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# Determinants of Labour Cost Adjustment Strategies during the Crisis – Survey Evidence from Croatia

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Marina Kunovac

Zagreb, September 2015





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## Abstract

This paper analyses labour cost adjustment strategies implemented during the 2010-2013 period by Croatian firms as a response to the prolonged deterioration in economic conditions, and their main determinants. The analysis is based on an ad-hoc company survey that was developed within the Wage Dynamic Network of the European Central Bank and conducted on a sample of Croatian firms in mid-2014. The main results are as follows: (1) most firms in Croatia experienced negative economic shocks, but the vast majority of firms are still reluctant to adjust base wages and prefer to reduce labour costs by reducing labour input; (2) nevertheless, incidence of wage cuts more than doubled over the years, pointing to a dissipation of nominal wage rigidity in Croatia; (3) the probability of adjusting labour costs is strongly influenced by negative changes in the economic environment a firm has been exposed to; (4) firm level and worker characteristics also turned out to be significant in the determination of the probability of labour cost adjustment and (5) restrictions created by collective bargaining and indexation are found to be important in reducing the likelihood of wage adjustments.

**JEL:**

J30, J31, J32 and J51

**Keywords:**

survey data, negative economic shocks, labour costs, wage adjustments

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# 1 Introduction

This paper presents the main labour cost adjustment strategies implemented during the 2010-2013 period by Croatian firms as well as their determinants. The analysis is based on a survey about the labour market and wages in Croatia that was implemented as a part of the third wave of the Wage Dynamic Network (WDN) survey. The survey was prepared and harmonized within the European Central Bank as a follow-up to the previous two surveys implemented by WDN. The first survey was implemented in the 2007-2008 period and its goal was to examine downward nominal and real wage rigidity in EU countries and the reasons that would prevent wage adjustments in the case of a hypothetical economic shock. However, shortly after the first wave of the survey was finished, the economic environment changed dramatically. Therefore the second wave of the survey was launched right away, in 2009, in order to examine the different adjustment mechanisms firms effectively used to respond to the sharp decline in economic activity at the beginning of the crisis. In this paper we present the results of the third wave of survey that was implemented in mid-2014 for Croatia. Croatia did not participate in the first two waves of the WDN survey, since at the time of their implementation the country was not part of European Union. Therefore all data and information collected by this survey represent a complete novelty for Croatia.

The main purpose of the third wave survey was to examine in detail different labour cost adjustment mechanisms firms have adopted during the 2010-2013 period, with a particular distinction being made between labour input and wage adjustments. Moreover, the survey collects detailed information about a wide range of firm characteristics, workforce characteristics, institutional background, wage setting practices and the changes in the economic environment to which firms were exposed, distinguishing between economic shocks in their nature, intensity and duration. The particularly rich survey data structure allowed us to contribute to the existing literature about the main features of labour market adjustment during the crisis in Croatia, by linking the different labour cost adjustment strategies firms have implemented directly with the shocks to which each firm was exposed, and all other available relevant firm/institutional characteristics.

Up to our knowledge, previous studies about the impact of the crisis on the labour market in Croatia have mainly used macro data. Matković et al. (2010) analyse labour market adjustment at the beginning of the crisis in 2009, and conclude that the first response to changing economic environment was made through employment cuts. Franičević (2011) also points to a significant decrease in employment during 2009-2010, while wage growth is found to slow down with the prolongation of the crisis. Finally, Vukšić (2014) examines the main labour market adjustments in the 2009-2012 period and concludes the main adjustment to worsening economic conditions was made through employment cuts, while moderation of real wages become relevant only in 2012. Existing research implies that the economic distress in Croatia caused significant job losses, while wages remained substantially more resistant to the crisis, pointing to the existence of downward wage rigidity in Croatia, which was, however, slightly moderated as the crisis persisted over the years.

In line with previous research and the effectively observed labour market data patterns for Croatia, the

main results of the survey that are presented in this paper point to a significant impact of the crisis on Croatian firms, resulting in large job losses, while wage adjustment has been more limited. These findings are contrary to the real business cycle models that predict pro-cyclical movements of wages as a consequence of propagation of shock through the economy, but are in line with theoretical predictions derived from standard New Keynesian models with search and matching frictions that allow for price and wage rigidities, as in Hall (2005) and Krause and Lubik (2007).<sup>1</sup> Similar theoretical considerations can be derived from Abbritti and Fahr (2011) which introduces asymmetric wage adjustment costs in business cycle analysis to stress the importance of asymmetries in labour market response to expansionary and contractionary phases of the business cycle, with particular emphasis on downward wage rigidities. Based on these theoretical considerations about wage rigidities and macroeconomic outcomes we contribute to the debate empirically by using survey data for Croatia that will facilitate the investigation of the way in which firms' wage setting practices and labour input decisions have developed during the economic crisis.

Moreover, this paper extends previous WND research carried during the first two waves of the survey pointing to the presence of downward wage rigidity in EU countries. Bertola et al. (2009) find substantial incidence of nominal and real wage rigidity based on the data from first wave of WDN survey for 2007-2008 period. Using the same dataset Bertola et al. (2010) show that only 1.6% of firms in the EU would decrease wages of their workers in response to a hypothetical economic shock. Fabiani et al. (2015) use data from second wave of WDN carried at the beginning of the crisis in 2009 and find that despite the outbreak of the worst economic crisis since the Great Depression, firms were indeed reluctant to cut wages. The authors show that only 2.4% of firms suffering from sharp demand and credit contraction consider wage adjustment the most important factor in firms' cost reduction strategies, compared to 55% of firms that consider cuts in number of employees the most important strategy of adjustment. This paper extends the analysis using WDN third wave data, concentrating on the 2010-2013 period that permits the investigation of the way in which firms' labour market-relevant decisions have developed with the prolongation of the economic crisis.

Results show that although most firms experienced a negative economic shock, the vast majority of firms in Croatia are still reluctant to cut base wages and prefer to reduce labour costs by reducing labour input. Nevertheless, the incidence of wage cuts increased significantly over the years, and in 2013 the share of workers affected by wage cuts became larger than the share of workers affected by the wage freeze, indicating a dissipation of nominal wage rigidity in Croatia. The survey data structure allowed us to disentangle in detail the main drivers behind the decrease in employment and wage rigidity from firms' perspective. Results showed that firms exposed to negative economic shocks are more likely to adjust labour costs by decreasing labour input or adjusting wages than firms not suffering from the economic crisis. Here we found demand shock and illiquidity shock to be particularly relevant. On other hand, exposure to foreign markets and the competitive environment firms operate in are associated with a lower likelihood of adjustment of labour costs. Worker characteristics and firms' production technology are also found to influence significantly the likelihood of implementing labour cost adjustments. Firms with a high share of high skilled, non-manual employees are less likely to decrease the number of employees, while firms with a high share of older workers are more inclined to cut the number of employees. These findings confirm that workforce composition is relevant for firms' decisions to decrease labour input. Firms' production technology on the other hand was found relevant for firms' decisions to adjust wages, since firms with labour intensive production technology are found to be more likely to implement wage adjustments, compared to firms with capital intensive production technology.

Finally, the analysis revealed the importance of several factors affecting only wage adjustment decision of firms. Estimation results imply that presence of collective agreements and indexation rules significantly decreases the likelihood of wage adjustments during the crisis, while the existence of onerous credit conditions influencing firms' activity strongly increases the probability of a wage cut/freeze being implemented.

The remaining part of the paper is organized as follows. Section 2 shortly describes the data collection

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<sup>1</sup> Introduction of real wage rigidity in New Keynesian models with frictional labour market is central to explaining the cyclical behaviour of labour input over the business cycle. For detailed model explanation see Hall (2005).

process and the main characteristics of the realized sample. Section 3 analyses the main changes in the economic environment firms were exposed to, while different methods of labour cost adjustment to the crisis are analysed in Sections 4 and 5, discussing the main determinants of labour input and wage adjustments, respectively. Section 6 concludes.

