

II<sup>nd</sup> Section:  
**NEW ECONOMY**



# RIGIDITY OF THE ROMANIAN LABOUR MARKET. THEORETICAL AND EMPIRICAL APPROACH<sup>1</sup>

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***Abstract.** This paper studies the rigidity of the labour market in the context of accession to the Economic and Monetary Union, moment after which Romania will not be able to use the exchange rate as an adjustment instrument in front of economic shocks. Since 2001 government policies have reduced the institutional rigidity of the labour market: the government intervention has decreased and the negotiation of employment contracts has moved from national to industry or company level, making it easier for the companies to adjust wages and withstand shocks. The empirical analysis, based on a multiple linear regression, shows that wages are in connection with macroeconomic variables such as inflation, GDP and non-wage costs. Union power in wage negotiations is highlighted by the positive relationship between the average wage and the minimum wage.*

***Keywords:** labour market, rigidities of labour market, regression, business cycles volatility, persistent inflation.*

## 1. Introduction

A vast literature discusses the labor market rigidities and their major influence on the ability of the income policy, especially the wage policy, to absorb shocks in the economy. Literature in the field emphasizes three aspects of labor market rigidity, widely debated in terms of ability to adjust wages, namely: i) the impact of labor market institutions with emphasis on the influence of trade unions and collective agreements ii) the influence of employee protection legislation and iii) wage formation mechanism affecting nominal and real wage rigidity. All these factors influence the labor market rigidity with significant effect on the ability of economies within the euro area to absorb economic shocks.

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Pissarides (1997) considered that short-term problems arising from wage rigidities are more serious within the euro area than outside it because normally “exchange rate is the first variable which is adjusted to market shocks and initiates changes in relative prices” (Pissarides, 1997, p. 520).

The labour market is greatly influenced by the ability of firms to move production from one location to another which creates a pressure on reducing taxes, salaries and social security system (Jepsen, Mary A., Pascual S., 2004).

Highlighting the importance of this theme we address aspects of labour market rigidities in Romania, being aware that in the context of accession to the euro area, knowing the labour market capacity to absorb economic shocks is extremely important.

This paper is organized as follows: the first part will present a brief overview of some of the findings in literature on this topic. The second part will deal with labour market rigidity in Romania by examining a model based on various components of labour market response to shocks in the economy. The third part will contain the conclusions.

## **2. Rigidity approaches in literature**

Economic theories regarding wage rigidity (implicit contract theory and efficiency wage theory<sup>2</sup>), according to Stiglitz (1984), do not explain in a convincing manner neither cyclical unemployment nor macro-economic cycles. He believes that even newer versions that incorporate asymmetric information in contracts theory cannot explain some of the observable behaviour of unemployment, but the approach in terms of both theories can provide a satisfactory explanation. According to Stiglitz, firms have two reasons to pay high salaries: the first is to ensure employee productivity and, second, to reduce costs of future recruitment. Furthermore he believes that the companies reluctance to reduce wages in spite of the oversupply of labour assumes that employee productivity depends on the wage (ie productivity is a function of wages).

Studies in the literature on wage rigidity have a wide variety of approaches: analysis regarding downward wage rigidity and the impact on effectiveness of monetary policy; the influence of wage dynamics on monetary policy and inflation in particular; the relationship between

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<sup>2</sup> Worth mentioning here the contracts theory and the fairness theory by Wolfgang F. and F. Pfeiffer (2006), *Reason for Wage Rigidity in Germany*, IYA DP 2017.

wage policy in the public sector and budgetary balance; the relationship wages-competitiveness, wages-labour productivity; the relationship between wages and employment (wages-unemployment) and the effect of labour market institutions on volatility of business cycles.

Several conclusions can be drawn from the literature dedicated to this area of research:

1. *Institutional characteristics of labour market* are influenced by the type of labour contracts, by the bargaining power of unions which depends on the number of members, degree of association of trade unions into confederations, the degree of employee protection provided by national legislation<sup>3</sup>, the minimum wage level. Studies have shown that institutional rigidities reduction through higher legislation flexibility<sup>4</sup> and the transition from national or sectorial negotiations (associated with greater rigidity in wage determination – see Holden and Wulfsberg, 2008, Babecký and all, 2010), to individual level negotiation increases the firms ability to react more quickly to different shocks in the economy. If the legislative protection of employees is associated with long-term contracts at company level then the downward wage rigidity is higher (Dabušinskas Room, 2011).

2. *The link between trade union density and business cycles volatility* was studied by Scharler and Rumler (2009) and their conclusion was that strong unions are less favourable to a policy of wage moderation in case of adverse shocks, thus increasing the volatility of the business cycles. However, the extent to which trade unions internalize the macroeconomic consequences of their actions has implications for macroeconomic output variables. *Ie, characteristics of the wage bargaining institutional process influence the response of macroeconomic variables to disturbances. Thereby, trade unions, in a coordinated system can provide an adequate degree of real wages flexibility in order to promote macroeconomic adjustment.*

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<sup>3</sup> OECD has developed a methodology for determining the intensity of employee protection legislation in the 15 euro-area countries – EPL index with a scale of 0-6 where 6 is the strictest regulatory and 0 the lowest. The methodology was extended by Tonin (2004) to new countries of the euro area, data showing that EPL tends to be stricter in the EU compared to other countries – see Tairi Rõõm and Aurelijus Dabušinskas, 2011, *How Wage Respond to Shocks Asymmetry in the Speed of Adjustment*, Working Papers Series, no. 1340, 2011, European Central Bank.

