	19.0%	24.5%
>0 & <10	18.7%	16.8%
>=10	5.3%	2.5%
Total	100.0%	100.0%

Source: BoS WDN3 survey, AJPES

Table A3: Change in employment difference for firms in the WDN sample (comparison between WDN data and AJPES data, period: 2008-2013)²

Change in employment differential	Percent
<= -10	12.2%
>-10 & <0	30.5%
0	15.3%
>0 & <10	31.5%
>10	10.5%
Total	100.0%

Source: BoS WDN3 survey, AJPES

Next, we also use AJPES to check whether the sample resembles the composition of Slovenian firms as a whole. We compare the firms sampled in the WDN3 survey using AJPES data to the population as a whole when it comes to firm age, firm size, and industry. This is shown in Table A4, A5, and A6, respectively. From these analyses, we gain several important insights into the comparison between the sample data and the population as a whole. For one, older firms are overrepresented in the sample, whereas younger firms founded within 10 years prior to 2010 are underrepresented. In addition, small firms with less than 10 workers are underrepresented while those firms with 50 or more employees are overrepresented. When it comes to sectors of the Slovenian economy, manufacturing firms and firms working in finance and insurance activities are slightly overrepresented when compared to the overall composition of the Slovenian economy. On the other hand, firms from construction and trade are slightly underrepresented. In addition, both younger and smaller firms were less likely to have completed their surveys than older or larger firms, as depicted in Tables A8 and A9, respectively. Despite these small differences, these comparisons support the overall consistency and representativeness of the WDN3 sample.

¹ Measured as employment calculated in AJPES minus employment recorded in WDN.

² Measured as the change in employment in AJPES between 2008 and 2013 minus employment change recorded in WDN over the same period.

Table A4: Firm age composition comparison for firms in the WDN3 sample and firms in the population (year 2013)

Firm age ³	WDN sample (AJ PES data)	Population (AJ PES data)
<6	7.3%	8.9%
6-10	16.6%	20.4%
11-15	13.2%	13.6%
16-20	16.5%	16.2%
20+	46.4%	40.9%
Total	100.0%	100.0%

Source: BoS WDN3 survey, AJ PES

Table A5: Firm size comparison for firms in the WDN3 sample and firms in the population (year 2013)

Firm Size ⁴	WDN sample (AJ PES data)	Population (AJ PES data)
<5	0.7%	2.4%
5-9	25.7%	34.0%
10-19	23.3%	23.5%
20-49	18.4%	16.4%
50-199	19.2%	15.5%
200+	12.8%	8.3%
Total	100.0%	100.0%

Source: BoS WDN3 survey, AJ PES

Table A6: Sector size comparison for firms in the WDN3 sample and firms in the population (year 2013)

	WDN sample (AJ PES data)	Population (AJ PES data)
Manufacturing	33.0%	30.8%
Electricity	1.63%	0.7%
Water utilities	3.0%	1.5%
Construction	10.4%	14.8%
Trade	16.0%	18.1%
Transportation	7.0%	8.2%
Hotels and restaurants	3.3%	4.2%
Information and comm.	6.0%	5.5%
Finance and insurance	4.1%	1.7%
Real estate activities	1.2%	1.1%
Professional activities	10.2%	8.9%
Administrative activities	4.3%	4.4%
Total	100.0%	100.0%

Source: BoS WDN3 survey, AJ PES

Table A7: Employment adjustment for firms in the WDN3 sample and firms in the population

	Employment change			Total
	Decrease	No change	Increase	
WDN Sample (AJ PES data)	43.8%	7.3%	48.9%	100.0%
Population (AJ PES data)	42.8%	11.9%	45.3%	100.0%

Source: BoS WDN3 survey, AJ PES

³ Firm age measured as years since the founding of the firm, as calculated in 2013.

⁴ Firm size measured as full time equivalent (FTE) number of employees from the AJ PES data.