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## 2 Data and design of the survey

A survey about the labour market and wages in Croatia was commissioned by the Croatian National Bank (HNB) and effectively conducted by Ipsos Puls agency for market research. The survey questionnaire was prepared within the European Central Bank's Wage Dynamics Network, and harmonised across the EU member states. In Croatia the survey was carried out during the period from September to November 2014, while referring to the 2010-2013 period.<sup>2</sup> The gross sample consisted of 4548 firms with five or more employees in the manufacturing, construction, trade, and business services sectors that were randomly selected from the population of active firms from the Registry of Annual Financial Statements of non-financial sector (FINA). Stratification of firms from population into the gross sample was done according to size (5-19, 20-49, 50-199, +200 employees), and sector (manufacturing (C), construction (F), trade (G), business services (H-J, L-N)) resulting in total of 16 different strata.<sup>3</sup>

The survey was conducted on line and phone interviews were employed; a total of 301 firms responded indicating a response rate of 6.6%. The relatively low response rate can be attributed to the length of the survey.<sup>4</sup> Despite the low response rate, we consider the collected data useful. The implementation of the survey allowed us to obtain information about a firm's labour market-relevant decisions made during the period of prolonged economic distress in Croatia in conjunction with data about different firm characteristics, which are generally not available from any other sources.

All data are weighted by employment-adjusted weights that are used to adjust sample statistics with the distribution of employment in the population of firms, i.e. for each firm in the sample employment-adjusted weights reflect the number of employees this particular firm represents in the total population. Thus the weights sum up to total employment in the population. In this way responses obtained by each firm are adjusted to reflect the number of employees that a given firm represents in the population. Employment-adjusted weights are used to adjust all descriptive statistics, but are not applied in estimation of the econometric model.

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2 During the second half of 2014, the third wave of the WDN survey was also carried out in other EU member states, with the exception of Finland, Denmark and Sweden. At this moment the results of the third WDN survey for other countries are still not available.

3 Extensive information about survey design and implementation is given in Kunovac and Pufnik (2015).

4 In previous waves of WDN survey only Greece recorded a similarly low response rate. However, according to preliminary results of the third WDN survey, several countries also recorded a response rate lower than 10%.

### 3 Changes in economic environment

At the time of the survey on the labour market and wage setting, Croatia was going through the sixth consecutive year of recession, and the cumulative decrease in its economic activity from the beginning of the crisis in 2008 exceeded 12%. At the same time, labour market indicators deteriorated significantly. The number of employees decreased by 10%, and the decrease in the number of employees was especially pronounced in the private sector (14%), while the public sector grew in size (6%).<sup>5</sup> A significant decrease in the number of employees was coupled with a surge in the internationally comparable ILO unemployment rate, going from 8.5% in 2008 to 17.3% by the end of 2013. This unprecedented slack recorded in employment and unemployment on the labour market was however not fully reflected in movement of wages. Nominal gross wages continued to grow, albeit at a significantly slower pace than in the pre-crisis period, while real wages decreased moderately.

Prior to a detailed analysis of firms' labour cost adjustment decisions and the main determinants of these decisions it was very important to properly address the intensity and nature of the main economic shocks firms were faced with over the survey reference period (2010-2013). Using data from the first two WDN waves, Fabiani et al. (2015) showed that changes in the economic environment are crucial in a discussion of firms' main adjustment mechanisms.

Graph 1 shows how firms' activities were affected by different shocks, according to the intensity of the shock. Changes in customer ability to pay and changes in level and volatility of demand turn out to be the most widespread shocks in Croatia. At the same time access to financing and availability of supplies from usual suppliers does not seem to play a crucial role for most firms, since around 70% of the firms state these factors did not affect firm activity over the 2010-2013 period. Distribution of the shocks is clearly unequal over different sectors, with the construction sector being the most exposed to the crisis. Overall, the above mentioned economic shocks influenced almost all firms in the sample, with 75% of the firms reporting a moderate or strong negative impact of at least one economic shock on their activity, and 35% of firms reporting strong negative impact of at least one economic shock on their activities.

Moreover, we analyse the incidence of economic shocks not only with respect to sector of activity of the firm, but taking into account multiple firm characteristics. To that purpose we employ probit models of the following form:

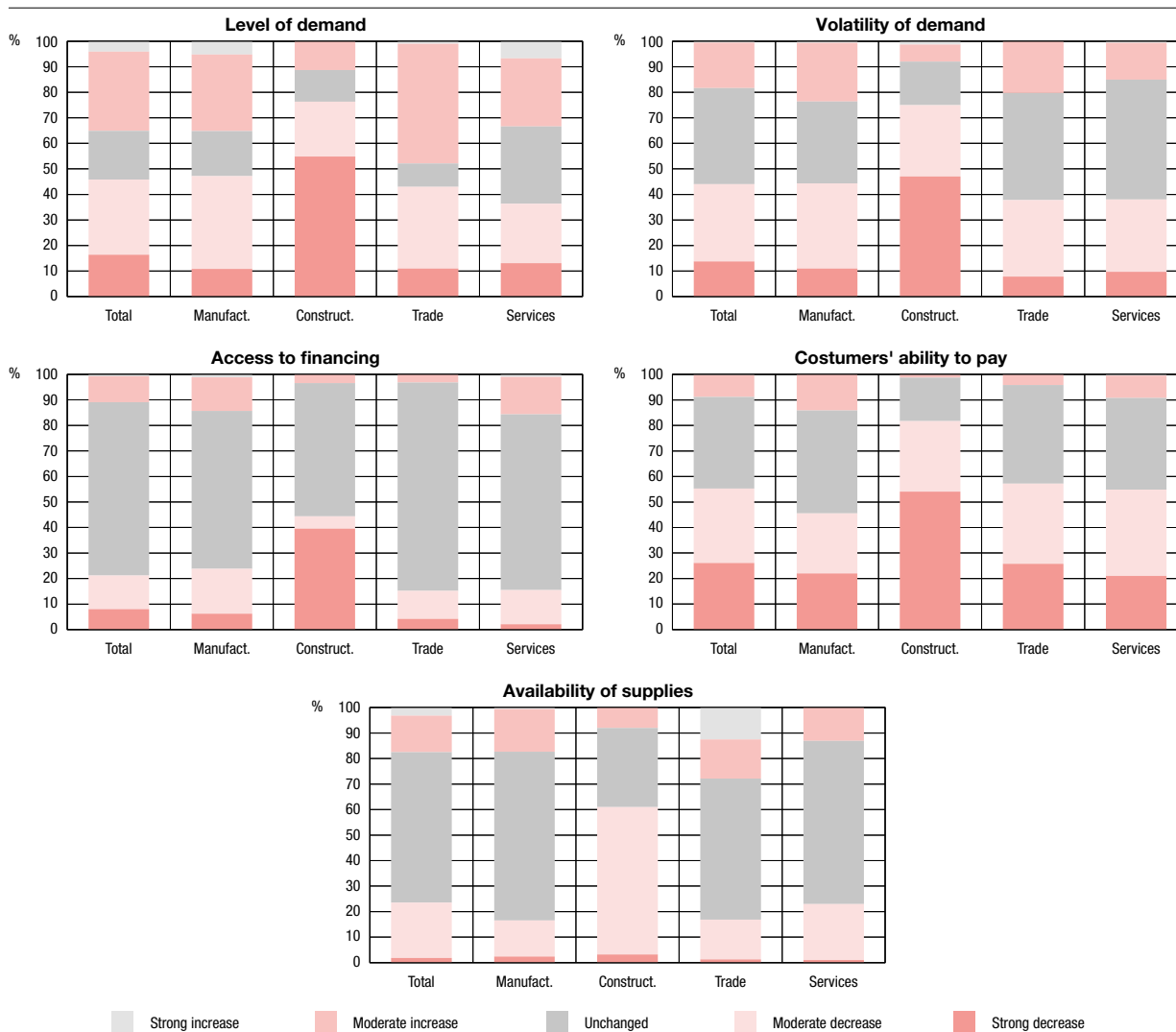
$$P(D_i = 1 | X_i) = \Phi(\beta' X_i) \quad (1)$$

where  $\beta$  denotes vector of coefficients,  $X_i$  is vector of explanatory variables and  $\Phi$  denotes the cumulative normal distribution function.