Table A8: Incomplete responses by firm age categories

Firm age ⁵	Complete	Incomplete	Total
<6	64.0%	36.0%	100.0%
6-10	64.2%	35.8%	100.0%
11-15	56.7%	43.3%	100.0%
16-20	55.2%	44.8%	100.0%
20+	51.4%	48.6%	100.0%

Source: BoS WDN3 survey, AJPES

Table A9: Incomplete responses by firm size categories

Firm size	Complete	Incomplete	Total
5-9	66.5%	33.5%	100.0%
10-19	55.8%	44.2%	100.0%
20-49	50.7%	49.3%	100.0%
50-199	47.3%	52.7%	100.0%
200+	48.3%	51.7%	100.0%

Source: BoS WDN3 survey, AJPES

Lastly, we provide a comparison between those firms sampled in the WDN3 survey and those firms in the population which operated for the entire reference period from 2010-2013. As shown in Table A10, the proportion of firms either cutting or increasing average wages, both in the survey sample and those firms in the population, which continuously operated across the reference period, largely coincide. Continuously operating firms in the population are slightly more likely than those in the sample to decrease average wages, and slightly less likely to increase average wages. Table A11 shows the proportion of firms in the WDN sample and continuously operating firms in the population, which undertook various average wage adjustments between 2010 and 2013. For example, 20.2% of firms in the sample, and 22.3% of firms in the population decreased their average wages by more than 5%. As with Table A10, the average wage adjustments undertaken by those firms in the sample and population are largely similar, giving credence to the robustness of the sample data

Table A10: Comparison of average wage change for firms in the WDN sample and population of continuously operating firms in the period 2010-2013

Average wage change	WDN sample (AJPES data)	Population (AJPES data)
Decrease	30.4%	33.5%
No change	0.3%	0.4%
Increase	69.3%	66.1%
Total	100.0%	100.0%

Source: BoS WDN3 survey, AJPES

Table A11: Comparison of average wage change for firms in the WDN sample and population of continuously operating firms in the period 2010-2013

Average wage change in percent (2010-2013)	WDN sample (AJPES data)	Population (AJPES data)
<= -5%	20.2%	22.3%
>-5% & <=0%	10.5%	10.8%
>0% & <=5%	14.9%	14.5%
>5%	54.4%	52.4%
Total	100.0%	100.0%

Source: BoS WDN3 survey, AJPES

⁵ Firm age measured as years since the founding of the firm, as calculated in 2010.

Appendix B: Descriptive statistics tables

Table B1: Base wage adjustment across various firm characteristics (period: 2010-2013)

	Base wage adjustment					
	Decrease		No change		Increase	
	%	Frequency	%	Frequency	%	Frequency
Firm size (number of employees)						
5-9	31.6%	73	26.9%	189	17.4%	61
10-19	19.9%	46	25.0%	176	23.1%	81
20-49	17.3%	40	19.2%	135	20.2%	71
50-199	19.5%	45	19.2%	135	21.7%	76
200+	11.7%	27	9.8%	69	17.7%	62
Total	100.0%	231	100.0%	704	100.0%	351
Pearson's chi-squared	28.266 (Pr = 0.000)					
Firm age (years)						
<6	4.3%	10	7.8%	55	8.3%	29
6-10	15.2%	35	16.5%	116	17.7%	62
11-15	10.4%	24	13.5%	95	14.5%	51
16-20	15.6%	36	18.0%	127	14.0%	49
20+	54.6%	126	44.2%	311	45.6%	160
Total	100.0%	231	100.0%	704	100.0%	351
Pearson's chi-squared	12.525 (Pr = 0.129)					
Sector						
Manufacturing	25.1%	58	29.1%	205	45.9%	161
Utilities	1.7%	4	5.5%	39	4.6%	16
Construction	15.2%	35	11.1%	78	6.0%	21
Trade and transport	24.2%	56	24.3%	171	19.4%	68
Business services	33.8%	78	30.0%	211	24.2%	85
Total	100.0%	231	100.0%	704	100.0%	351
Pearson's chi-squared	50.0652 (Pr = 0.000)					
Exporter						
No	37.7%	87	34.7%	244	25.6%	90
Yes	62.3%	144	65.3%	460	74.4%	261
Total	100.0%	231	100.0%	704	100.0%	351
Pearson's chi-squared	11.752 (Pr = 0.003)					
Ownership						
Majority domestic	93.5%	216	84.7%	596	77.5%	272
Majority foreign	6.5%	15	15.3%	108	22.5%	79
Total	100.0%	231	100.0%	704	100.0%	351
Pearson's chi-squared	27.140 (Pr = 0.000)					

Source: BoS WDN3 survey

Notes: Results are not weighted. Explanation of some variables: Exporter: controls whether a firm was an exporter in 2010 or not; Ownership: shows, whether a firm indicated mainly foreign ownership in the WDN survey.

Table B2: Base wage adjustment with regard to changes in the economic environment (period: 2010-2013)

	Base wage adjustment					
	Decrease		No change		Increase	
	%	Frequency	%	Frequency	%	Frequency
Demand change						
Decrease	84.0%	194	60.5%	426	36.8%	129
No change	10.0%	23	24.3%	171	21.9%	77
Increase	6.1%	14	15.2%	107	41.3%	145
Total	100.0%	231	100.0%	704	100.0%	351
Pearson's chi-squared	178.179 (Pr = 0.000)					
Access to credit change						
Decrease	67.5%	156	43.3%	305	32.5%	114
No change	30.3%	70	53.7%	378	62.7%	220
Increase	2.2%	5	3.0%	21	4.8%	17
Total	100.0%	231	100.0%	704	100.0%	351
Pearson's chi-squared	71.580 (Pr = 0.000)					
Volatility of demand change						
Decrease	65.8%	152	43.9%	309	28.5%	100
No change	19.9%	46	40.5%	285	44.7%	157
Increase	14.3%	33	15.6%	110	26.8%	94
Total	100.0%	231	100.0%	704	100.0%	351
Pearson's chi-squared	88.168 (Pr = 0.000)					
Customers' ability to pay change						
Decrease	81.0%	187	72.6%	511	59.8%	210
No change	15.2%	35	24.3%	171	35.6%	125
Increase	3.9%	9	3.1%	22	4.6%	16
Total	100.0%	231	100.0%	704	100.0%	351
Pearson's chi-squared	34.957 (Pr = 0.000)					
Availability of supplies change						
Decrease	27.7%	64	17.8%	125	15.1%	53
No change	70.1%	162	80.1%	564	78.1%	274
Increase	2.2%	5	2.1%	15	6.8%	24
Total	100.0%	231	100.0%	704	100.0%	351
Pearson's chi-squared	31.399 (Pr = 0.000)					

Source: BoS WDN3 survey
 Note: Results are not weighted.

Table B3: Flexible wage adjustment across various firm characteristics (period: 2010-2013)

	Flexible wage adjustment					
	Decrease		No change		Increase	
	%	Frequency	%	Frequency	%	Frequency
Firm size (number of employees)						
5-9	26.8%	100	26.0%	177	19.7%	46
10-19	20.4%	76	25.4%	173	23.2%	54
20-49	17.4%	65	18.4%	125	24.0%	56
50-199	19.0%	71	19.7%	134	21.9%	51
200+	16.4%	61	10.4%	71	11.2%	26
Total	100.0%	373	100.0%	680	100.0%	233
Pearson's chi-squared	17.431	(Pr = 0.026)				
Firm age (years)						
<6	4.6%	17	7.8%	53	10.3%	24
6-10	15.3%	57	15.7%	107	21.0%	49
11-15	11.3%	42	13.4%	91	15.9%	37
16-20	17.4%	65	17.7%	120	11.6%	27
20+	51.5%	192	45.4%	309	41.2%	96
Total	100.0%	373	100.0%	680	100.0%	233
Pearson's chi-squared	20.444	(Pr = 0.009)				
Sector						
Manufacturing	27.1%	101	34.0%	231	39.5%	92
Utilities	2.7%	10	6.6%	45	1.7%	4
Construction	12.9%	48	11.2%	76	4.3%	10
Trade and transport	24.1%	90	20.6%	140	27.9%	65
Business services	33.2%	124	27.7%	188	26.6%	62
Total	100.0%	373	100.0%	680	100.0%	233
Pearson's chi-squared	38.859	(Pr = 0.000)				
Exporter						
No	37.0%	138	34.4%	234	21.0%	49
Yes	63.0%	235	65.6%	446	79.0%	184
Total	100.0%	373	100.0%	680	100.0%	233
Pearson's chi-squared	18.443	(Pr = 0.003)				
Ownership						
Majority domestic	86.6%	323	86.6%	589	73.8%	172
Majority foreign	13.4%	50	13.4%	91	26.2%	61
Total	100.0%	373	100.0%	680	100.0%	233
Pearson's chi-squared	23.571	(Pr = 0.000)				

Source: BoS WDN3 survey

Note: Results are not weighted. Explanation of some variables: Exporter: controls whether a firm was an exporter in 2010 or not; Ownership: shows, whether a firm indicated mainly foreign ownership in the WDN survey.