Dependent variables ( $D_i$ ) are constructed taking into account different shocks affecting firms' activities from question 2.1., i.e.: demand shock, volatility shock, financing shock, illiquidity shock and supplies shock (as above). If a firm recorded a moderate or strong decrease in economic activity due to the above mentioned shocks, the dependent variable takes the value 1, otherwise it takes the value 0. Explanatory variables include a set of variables for the *size* of the firm (micro 5-19, small 20-49, medium 50-159, and large +200 employees) and the *sector* of economic activity (manufacturing, construction, trade and services). Moreover, we take into account firm exposure to the foreign market since it is logical to assume that distribution of shocks can differ in nature and intensity depending on the prevalently domestic versus foreign orientation of a firm's activity. To that purpose we construct the *export share variable*, indicating the share of firms' revenues originating from foreign markets.

<sup>5</sup> Public sector is defined as O, P, Q sectors according to NACE2 classification.

Graph 1 Heat map showing how firms' activities were affected by the following factors in the 2010-2013 period.



Note: The presented results have been weighted by employment-adjusted weights.

Source: HNB survey.

Table 1 Probabilities of experiencing moderate or strong negative economic shock in the 2010-2013 period. Probit models, marginal effects

	Demand shock	Volatility shock	Financing shock	Illiquidity shock	Supplies shock
Manufacturing	0.04 0.55	0.11 0.13	<b>0.11</b> <b>0.08*</b>	0.01 0.96	-0.02 0.73
Construction	<b>0.18</b> <b>0.09*</b>	<b>0.22</b> <b>0.05*</b>	-0.03 0.76	0.1 0.34	<b>0.17</b> <b>0.8*</b>
Trade	0.02 0.85	-0.01 0.88	0.05 0.53	-0.02 0.79	0.01 0.97
Micro	<b>0.22</b> <b>0.03**</b>	<b>0.27</b> <b>0.01**</b>	0.14 0.15	0.16 0.12	0.09 0.37
Small	0.12 0.25	0.08 0.45	0.04 0.69	0.01 0.92	0.07 0.42
Medium	0.02 0.85	0.02 0.86	0.06 0.51	-0.02 0.88	0.02 0.87
Export share	-0.12 0.24	-0.06 0.48	-0.02 0.85	<b>-0.4</b> <b>0.00***</b>	-0.1 0.22

Note: The symbols \*\*\*, \*\* and \* denote statistical significance at the levels of 99, 95 and 90%.

Source: Author's calculation.

The estimation results are presented in Table 1. They refer to marginal effects that is to the effect that a unit change in an explanatory variable has on the probability of interest. Regression coefficients cannot be interpreted as marginal effects within the probit model but can only point to the sign of the reaction that the pertaining variable has on the probability, and therefore we do not report them.<sup>6</sup> The results confirm our previous conclusion about the higher exposure of the firms operating in the construction sector to economic shocks. At the same time, we found evidence that small firms are also disproportionately hit by the crisis. Firms with higher exposure to foreign markets are less likely to record shock originating from customers' ability to pay and meet contractual terms, suggesting that the illiquidity problem seems to be an internal market problem. Finally, although the financing shock is found to be less important than other shocks (Graph 1), from the standpoint of monetary policy-makers, its determinants are still very important. The estimated results imply that, after controlling for all other factors, firms operating in the manufacturing sector are more likely to suffer from a negative financing shock.

## 4 Response to economic shocks – labour input adjustments

After analysing the incidence of different economic shocks, in the remaining part of the paper we analyse how firms have adjusted their costs to the recessionary economic conditions. Research carried during the second wave of the WDN survey (Fabiani et al. (2015)) showed that on average 78% of European firms considered cost cutting a very relevant or relevant strategy implemented after strong demand shock at the beginning of the crisis in 2009.<sup>7</sup> Reduction of prices, output or profit margins were also frequently used, but to a significantly lower extent than cost cutting strategies. Based on this evidence, the current survey has put the emphasis directly on the different labour cost adjustment strategies implemented, and firms were asked to describe the evolution of different total cost components during the 2010-2013 period. For most firms (59%) total costs and all their components increased in the reference period. However, firms that suffered a moderate or strong negative shock in demand reported that they had adjusted to the new economic conditions by cutting their total costs (41%), the dominant strategy being the reduction of labour costs (42%).

**Table 2** Developments in total costs components for firms during the 2010-2013 period, in %

	All firms		Firms that suffered demand shock	
	Strong/Moderate decrease	Strong/Moderate increase	Strong/Moderate decrease	Strong/Moderate increase
Total costs	28%	59%	41%	46%
Labour cost	27%	48%	41%	29%
Financing costs	17%	49%	19%	50%
Costs of supplies	19%	45%	27%	47%
Other costs	13%	51%	17%	43%

Note: The presented results have been weighted by employment-adjusted weights.

Source: HNB survey.

<sup>6</sup> Marginal effect can vary for different values of explanatory variables so it is usual to report marginal effect evaluated at the mean of explanatory variables.

<sup>7</sup> According to Fabiani et al. (2015), this share increases to 94% of firms if we consider firms exposed to both strong demand and strong credit shock at the same time.

Given that reduction of the labour cost was the strategy most commonly used to reduce total costs for firms hit by demand shock, in the remaining part of the paper we analyse in detail the differences between different labour cost adjustment strategies – a reduction in the number of employees or a reduction (or freezes) in wages. To that purpose first we use survey question 3.3.a, which explicitly asks firms whether they encountered a need to significantly reduce labour input or alter its composition during the 2010-2013 period. 41% of firms gave affirmative answers to this question (59% of firms directly hit by the demand shock and 26% of other firms).

**Table 3 Percentage of firms adjusting labour input, according to the firm's exposure to the crisis**

		All firms	Firms that suffered demand shock	Firms that did not suffer demand shock
During 2010-2013 did you need to significantly reduce your labour input or alter its composition	YES	41%	59%	26%
	NO	59%	41%	74%

Note: The presented results have been weighted by employment-adjusted weights.

Source: HNB survey.

Again, we employ a probit model to examine the determinants of firms' choices in the adjustment of labour input as a response to different economic shocks, accounting for different firm, institutional and workforce characteristics. The dependent variable (constructed by survey question 3.3.a.) takes the value one in the case of firms faced with the need significantly to reduce labour input or alter its composition; otherwise it assumes the value of zero.

Explanatory variables used in analysis are the following:

Firm specific variables (accounting for differences in production technology of firms), including a set of indicator variables for *size* of the firm (micro 5-19, small 20-49, medium 50-159, and large +200) and *sector* of economic activity (manufacturing, construction, trade and services). Moreover, we take into account the composition of the wage bill of the firm, since Babecky et al. (2009b), show that firms use cuts in flexible wage components like bonuses as a substitute for other labour cost adjustment strategies. The variable *bonus* is a continuous variable ranging from 0 to 1, indicating the percentage of firms' total wage bill that is related to individual or company performance-related bonuses and benefits. The influence of workforce characteristics on adjustment strategy of the firm is measured by *job tenure* and *highly skilled* variables. The variable *job tenure* is a continuous variable ranging from 0 to 1, related to the share of a firm's employees with a job tenure longer than 5 years in total number of employees. The variable *highly skilled* is a continuous variable ranging from 0 to 1, related to the share of highly skilled non-manual employees in total number of employees.

In order to assess degree of *competition* faced by the firm, respondents were asked to characterize the degree of competition on the domestic and foreign markets of their main product.<sup>8</sup> All firms that characterized domestic or foreign competition as very severe are defined as being exposed to severe competition (with corresponding indicator variable equals to one). Competition pressure faced by firms is also represented by a firm's exposure to foreign markets, captured by the variable *export share*. It is a continuous variable ranging from 0 to 1, indicating the share of firms' revenues originating from foreign markets. In addition to competitive pressure, we would like to take into account general institutional environment firm operates in. The variable *collective agreement* is an indicator variable that takes value 1 in the case of a binding collective agreement that is signed at either firm level or outside of the firm (at national, regional, sector or occupational level). We do not distinguish between firm and sectorial collective agreements, since in Croatia most of the firms apply firm-level collective agreements.<sup>9</sup>

<sup>8</sup> The theoretical rationale for using intensity of competition as one of explanatory variables in proposed empirical framework is given by Etro and Colciago (2010). These authors developed a DSGE model based on imperfect competition in which they analyse different forms of market conduct (Bertrand, Cournot) and allow for the existence of endogenous market structures and show that propagation of exogenous shocks through an economy differ taking into account market structure with different forms of competition.

<sup>9</sup> According to the survey results among firms applying collective agreements only 22% of the firms apply an exclusively sectorial agreement. For detailed information about collective bargaining according to the WDN3 survey results for Croatia see Kunovac and Pufnik (2015).

The influence of the economic crisis is measured by the *demand shock* variable. The variable has been constructed on the basis of responses to the survey question 2.1, related to the impact of the changes in the level of demand on the firm's activity during 2010-2013. If a firm assessed that changes in level of demand caused a strong or severe decrease in its activity the associated indicator variable assumes the value of one; otherwise, it assumes the value of zero. As discussed in Section 3 demand shock was the second most widespread shock among firms in Croatia (46% of firms have recorded moderate or strong decrease in demand), after the illiquidity shock. However, between the two, we have opted for demand shock variable as proxy for general economic distress in our baseline model specification since it is expected to have more significant impact on firms' activity.

**Table 4 Probabilities of implementing labour input adjustment in the 2010-2013 period. Probit models, marginal effects**

	Model (1)		Model (2)		Onerous cred. cond.	
	Marginal effect	p-value	Marginal effect	p-value	Marginal effect	p-value
Very severe degree of competition (domestic or foreign)	<b>-0.11</b>	<b>0.09*</b>	-0.11	0.12	-0.11	0.12
Collective agreement	-0.04	0.56	-0.01	0.34	-0.07	0.32
Share of revenues from foreign markets	<b>-0.22</b>	<b>0.04**</b>	<b>-0.18</b>	<b>0.09*</b>	<b>-0.18</b>	<b>0.09*</b>
Share of bonuses in total labour cost	-0.46	0.21	-0.21	0.55	-0.23	0.53
Job tenure	<b>0.19</b>	<b>0.09*</b>	0.17	0.14	0.18	0.12
Share of high skilled non-manual workers	-0.18	0.1	<b>-0.21</b>	<b>0.06*</b>	<b>-0.21</b>	<b>0.06*</b>
Demand shock	<b>0.34</b>	<b>0.00***</b>	-	-		
Strong demand shock	-	-	<b>0.29</b>	<b>0.01**</b>	<b>0.3</b>	<b>0.01**</b>
Strong financing shock	-	-	0.01	0.94	0.09	0.26
Strong volatility shock	-	-	0.1	0.44	0.09	0.5
Strong illiquidity shock	-	-	<b>0.16</b>	<b>0.02**</b>	<b>0.16</b>	<b>0.03**</b>
Strong shock to supplies	-	-	0.18	0.39	0.15	0.46
Construction	0.04	0.75	0.03	0.76	0.03	0.77
Trade	0.2	0.83	0.04	0.69	0.04	0.69
Services	0.1	0.18	0.11	0.13	0.12	0.13
Micro	<b>-0.19</b>	<b>0.05*</b>	<b>-0.19</b>	<b>0.07*</b>	<b>-0.19</b>	<b>0.07*</b>
Small	<b>-0.22</b>	<b>0.03**</b>	<b>-0.21</b>	<b>0.03**</b>	<b>-0.21</b>	<b>0.03**</b>
Medium	<b>-0.25</b>	<b>0.01**</b>	<b>-0.23</b>	<b>0.02**</b>	<b>-0.23</b>	<b>0.02**</b>
Mc Fadden R-squared	0.14		0.14		0.15	
LR statistic	57.08		57.86		59.09	
Prob(LR statistic)	0.00		0.00		0.00	

Note: The symbols \*\*\*, \*\* and \* denote statistical significance at the levels of 99, 95 and 90%.

Source: Author's calculations.

The main conclusions are as follows. Model 1 implies that after controlling for all other factors, firms that have been exposed to economic distress, recording moderate or strong decrease in demand, are 34% more likely to decrease labour input. At the same time, those firms that operate in a highly competitive environment and firms with a high exposure on foreign markets are less likely to dismiss workers (by 11% and 22% respectively). Thus, firms operating in a competitive environment seem to be more efficient than those that are not exposed to competition, confirming that all administrative efforts to reduce barriers to competition and increase export capacity of firms have beneficial effects on economic development and employment.<sup>10</sup> Moreover, we analyse relevance of worker characteristics on firms' decisions to reduce labour input. As expected, firms with a high share of highly skilled, non-manual employees are less likely to dismiss employees (although

<sup>10</sup> HNB (2012) research based on firm level data shows that firms in Croatia operating on foreign markets are less affected by the crisis in the terms of revenues, but the number of employees in exporting firms decreased more strongly during the crisis than in other firms. Divergences in the results could be explained by the different time period considered (HNB analyses the beginning of the crisis from 2008 to 2010, while our analysis is done for 2010-2013 period), differences in database and construction of variables and different methodology employed.



statistical significance is marginal here). This is in line with previous WDN results showing that firms with a high share of highly skilled workers usually cut non-labour costs in an attempt to preserve human capital and skills in the firm.<sup>11</sup> At the same time high job tenure increases the probability of workers being dismissed (by 19%). This is in line with the survey finding that more than 35% of firms used early retirement schemes as one of the strategies to reduce labour input.<sup>12</sup> Regarding the firm size, we would expect small firms to be more likely to reduce labour input than large firms. Our expectations are related to the interpretation of the “significant reduction in number of employees” concept, which could differ according to the firm size – with small firms being more inclined to see every decrease in labour input as significant, given their size. However, the results of the estimation imply small firms are less likely to dismiss employees than large firms. Although it could seem counterintuitive, it is probably related to the creation and destruction process of firms, as small firms are less able to absorb adverse shocks than large firms. Thus many small firms laying-off their employees might have already disappeared from the firm database registry at some point during the crisis.

Since the existence of economic distress had the most pronounced impact on the probability that a firm would dismiss workers, and given our interest in evaluating the impact of the crisis on labour cost adjustment strategies, in an additional specification of our model we include more information about the economic shocks to which firms were exposed. We distinguish between the different shocks a firm could have been exposed to and construct separate variables for demand shock, volatility shock, financing shock, illiquidity shock and supplies shock. If a firm assessed that one of these shocks caused a strong decrease in the firm’s activity the associated indicator variable assumes value one; otherwise, it assumes the value of zero. Here we only take into account shocks having strong negative impact on firms’ activity, while shocks having a moderate negative impact are not included, since otherwise there would be a high correlation between different shock variables blurring conclusions about their separate impact on the probability of labour input adjustment.

According to the estimation results from Model 2, firms exposed to strong demand shock are 29% more likely to reduce labour input than other firms. Moreover, illiquidity shock is also relevant for decision about decrease in labour input, since firms that face strong illiquidity shock are 16% more likely to decrease labour input than firms without liquidity constraints.<sup>13</sup> On other hand, volatility, financing and supplies shocks turn out to be irrelevant for decision about labour input adjustment.

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## 5 Response to economic shocks – wage adjustments

Apart from decreasing the labour input, firms had also option to reduce labour costs by cutting or freezing the base wages of their workers. This strategy was used less often than that opting for decrease in labour input, with one third (36%) of the firms freezing or decreasing base wage in at least one year. However, it is worth noticing that while the share of the firms that froze the wages of their employees remained constant over time, at around 13%, the share of the firms implementing wage cuts increased significantly over time, going from only 7% in 2010 to 16% in 2013, implying a decrease in wage rigidity over time.<sup>14,15</sup>

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11 See for example Fabiani and Sabbatini (2011).

12 Those firms that have reported a need to significantly reduce labour input over 2010-2013 period were also asked in the survey about the main strategies they effectively used to reduce labour input. According to the survey results almost 50% of firms used individual layoffs and non-renewal of temporary contracts, 40% used freeze or reduction of new hires, while 34% used early retirement schemes. For more information see Kunovac and Pufnik (2015).

13 Given the importance of illiquidity for labour market relevant decisions, we could argue that the more effective Pre-Bankruptcy Settlement Act might have beneficial effects not only for firms’ activity in general but also for firms’ labour market-relevant decisions.

14 According to Babecky et al. (2009) high incidence of wage freezes coupled with low incidence of wage cuts can be interpreted as an indicator of downward nominal wage rigidity.

15 Evidence of the existence of wage rigidity in Croatia, at least to some extent is confirmed also in Tomić (2015), which, using the LFS micro dataset, finds evidence of a strong nominal increase in wages from 2008 until 2012.