Table B4: Flexible wage adjustment with regard to changes in the economic environment (period: 2010-2013)

	Flexible wage adjustment					
	Decrease		No change		Increase	
	%	Frequency	%	Frequency	%	Frequency
Demand change						
Decrease	84.5%	315	52.5%	357	33.1%	77
No change	9.9%	37	27.4%	186	20.6%	48
Increase	5.6%	21	20.2%	137	46.4%	108
Total	100.0%	373	100.0%	680	100.0%	233
Pearson's chi-squared	223.180 (Pr = 0.000)					
Access to credit change						
Decrease	59.5%	222	41.2%	280	31.3%	73
No change	38.3%	143	55.3%	376	64.0%	149
Increase	2.1%	8	3.5%	24	4.7%	11
Total	100.0%	373	100.0%	680	100.0%	233
Pearson's chi-squared	53.741 (Pr = 0.000)					
Volatility of demand change						
Decrease	61.1%	228	40.3%	274	25.3%	59
No change	21.2%	79	44.3%	301	46.4%	108
Increase	17.7%	66	15.4%	105	28.3%	66
Total	100.0%	373	100.0%	680	100.0%	233
Pearson's chi-squared	100.724 (Pr = 0.000)					
Customers' ability to pay change						
Decrease	81.8%	305	67.2%	457	62.7%	146
No change	14.5%	54	29.7%	202	32.2%	75
Increase	3.8%	14	3.1%	21	5.2%	12
Total	100.0%	373	100.0%	680	100.0%	233
Pearson's chi-squared	38.116 (Pr = 0.000)					
Availability of supplies change						
Decrease	26.0%	97	17.9%	122	9.9%	23
No change	71.6%	267	79.7%	542	82.0%	191
Increase	2.4%	9	2.4%	16	8.2%	19
Total	100.0%	373	100.0%	680	100.0%	233
Pearson's chi-squared	41.756 (Pr = 0.000)					

Source: BoS WDN3 survey
 Note: Results are not weighted.

Table B5: Permanent worker adjustment across various firm characteristics (period: 2010-2013)

	Permanent worker adjustment					
	Decrease		No change		Increase	
	%	Frequency	%	Frequency	%	Frequency
Firm size (number of employees)						
5-9	21.6%	88	32.3%	177	17.5%	58
10-19	19.7%	80	27.2%	149	22.4%	74
20-49	17.0%	69	18.4%	101	23.0%	76
50-199	24.1%	98	15.2%	83	22.7%	75
200+	17.7%	72	6.9%	38	14.5%	48
Total	100.0%	407	100.0%	548	100.0%	331
Pearson's chi-squared	65.253 (Pr = 0.000)					
Firm age (years)						
<6	3.7%	15	8.6%	47	9.7%	32
6-10	13.0%	53	14.2%	78	24.8%	82
11-15	11.8%	48	13.9%	76	13.9%	46
16-20	17.7%	72	18.3%	100	12.1%	40
20+	53.8%	219	45.1%	247	39.6%	131
Total	100.0%	407	100.0%	548	100.0%	331
Pearson's chi-squared	43.917 (Pr = 0.000)					
Sector						
Manufacturing	34.9%	142	31.4%	172	33.2%	110
Utilities	3.2%	13	6.2%	34	3.6%	12
Construction	10.8%	44	11.5%	63	8.2%	27
Trade and transport	22.6%	92	25.4%	139	19.3%	64
Business services	28.5%	116	25.6%	140	35.7%	118
Total	100.0%	407	100.0%	548	100.0%	331
Pearson's chi-squared	19.297 (Pr = 0.000)					
Exporter						
No	34.9%	142	36.9%	202	23.3%	77
Yes	65.1%	265	63.1%	346	76.7%	254
Total	100.0%	407	100.0%	548	100.0%	331
Pearson's chi-squared	18.582 (Pr = 0.013)					
Ownership						
Majority domestic	85.0%	346	86.9%	476	79.2%	262
Majority foreign	15.0%	61	13.1%	72	20.9%	69
Total	100.0%	407	100.0%	548	100.0%	331
Pearson's chi-squared	9.491 (Pr = 0.000)					

Source: BoS WDN3 survey

Notes: Results are not weighted. Explanation of some variables: Exporter: controls whether a firm was an exporter in 2010 or not; Ownership: shows, whether a firm indicated mainly foreign ownership in the WDN survey.