Moreover, there was also a significant increase in the percentage of workers affected by wage cuts in each firm, going from around three quarters (76%) in 2010, to almost all workers in 2013 (96%). Thus if we analyse the total percentage of workers affected by wage cuts, the increase in wage cuts is even more pronounced, going from around 5% to 15%. This result is very interesting. Research carried out in the second wave of the WDN survey (implemented at the beginning of the crisis in 2009) showed that some countries, like Estonia, exhibited significant wage flexibility at the beginning of the crisis. In fact, at the beginning of the crisis in 2009, more than 44% of firms in Estonia cut the wages of their employees, compared to average 3% in other EU countries.<sup>16</sup> However, evidence for Croatia is mixed, and could not be interpreted as an indicator of outstanding wage flexibility. It is more likely that some other factor affected the degree of wage flexibility in Croatia over time.

**Table 5 Percentage of firms that froze/cut wages and percentage of workers affected**

	Firms that FROZE wages		Firms that CUT wages		Total percentage of workers affected by wage FREEZE	Total percentage of workers affected by wage CUT
	% of firms	% of workers affected	% of firms	% of workers affected		
2010	13	91	7	76	11.6	5.3
2011	13	92	11	85	12.4	9.4
2012	14	93	14	83	13.0	11.6
2013	13	93	16	96	12.8	15.4

Note: The presented results have been weighted by employment-adjusted weights.

Source: HNB survey.

To investigate this issue, we construct a probit model with a dependent variable that is related to wage adjustment decision (obtained as a response to question 4.7c). For each year during the 2010-2013 period firms were asked whether they froze or cut the base wage of their employees. If firm answered wages were frozen or cut in at least one year during 2010-2013 period the dependent variable takes the value 1. If wages were neither frozen nor cut during the reference period the indicator variable takes the value 0.

Explanatory variables used in analysis are the same as before. However, *sector* variable representing sector of economic activity of the firm proved not to be significant in determination of the probability of wage adjustment. Instead, we use the labour cost share variable that should allow us to distinguish between firms with labour and capital intensive production technology. We expect labour intensive production technology to be significant in determination of wage adjustment probabilities.<sup>17</sup> The variable *labour cost share* represents the share of total costs of the firm that are related to direct remuneration and other direct or indirect costs of labour. Labour cost share is a continuous variable ranging from 0 to 1. In addition, the model for determinants of wage adjustment includes a few additional variables. The variable *indexation* is an indicator variable that takes the value 1 if the firm adapts changes in base wage to inflation during the period 2010-2013. Previous research (Babecky et al. (2009)) showed indexation is relevant in preventing firms deciding to cut wages. We also construct the *public signal* variable, which takes into account the importance of the signal coming from the cut in public sector wages implemented by the Croatian government in 2013. The public signal variable is constructed as an indicator variable that takes the value of one if a firm states that the decrease in public sector wages directly or indirectly affected the average wage in the firm, (by having a demonstrational effect helping to justify the lowering of wages, by or reducing the attractiveness of alternative employment options in the public sector).

Table 6 shows the estimated probability of a wage freeze or wage cut being implemented during the period 2010-2013. Again, high share of firm's revenues originating from the foreign market is associated with a lower likelihood that it will implement a wage freeze or wage cut (by around 20%). As previously discussed

<sup>16</sup> The incidence of wage cuts and freezes after the outbreak of the financial crisis are discussed in Fabiani et al. (2015), p.23.

<sup>17</sup> For more information see Kwapil (2010).

Table 6 Probabilities of implementing wage adjustment in the 2010-2013 period. Probit models, marginal effects

	Model (1)		Model (2)		Model (3)	
	Marginal effect	p-value	Marginal effect	p-value	Marginal effect	p-value
Very severe degree of competition (domestic or foreign)	-0.05	0.43	-0.03	0.63	-0.03	0.61
Collective agreement	-0.08	0.20	-0.11	0.10	-0.12	0.06*
Share of revenues from foreign markets	<b>-0.24</b>	<b>0.02**</b>	<b>-0.2</b>	<b>0.07*</b>	<b>-0.21</b>	<b>0.06*</b>
Share of bonuses in total labour cost	-0.25	0.49	-0.16	0.67	-0.27	0.48
Job tenure	0.14	0.20	0.13	0.25	0.15	0.19
Share of high skilled non-manual workers	-0.11	0.28	-0.11	0.3	-0.12	0.28
Demand shock	<b>0.20</b>	<b>0.00***</b>	-	-	-	-
Strong demand shock	-	-	<b>0.29</b>	<b>0.01**</b>	<b>0.30</b>	<b>0.01**</b>
Strong financing shock	-	-	<b>-0.06</b>	<b>0.63</b>	-	-
Very onerous credit conditions	-	-	-	-	<b>0.23</b>	<b>0.00***</b>
Strong volatility shock	-	-	<b>0.09</b>	<b>0.46</b>	<b>0.04</b>	<b>0.76</b>
Strong illiquidity shock	-	-	<b>0.28</b>	<b>0.00***</b>	<b>0.25</b>	<b>0.00***</b>
Strong shock to supplies	-	-	<b>-0.11</b>	<b>0.44</b>	<b>-0.15</b>	<b>0.28</b>
Total labour cost share	<b>0.10</b>	<b>0.08*</b>	<b>0.12</b>	<b>0.05*</b>	<b>0.12</b>	<b>0.06*</b>
Micro	-0.90	0.40	-0.12	0.29	-0.12	0.27
Small	-0.13	0.20	-0.17	0.12	-0.18	0.09*
Medium	0.01	0.89	0.04	0.71	0.03	0.74
Wage indexation	<b>-0.15</b>	<b>0.01**</b>	<b>-0.16</b>	<b>0.01**</b>	<b>-0.13</b>	<b>0.03**</b>
Signal coming from cut in public wages	<b>0.62</b>	<b>0.00***</b>	<b>0.67</b>	<b>0.00***</b>	<b>0.69</b>	<b>0.00***</b>
Mc Fadden R-squared	0.18		0.25		0.27	
LR statistic	67.53		95.90		104.34	
Prob(LR statistic)	0.00		0.00		0.00	

Note: The symbols \*\*\*, \*\* and \* denote statistical significance at the levels of 99, 95 and 90%.

Source: Author's calculations.

this can be related to better overall results of firms operating intensively on foreign markets. Firms facing severe economic distress are on average about 21% more likely to cut or freeze wages of their workers than firms that are not exposed to deteriorating economic conditions. Moreover, firms with a high share of labour costs, i.e. firms that use more intensive labour technology, are around 10% more likely to adjust wages than capital intensive firms. Results (from Model 2 and 3) show that the presence of a collective agreement – at either firm or sector level – decreases the likelihood of a wage cut or wage freeze, implying that the existence of collective agreements is positively correlated with wage rigidity. Importance of collective agreements for wage stickiness was found in previous WDN research.<sup>18</sup> The same is true for indexation rules. Firms applying indexation rules that relate wage movements to inflation are about 15% less likely to implement wage ceilings/reductions than other firms. The coefficients on job tenure and share of high skilled workers have the expected signs, but are not statistically significant.

Estimation results show the high importance of the public signal variable in determining the probability of wage adjustments. Firms that perceive a cut of 3% in public sector wages that Croatian government has implemented in February 2013 as an action having demonstrational effect for their workers or an action reducing the attractiveness of alternative employment in public sector are around 60% more likely to implement a wage cut/freeze. Overall only 10% of firms perceive a cut in public sector wages as a signal, which is probably due to the timing of this government decision, since it was implemented only in 2013, when many firms had already adjusted wages of their workers. Irrespective of this, estimation results clearly indicate that those firms that perceive a cut in public sector wages as a signal facilitating wage adjustments are also more likely to implement wage adjustment effectively. This could point to a lost opportunity for Croatia, and the importance that timely wage cuts in public sector at the beginning of the crisis might have had for the Croatian economy and overall internal devaluation. In fact, following the example of Baltic countries and their wage adjustments, many

<sup>18</sup> Bertola et al. (2010) show that wages tends to be stickier when collective agreements apply.

international institutions pointed to the importance of decrease in public sector wages for the total economy at the beginning of the crisis for Croatia.<sup>19</sup>

Here we also perform a detailed analysis about the influence of different economic shocks on the probability of wage adjustments. As before, strong demand and illiquidity shock prove to increase the probability of wage adjustments for firms considerably, all other factors being the same (Model 2). Moreover, we found evidence related to the importance of onerous financing conditions for firms' wage adjustment decision. In Model 3 specification we present the financing shock as an indicator variable that takes the value one in a case in which the firm denoted as very relevant the statement that although credit was available for financing of the firm, conditions (interest rates and other contractual terms) were too onerous.<sup>20</sup> Survey question 2.3 examines the importance of financing conditions for working capital, new investment or debt refinancing. Survey results show that although most firms perceive the financing shock irrelevant to their activities as compared to other economic shocks (demand, volatility or illiquidity) as discussed in Section 3, half of the firms (52%) consider themselves to be exposed to onerous or very onerous credit conditions, while 18% consider themselves to be exposed to very onerous credit conditions. Despite the formal availability of credit, the importance of difficult financing conditions discouraging firms from making credit applications was confirmed in the ECB's Survey on the access to finance of enterprises that has been regularly implemented in 11 EU countries since 2009.<sup>21</sup> Very onerous credit conditions are found to be important in the context of wage adjustment decisions in Croatia. Firms exposed to very onerous credit conditions are 23% more likely to decrease/freeze the wages of their employees than other firms, implying this is another relevant negative economic shock together with demand and illiquidity shock forcing firms to respond and adjust their activity – through wage adjustments. This result demonstrates the influence of tight credit conditions on firms' labour market-relevant decisions in Croatia during the crisis.

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## 6 Conclusion

This paper presents main results from a survey about the labour market and wages in Croatia that was implemented as a part of the third wave of the WDN. The main purpose of the paper is to examine the main drivers of labour input and wage adjustments firms have implemented during the crisis. The results are especially important in the context of the prolonged recessionary environment in Croatia.

The results show that most of the firms in Croatia were exposed to some economic shock in the 2010-2013 period. As a response to economic shocks, firms cut their costs, prevailingly concentrating on labour cost reductions. The main method of labour cost adjustment in Croatia was a decrease in labour input, while a decrease in wages was implemented less often, although the share of workers affected by wage cuts tripled over the years.

Analysing the main determinants influencing the probability of labour costs being adjusted, we have found that the probability of both labour input adjustments and wage adjustments are strongly influenced by the unfavourable economic shocks to which a firm is exposed. Demand shock and illiquidity shock seem to be particularly important. On other hand, competitive environment and exposure to foreign markets are found to decrease the likelihood of labour cost adjustments. Characteristics of the workforce and firms' production

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19 For more information see: [http://www.hnb.hr/mmf/clanak-iv/2012/h-posjet-mmf-zakljucna-izjava\\_veljaca-2012.pdf](http://www.hnb.hr/mmf/clanak-iv/2012/h-posjet-mmf-zakljucna-izjava_veljaca-2012.pdf).

20 The onerous financing conditions variable was included as an additional specification also in the model for determination of labour input adjustment decisions in Section 4. However, estimation results showed onerous credit conditions are not significant in the determination of the probability of labour input adjustment decisions. Therefore this specification was not presented with other results, but it is available in Appendix 1.

21 In Croatia a Survey on the access to finance of enterprises has been prepared, but the official results are still not available.

technology also have significant impact on the probability of labour cost adjustment.

Concentrating on the determinants of wage adjustment, the analysis implies that all other factors being the same, the existence of collective agreements and indexation rules decreases the probability of wage moderation, confirming the role of these institutional constraints as obstacles in preventing timely firm adjustment to changes in the economic environment, which could be a conclusion of interest to unions, employer associations and policymakers in Croatia. On the other hand, a recommendation for further implementation of accommodative monetary policy measures can be retrieved from analysis of the impact of onerous credit conditions on labour cost adjustments, since results show firms perceive very onerous credit conditions to be a negative economic shock requiring the adjustment of their activities and the implementation of wage cuts/freezes.

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## Appendix 1

Table 7 Probabilities of implementing labour input adjustment in the 2010-2013 period. (Model 3 specification accounting for existence of very onerous credit conditions). Probit model, marginal effects

	Marginal effect	p-value
Very severe degree of competition (domestic or foreign)	-0.11	0.12
Collective agreement	-0.07	0.32
Share of revenues from foreign markets	<b>-0.18</b>	<b>0.09*</b>
Share of bonuses in total labour cost	-0.23	0.53
Job tenure	0.18	0.12
Share of high skilled non-manual workers	<b>-0.21</b>	<b>0.06*</b>
Demand shock		
Strong demand shock	<b>0.3</b>	<b>0.01**</b>
Very onerous credit conditions	0.09	0.27
Strong volatility shock	0.09	0.5
Strong illiquidity shock	<b>0.16</b>	<b>0.03**</b>
Strong shock to supplies	0.15	0.46
Construction	0.03	0.77
Trade	0.04	0.69
Services	0.12	0.13
Micro	<b>-0.19</b>	<b>0.07*</b>
Small	<b>-0.21</b>	<b>0.03**</b>
Medium	<b>-0.23</b>	<b>0.02**</b>
Mc Fadden R-squared	0.15	
LR statistic	59.09	
Prob(LR statistic)	0.00	

Note: The symbols \*\*\*, \*\* and \* denote statistical significance at the levels of 99, 95 and 90%.

Source: Author's calculation.



## Appendix 2 The survey

C1. Information about the firm		
C1.1 – What is your main sector of activity? NACE2 sectoral classification. OPTIONAL: Do not ask if information is available from the sampling register.		
C1.2 – What was the first year of operation of your firm? OPTIONAL: Do not ask if information is available from the sampling register)		
C1.3 – What was the structure, ownership status and autonomy of your firm at the end of 2013?		
Structure:	Ownership:	Autonomy:
Single establishment firm <input type="checkbox"/>	Mainly domestic <input type="checkbox"/>	Parent company <input type="checkbox"/>
Multi-establishment firm <input type="checkbox"/>	Mainly foreign <input type="checkbox"/>	Subsidiary/affiliate <input type="checkbox"/>
		Does not apply <input type="checkbox"/>

C2. Changes in the economic environment					
This section aims at assessing the main changes in economic environment your firm suffered during <b>2010-2013</b> . When answering the questions please refer to <b>"the most significant changes"</b> taking place over this period.					
<b>C2.1 – How did the following factors affect your firm's activity during 2010-2013?</b> <i>Please choose ONE option for each line.</i>					
	Strong decrease	Moderate decrease	Unchanged	Moderate increase	Strong increase
The level of demand for your products/services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Volatility/uncertainty of demand for your products/services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Access to external financing through the usual financial channels	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Customers' ability to pay and meet contractual terms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Availability of supplies from your usual suppliers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>C2.2 – For those factors which affected your firm strongly, were the effects transitory, partly persistent or long-lasting for 2010-2013?</b> <i>Please choose ONE option for each line.</i>					
	Transitory	Only partly persistent	Long-lasting		
The level of demand for your products/services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Volatility/uncertainty of demand for your products/services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Access to external financing through the usual financial channels	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Customers' ability to pay and meet contractual terms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Availability of supplies from your firm's usual suppliers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<b>C2.3 – With regard to finance, please indicate for 2010-2013 how relevant were for your firm each one the following happenings?</b> <i>Please choose ONE option for each line. Note: credit here refers to any kind of credit, not only bank credit</i>					
	Not relevant	Of little relevance	Relevant	Very relevant	
Credit was not available to finance working capital	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Credit was not available to finance new investment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Credit was not available to refinance debt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Credit was available to finance working capital, but conditions (interest rate and other contractual terms) were too onerous	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Credit was available to finance new investment, but conditions (interest rate and other contractual terms) were too onerous	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Credit was available to refinance debt, but conditions (interest rate and other contractual terms) were too onerous	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>C2.4 – How did these components of total costs evolve during 2010-2013? Please choose ONE option for each line. See definitions in the Appendix.</b>					
	Strong decrease	Moderate decrease	Unchanged	Moderate increase	Strong increase
Total Costs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Labour Costs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Financing costs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Costs of supplies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other costs (please specify _____)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>C2.5 – Please indicate how each one of the components of labour costs listed below has changed during 2010-2013. Please choose ONE option for each line. See definitions in the Appendix.</b>					
	Strong decrease	Moderate decrease	Unchanged	Moderate increase	Strong increase
Base wages or piece work rates	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flexible wage components (bonuses, fringe benefits, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Number of permanent employees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Number of temporary/fixed-term employees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Number of agency workers and others (free-lance work, etc, not hired under employment contracts)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Working hours per employee	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other components of labour costs (please specify _____)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>C2.6 – How did prices and demand for your main product evolve during 2010-2013? Please choose ONE option for each line.</b>					
	Strong decrease	Moderate decrease	Unchanged	Moderate increase	Strong increase
Domestic demand for your main product/service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Foreign demand for your main product/service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Prices of your main product in domestic markets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Prices of your main product in foreign markets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## C.3. Labour force adjustments