Table B6: Permanent worker adjustment with regard to changes in the economic environment (period: 2010-2013)

	Permanent worker adjustment					
	Decrease		No change		Increase	
	%	Frequency	%	Frequency	%	Frequency
Demand change						
Decrease	79.4%	323	58.2%	319	32.3%	107
No change	12.3%	50	26.8%	147	22.4%	74
Increase	8.4%	34	15.0%	82	45.3%	150
Total	100.0%	407	100.0%	548	100.0%	331
Pearson's chi-squared	228.802 (Pr = 0.000)					
Access to credit change						
Decrease	59.7%	243	39.1%	214	35.7%	118
No change	37.8%	154	57.5%	315	60.1%	199
Increase	2.5%	10	3.5%	19	4.2%	14
Total	100.0%	407	100.0%	548	100.0%	331
Pearson's chi-squared	55.316 (Pr = 0.000)					
Volatility of demand change						
Decrease	60.0%	244	44.5%	244	22.1%	73
No change	22.1%	90	41.1%	225	52.3%	173
Increase	17.9%	73	14.4%	79	25.7%	85
Total	100.0%	407	100.0%	548	100.0%	331
Pearson's chi-squared	120.731 (Pr = 0.000)					
Customers' ability to pay change						
Decrease	78.9%	321	71.4%	391	59.2%	196
No change	17.4%	71	25.4%	139	36.6%	121
Increase	3.7%	15	3.3%	18	4.2%	14
Total	100.0%	407	100.0%	548	100.0%	331
Pearson's chi-squared	36.524 (Pr = 0.000)					
Availability of supplies change						
Decrease	27.5%	112	17.7%	97	10.0%	33
No change	70.3%	286	79.2%	434	84.6%	280
Increase	2.2%	9	3.1%	17	5.4%	18
Total	100.0%	407	100.0%	548	100.0%	331
Pearson's chi-squared	41.415 (Pr = 0.000)					

Source: BoS WDN3 survey
 Note: Results are not weighted.

Appendix C: Consistency checks of the basic model

The consistency of the results based on the WDN3 survey data was checked by using the AJPES data for the population of comparable firms. Since only few firms kept their average wages unchanged, this option was not included as one of the adjustment strategies. Results confirm that firms in construction, trade and transport, and business services sectors are on average more likely to cut average wages, compared to manufacturing firms. In addition, results also confirm that firms, faced with decreasing demand for their products are more likely to cut average wages. On the other hand, firms that are more profitable are less likely to cut their average wage level. Due to data limitations, this part of the analysis was able to control only for the change in the average wage level of firms and not the change in actual wages. Consequently, some of the results for the changes in adjusting average wages are not consistent with the WDN3 results (Table C1).

Results on employment adjustment (Table C2) show that all firms by the firm size were less likely to cut employment, compared to the biggest firms, while firms in construction sector were more likely to cut employment, compared to manufacturing firms. In addition, firms that were faced with decreasing demand were more likely to cut employment, while exporters and more profitable and productive firms were less likely to cut employment. With the exception of the results for exporters, these results on average correspond to the results from the WDN3 survey.

When taking into account the overall labour cost adjustment (Table C3), the results for average wage adjustment and employment adjustment on average correspond to the results from the previous two tables. Firms that were more likely to decrease both, average wages and employment were firms from business services sector, compared to manufacturing firms, and firms faced with decreasing demand. In contrast, firms that were less likely to cut average wages and employment were more profitable firms.