**C3.1. – How many employees did your firm have on the payroll at the end of 2013? How many agency workers and others workers did your firm have at the end of 2013? For definitions see Appendix**

Total Number of employees _____	Total number of agency workers and others _____
Of which:	
Permanent full-time _____	
Permanent part-time _____	
Temporary or fixed-term _____	

**C3.2 – At the end of 2013, how were your firm's employees approximately distributed by occupational group or tenure? (See definitions of the ISCO occupational groups and the definition of tenure in the Appendix)**

OCCUPATIONAL GROUPS			JOB TENURE	
Higher skilled non-manual (ISCO: 1, 2, 3)	_____%		Below 1 year	_____%
Lower skilled non-manual (ISCO: 4 and 5)	_____%		Between 1 and 5 years	_____%
Higher skilled manual (ISCO: 7 and 8)	_____%		More than 5 years	_____%
Lower skilled manual (ISCO: 9)	_____%			
TOTAL (= 100%)			TOTAL (= 100%)	

**C3.3a – During 2010-2013 did you need to significantly reduce your labour input or to alter its composition?**

Need to reduce labour cost or alter its composition	YES <input type="checkbox"/>	NO <input type="checkbox"/>
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**C3.3.bis. If YES, which of the following measures did you use to reduce your labour input or alter its composition when it was most urgent? Please choose ONE option for each line. See definitions in the Appendix.**

	Not at all	Marginally	Moderately	Strongly
Collective layoffs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Individual layoffs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Temporary layoffs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Subsidised reduction of working hours	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Non-subsidised reduction of working hours (including reduction of overtime)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Non-renewal of temporary contracts at expiration	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Early retirement schemes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Freeze or reduction of new hires	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reduction of agency workers and others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<b>C3.4 – Have any of the following actions become more or less difficult, compared to the situation in 2010?</b> <i>Please choose ONE option for each line.</i>					
	Much less difficult	Less difficult	Unchanged	More difficult	Much more difficult
To lay off employees for economic reasons (collectively)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To lay off employees for economic reasons (individually)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To dismiss employees for disciplinary reasons	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To lay off employees temporarily for economic reasons	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To hire employees (cost of recruitment, including administrative costs)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To adjust working hours	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To move employees to positions in other locations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To move employees across different job positions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To adjust wages of incumbents employees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To lower wages at which you hire new employees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>NC3.4b. ONLY FOR THOSE REPORTING CHANGES IN C3.4 – To what factors would you attribute the changes reported in Question C3.4?</b> <i>Please choose ONE option for each line.</i>					
	Reforms of labour laws	Jurisprudence/ law enforcement	Changes in trade unions behaviour	Changes in individual behaviour	
To lay off employees for economic reasons (collectively)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
To lay off employees for economic reasons (individually)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
To dismiss employees for disciplinary reasons	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
To lay off employees temporarily for economic reasons	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
To hire employees (costs of recruitment, including administrative costs)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
To adjust working hours	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
To move employees to positions in other locations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
To move employees across different job positions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
To adjust wages of incumbents employees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
To lower wages at which you hire new employees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

<b>C3.5 – How relevant is each of the following factors as obstacles in hiring workers with a permanent, open-ended contract?</b> <i>Please choose <b>ONE</b> option for each line.</i>					
	Not relevant	Of little relevance	Relevant	Very relevant	
Uncertainty about economic conditions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Insufficient availability of labour with the required skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Access to finance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Firing costs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Hiring costs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
High payroll taxes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
High wages	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Risks that labour laws are changed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Costs of other inputs complementary to labour	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Other (please specify for example high minimum wages, high wage rates in collective agreements _____)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>C3.6 – In your opinion, is it necessary to reform labour market regulations in Croatia, involving the following changes?</b>					
	Strong decrease	Moderate decrease	Unchanged	Moderate increase	Strong increase
Dismissals costs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Costs of hiring procedures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flexibility of working hours	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Costs of early retirement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Minimum wages	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Costs derived from Collective Agreements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unemployment benefits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### C4. Wage adjustments

This section collects information on wage setting and the frequency of wage changes. Most of the questions refer to 2013, but some questions aim at assessing differences between 2008 and 2010-2013.

**C4.1 – In 2013: What percentage of your firm's total costs (all operating expenses) was due to labour costs (wages, salaries, bonuses, social security contributions, training, tax contributions, contributions to pension funds, etc.)? See definitions in the Appendix.**

Labour cost /Total cost \_\_\_\_\_ %

**C4.2 – What percentage of your total wage bill in 2013 was related to individual or company performance related bonuses and benefits?**

\_\_\_\_\_ %

**C4.3 – In 2013, did your firm apply a collective pay agreement bargained and signed inside of the firm (at the firm level)? and signed outside of the firm (at the national, regional, sectoral or occupational level)?**

	At the firm level	Outside the firm
No, such an agreement does not exist	<input type="checkbox"/>	<input type="checkbox"/>
No, the agreement exists but the firm opted-out	<input type="checkbox"/>	<input type="checkbox"/>
Yes, such an agreement is in effect	<input type="checkbox"/>	<input type="checkbox"/>

**C4.3b – What is the proportion of your employees covered in 2013 by any collective pay agreement?**

Proportion of employees covered by any collective pay agreement (approx.) \_\_\_\_\_ %

**C4.4 – How often does the collective pay agreement applied at you firm typically change?**

More than once a year <input type="checkbox"/>	Once a year <input type="checkbox"/>	Between one and two years <input type="checkbox"/>	Every two years <input type="checkbox"/>	Less frequently than once every two years <input type="checkbox"/>	Never/Not applicable <input type="checkbox"/>
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**C4.5 Did your firm adapt changes in base wages to inflation before 2010? And during 2010-2013?**

**Definition of base wage – direct remuneration excluding bonuses (regular wage and salary, commissions, piecework payments).**

	Before 2010	During 2010-2013
Yes	<input type="checkbox"/>	<input type="checkbox"/>
No	<input type="checkbox"/>	<input type="checkbox"/>
Inflation was too low so that indexation rules were no operative	<input type="checkbox"/>	<input type="checkbox"/>
There were no legal or other types of indexation rules specifying such an adjustment	<input type="checkbox"/>	<input type="checkbox"/>

**C4.6 – How frequently was the base wage of an employee belonging to the main occupational group in your firm (largest group in Question C3.2) typically changed in your firm? Please choose **ONE** option for each line.**

	More than once a year	Once a year	Between one and two years	Every two years	Less frequently than once every two years	Never/Not applicable
Before 2010	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
During 2010-2013	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<b>C4.7 – Over 2010-2013, did you freeze or cut base wages in a given year (please indicate in which years)?</b>						
	Wages were frozen		Wages were cut			Wages were neither frozen nor cut
	YES	% Workers affected	YES	% Workers affected	(average wage cut)	YES
2010	<input type="checkbox"/>	____%	<input type="checkbox"/>	____%	( ____ % )	<input type="checkbox"/>
2011	<input type="checkbox"/>	____%	<input type="checkbox"/>	____%	( ____ % )	<input type="checkbox"/>
2012	<input type="checkbox"/>	____%	<input type="checkbox"/>	____%	( ____ % )	<input type="checkbox"/>
2013	<input type="checkbox"/>	____%	<input type="checkbox"/>	____%	( ____ % )	<input type="checkbox"/>