Table C1: Labour cost adjustment of Slovenian firms during 2010-2013, wages

Average wage cut	
Size category (base: 200+)	
5-9	0.164*** (0.048)
10-19	0.136*** (0.049)
20-49	0.114** (0.050)
50-199	0.038 (0.045)
Firm age (base: 20+)	
<6	-0.049 (0.031)
6-10	-0.050 (0.033)
11-15	-0.065** (0.027)
16-20	-0.051** (0.024)
Sector (base: Manufacturing)	
Utilities	0.090 (0.073)
Construction	0.067*** (0.021)
Trade and Transport	0.048** (0.019)
Bus. services	0.126*** (0.029)
Other explanatory variables	
Demand	0.159*** (0.013)
Ownership	-0.017 (0.034)
Exporter	0.003 (0.018)
ROA	-0.337*** (0.075)
VAE	0.001*** (0.000)
Observations	7,353
Pseudo R-squared	0.044
Log-likelihood	-4,576

Source: BoS WDN3 survey, AJPES, SORS

Notes: The table presents the marginal effects and their robust standard errors (in parentheses) after multinomial logit estimation, where the baseline was no change or increase in the dependent variable. *** p<0.01, ** p<0.05, * p<0.1. The explanation of the variables used in the model corresponds to the model (2).

Table C2: Labour cost adjustment of Slovenian firms during 2010-2013, employment

Employment cut	
Size category (base: 200+)	
5-9	-0.216*** (0.043)
10-19	-0.143*** (0.046)
20-49	-0.119*** (0.045)
50-199	-0.088** (0.041)
Firm age (base: 20+)	
<6	-0.108*** (0.037)
6-10	-0.036 (0.029)
11-15	-0.030 (0.033)
16-20	-0.052* (0.028)
Sector (base: Manufacturing)	
Utilities	-0.101 (0.097)
Construction	0.067* (0.038)
Trade and Transport	0.015 (0.041)
Bus. services	0.049 (0.038)
Other explanatory variables	
Demand	0.454*** (0.017)
Ownership	-0.014 (0.029)
Exporter	-0.066*** (0.018)
ROA	-0.558*** (0.113)
VAE	-0.002*** (0.001)
Observations	7,353
Pseudo R-squared	0.179
Log-likelihood	-4,187

Source: BoS WDN3 survey, AJPES, SORS

Notes: The table presents the marginal effects and their robust standard errors (in parentheses) after multinomial logit estimation, where the baseline was no change or increase in the dependent variable. *** p<0.01, ** p<0.05, * p<0.1. The explanation of the variables used in the model corresponds to the model (2).

Table C3: Labour cost adjustment of Slovenian firms during 2010-2013, wages and employment

	(1)	(2)	(3)
	Only average wage cut	Only employment cut	Average wage and employment cut
Size category (base: 200+)			
5-9	0.189*** (0.045)	-0.209*** (0.047)	-0.014 (0.030)
10-19	0.153*** (0.053)	-0.149*** (0.044)	-0.004 (0.034)
20-49	0.115** (0.057)	-0.128*** (0.042)	0.004 (0.031)
50-199	0.058 (0.050)	-0.074* (0.038)	-0.017 (0.031)
Firm age (base: 20+)			
<6	-0.045** (0.018)	-0.097*** (0.035)	-0.032 (0.021)
6-10	-0.070*** (0.016)	-0.057** (0.025)	0.000 (0.027)
11-15	-0.072*** (0.018)	-0.039 (0.024)	-0.013 (0.024)
16-20	-0.064*** (0.017)	-0.057** (0.025)	-0.005 (0.022)
Sector (base: Manufacturing)			
Utilities	0.117 (0.082)	-0.100 (0.098)	-0.015 (0.018)
Construction	0.047 (0.032)	0.034 (0.034)	0.019 (0.015)
Trade and Transport	0.048*** (0.018)	0.009 (0.027)	-0.001 (0.020)
Bus. services	0.071*** (0.025)	-0.013 (0.036)	0.052*** (0.020)
Other explanatory variables			
Demand	-0.077*** (0.008)	0.218*** (0.017)	0.236*** (0.011)
Ownership	0.000 (0.027)	0.005 (0.032)	-0.017 (0.017)
Exporter	0.011 (0.015)	-0.054*** (0.015)	-0.011 (0.013)
ROA	0.040 (0.045)	-0.157 (0.106)	-0.387*** (0.082)
VAE	0.001*** (0.000)	-0.002*** (0.001)	0.000 (0.000)
Observations		7,353	
Pseudo R-squared		0.118	
Log-likelihood		-8,716	

Source: BoS WDN3 survey, AJPES, SORS

Notes: The table presents the marginal effects and their robust standard errors (in parentheses) after multinomial logit estimation, where the baseline was no change or increase in the dependent variable. *** p<0.01, ** p<0.05, * p<0.1. The explanation of the variables used in the model corresponds to the model (2).