<b>CS 4.9 – How relevant is each one of the following reasons in preventing base wage cuts? Please choose <u>ONE</u> option for each line.</b>					
	Not relevant	Of little relevance	Relevant	Very relevant	Don't know
Labour regulation/collective agreements prevent wages from being cut	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It would reduce employees' efforts, resulting in less output and poorer service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It would have a negative impact on employees morale	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It would damage the firm's reputation as an employer, making it more difficult to hire workers in the future	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
In presence of the wage cut the most productive employees might leave the firm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A wage cut would increase the number of employees who quit, increasing the cost of hiring and training new workers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It would create difficulties in attracting new workers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Workers dislike unpredictable reductions in income. Therefore workers and firms reach an implicit understanding that wages will neither fall in recessions nor rise in expansions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Employers compare their wage to that of similarly qualified workers in other firms in the same market	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<b>CS 4.10 – Has any of the following strategies ever been used in your firm to reduce labour costs during 2010-2013? Please choose <u>as many options as apply to your firm.</u></b>	
Reduction or elimination of bonus payments	<input type="checkbox"/>
Reduction or elimination of non pay benefits	<input type="checkbox"/>
Change in shift assignments	<input type="checkbox"/>
Slowdown or freeze of the rate at which promotions are filled	<input type="checkbox"/>
Recruitment of new employees (with similar skills and experience) at lower wage than those who left (e.g. due to voluntary quits and retirement)	<input type="checkbox"/>
Use of early retirement to replace high employees by entrants with low wages	<input type="checkbox"/>
Other strategies (please specify)	<input type="checkbox"/>

<b>S4.11 – Considering the main occupational group in your firm (as identified in the question C.3.2) please indicate among the following options which is the most relevant factor in determining entry wage of newly hired employees. Please choose a single option.</b>					
Collective pay agreement (signed at any level)					<input type="checkbox"/>
Wage of similar employees in the firm					<input type="checkbox"/>
Wage of similar employees outside the firm					<input type="checkbox"/>
Availability of workers with similar characteristics in the labour market					<input type="checkbox"/>
Other reasons (please specify) _____					<input type="checkbox"/>
<b>NC4.8 – How did the labour cost of a newly hired worker compare with that of similar (in terms of experience and task assignment) workers at your firm?</b>					
	Much lower	Lower	Similar	Higher	Much higher
Before 2010	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
During 2010-2013	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>CS4.12 – Did the decrease of public sector wages of 3% (coming from government decision in February 2013) directly or indirectly affect the average wage in your company?</b>					
Yes, it had a demonstrational effect, which helped us to justify lowering of wages in our company					<input type="checkbox"/>
Yes, it reduced the attractiveness of alternative employment options in the public sector					<input type="checkbox"/>
No, it didn't have an effect					<input type="checkbox"/>

### C5. Price setting and price changes

This section collects information on price setting and the frequency of price changes. Some questions aim at assessing differences in 2010-2013 with respect to the period before 2008.

If your firm produces (or sells) more than a single good or service, the answers should refer to the "main product" ("activity" or "service"), defined as the one that generated the highest fraction of your firm's revenue in the "reference year". For instance, if your firm produces (or sells) several types of hats and shoes, by "product" we mean "hats" and "shoes" (irrespective of the specific type), whereas by "main product" we mean the one that generated the highest revenue in the "reference year".

**NC5.2 – In 2013 what share of the revenues from your firm's main products, activity or service was due to sales in domestic markets and what share in foreign markets?**

Sales in the domestic market \_\_\_\_\_%

Sales in the foreign markets \_\_\_\_\_%

**NC5.4 – How would you characterise the degree of competition domestic and foreign markets for your main product? Please choose ONE option for each line.**

	Weak	Moderate	Severe	Very severe	Non applicable
Domestic markets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Foreign markets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



<b>NC5.6 – In 2013, how and how often did you typically change the price of your main product?</b> <i>Please choose <b>ONE</b> option per column, the one that best describes the situation in your firm.</i>		
	ON A REGULAR TIME PATTERN	WHENEVER COSTS and/or DEMAND CONDITIONS CHANGED <i>(please select in this case the most typical frequency change)</i>
More frequently than a year:		
Daily	<input type="checkbox"/>	<input type="checkbox"/>
Weekly	<input type="checkbox"/>	<input type="checkbox"/>
Monthly	<input type="checkbox"/>	<input type="checkbox"/>
Quarterly	<input type="checkbox"/>	<input type="checkbox"/>
Half-yearly	<input type="checkbox"/>	<input type="checkbox"/>
Once a year	<input type="checkbox"/>	<input type="checkbox"/>
Between one and two years	<input type="checkbox"/>	<input type="checkbox"/>
Less frequently than once every two years	<input type="checkbox"/>	<input type="checkbox"/>
Never	<input type="checkbox"/>	<input type="checkbox"/>
Don't know	<input type="checkbox"/>	<input type="checkbox"/>
<b>CS5.7 – How does the timing of price changes relate to that of wage changes?</b> <i>Please choose a <b>single</b> option.</i>		
There is no link between the two		<input type="checkbox"/>
There is a link but no particular pattern		<input type="checkbox"/>
Decisions are taken simultaneously		<input type="checkbox"/>
Price changes tend to follow wage changes		<input type="checkbox"/>
Wage changes tend to follow price changes		<input type="checkbox"/>
Don't know		<input type="checkbox"/>

## The following Working Papers have been published:

No.	Date	Title	Author(s)
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W-2	January 2000	Is Unofficial Economy a Source of Corruption?	Michael Faulend and Vedran Šošić
W-3	September 2000	Measuring the Similarities of Economic Developments in Central Europe: A Correlation between the Business Cycles of Germany, Hungary, the Czech Republic and Croatia	Velimir Šonje and Igeta Vrbanc
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In its periodical publications *Working Papers*, *Surveys* and *Technical Papers*, the Croatian National Bank publishes scientific and scholarly papers of the Bank's employees and other associate contributors.

After the submission, the manuscripts shall be subject to peer review and classification by the Manuscript Review and Classification Committee. The authors shall be informed of the acceptance or rejection of their manuscript for publication within two months following the manuscript submission.

Manuscripts are submitted and published in Croatian and/or English language.

Manuscripts submitted for publication should meet the following requirements:

Manuscripts should be submitted via e-mail or optical storage media (CD, DVD), accompanied by one printed paper copy. The acceptable text format is Word.

The first page of the manuscript should contain the article title, first and last name of the author and his/her academic degree, name of the institution with which the author is associated, author's co-workers, and the complete mailing address of the corresponding author to whom a copy of the manuscript with requests for corrections shall be sent.

Additional information, such as acknowledgments, should be incorporated in the text at the end of the introductory section.

The second page should contain the abstract and the key words. The abstract is required to be explicit, descriptive, written in third person, consisting of not more than 250 words (maximum 1500 characters). The abstract should be followed by maximum 5 key words.

A single line spacing and A4 paper size should be used. The text must not be formatted, apart from applying bold and italic script to certain parts of the text. Titles must be numerated and separated from the text by double-line spacing, without formatting.

Tables, figures and charts that are a constituent part of the

paper must be well laid out, containing: number, title, units of measurement, legend, data source, and footnotes. The footnotes referring to tables, figures and charts should be indicated by lower-case letters (a,b,c...) placed right below. When the tables, figures and charts are subsequently submitted, it is necessary to mark the places in the text where they should be inserted. They should be numbered in the same sequence as in the text and should be referred to in accordance with that numeration. If the tables and charts were previously inserted in the text from other programs, these databases in the Excel format should also be submitted (charts must contain the corresponding data series).

The preferred formats for illustrations are EPS or TIFF with explanations in 8 point Helvetica (Ariel, Swiss). The scanned illustration must have 300 dpi resolution for grey scale and full colour illustration, and 600 dpi for lineart (line drawings, diagrams, charts).

Formulae must be legible. Indices and superscript must be explicable. The symbols' meaning must be given following the equation where they are used for the first time. The equations in the text referred to by the author should be marked by a serial number in brackets closer to the right margin.

Notes at the foot of the page (footnotes) should be indicated by Arabic numerals in superscript. They should be brief and written in a smaller font than the rest of the text.

References cited in the text are listed at the last page of the manuscript in the alphabetical order, according to the authors' last names. References should also include data on the publisher, city and year of publishing.

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Regular annual publication surveying annual monetary and general economic developments as well as statistical data.

### Croatian National Bank – Semi-annual Report

Regular semi-annual publication surveying semi-annual monetary and general economic developments and statistical data.

### Banks Bulletin

Publication providing survey of data on banks.

### Croatian National Bank – Bulletin

Regular monthly publication surveying monthly monetary and general economic developments and monetary statistics.

### Croatian National Bank – Working Papers

Occasional publication containing shorter scientific papers written by the CNB employees and associate contributors.

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