<sup>4</sup> Holden (2004) developed a theoretical model which revealed a strong relationship between strict protection of employees by legislation and high downward wage rigidity. See Holden, S. (2004), *The Cost of Price Stability – Downward Nominal Wage Rigidity in Europe*. *Economica*, No. 71, pp. 183-208.

3. *Macroeconomic implications of trade unions and collective bargaining on wage rigidities* were highlighted by Calmfors and Driffill (1988). Their primary analysis is focused on unemployment and argue that the way wage bargaining is organized affects output, but without answering the question on the extent to which unions internalize the consequences of their actions given that absorbing the shocks implies an adjustment of real wages. For example, if a shock leads to decreased activity and increased inflation, unions response demanding higher nominal wages to compensate for losses in purchasing power of workers, leading to spiralling inflation and an increase in the production costs due to higher salary and lower production.

4. Peltzman (2000), referring to institutional rigidities, stated that *concentrated power in the labour market*, reflecting the oligopolistic nature of the participants in the labour market *is positively associated with asymmetries in price behaviour which tend to react more quickly to a decrease in demand*.

5. *Asymmetric reaction intensity of the economy to shocks is positively influenced by how the wages are adjusted*. The literature presents two approaches: adjustment depending on time and adjustment depending on the adjustment of salaries in the public sector. Studies show that countries where salaries are adjusted according to the public sector rules (for example Estonia where 58% of companies adjust their salaries based on this system) have a higher wage asymmetry. (Rõõm and Dabušinskas, 2011).

6. *Speed of adjustment to shocks increases when flexible wage component is higher*, usually companies linking the size of this component to the company's economic performance. However, the link between stimulus size and speed of response to shock is negative rather than positive (Dabušinskas Room, 2011).

7. *Rigidity of wages and price rigidity generates inertial inflation and persistent fluctuations in gross domestic product (GDP) causing a shift between volatility of inflation and volatility of GDP, which makes a strict policy of inflation targeting not to be an optimal monetary policy strategy*. (Cashew, Fuss and Wintr, 2009). Complementing this idea, Akerlof et al. (1996) believes that an inflation rate too low (near zero) will lead to increased unemployment and a GDP at a suboptimal level. In this context it is appropriate to distinguish between nominal wage rigidity and real wage rigidity, because *in case of real wage rigidities, monetary policy will not have an adjustment effect on labour market*.

*A number of studies have revealed that differences in wage rigidity between countries can be explained by different degree of syndication, by the area covered by collective agreements, by labour protection laws, by the centralized coordination of wage bargaining, which can all be resumed as the institutional rigidity of the labour market. Moreover, wage rigidity across sectors was attributed to the ratio of sector employees to capital intensity, ratio of officials (white-collar employees) to workers (blue collar employees).*

Starting from the idea that wage rigidity affects employment and unemployment Cashew, Fuss and Wintr (2009) measured downward wage rigidity based on the methodology developed by Dickens and Goette<sup>5</sup> (2006). They showed that *downward rigidity is greater in case of white-collar workers and lower in areas of blue collar employees and for those who receive bonuses*. Apart of the effect of labour force composition, they highlight factors that influence differences in downward wage rigidity: firm's size, the degree of competition, technology, wage bargaining institutions. Thus, *wages are more rigid in more competitive sectors, in the labour-intensive sectors and in sectors where wages are mainly centralized, set at sector level, compared with sectors where negotiations are at the firm level.*

8. Kai Christoffel and Tobias Linzert (2005) showed that *wage rigidity explains persistent inflation*. Using a New Keynesian dynamic stochastic general equilibrium model they argued that *i) the dynamics of inflation and unemployment depend also on other labour market fundamental factors such as labour protection and collective bargaining; ii) the volatility of the labour market flows increases salary adjustments and tend to increase the persistence of inflation and iii) labour market plays an important role in the transmission mechanism of monetary policy.*

### **3. Rigidity of the labour market in Romania. Empirical analysis**

In Romania as in all European countries, an important role in wage formation mechanism is held by collective agreements, effective on more than a year, at branch, district or country level. Due to these contracts, the

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<sup>5</sup> Stiffness estimation methodology, described by Dickens and Goette (2006), is developed within the International Wages Flexibility Project. According to this methodology, downward wage rigidity is defined as the share of employees who wish to receive nominal salaries frozen if they are confronted with a real reduction (nominal) wages. This methodology was applied in studies conducted by Wage Dynamics Network.

response of wages to business cycles is delayed by a period that depends on the duration of these contracts and their level of aggregation.

Romania, as part of the European Union has launched a comprehensive reform of the labour market, in the sense of a greater flexibility, aimed to change the law on collective agreements (certified nationally by Law 130/1996 – which states that the contracts should be concluded for a four years period, and eliminated by Law 62/2011 on social dialogue, through which collective bargaining is permitted only at smaller level: sector, branch, unit, group of units) and employee protection legislation (Labour Code, the social benefits etc.).

Analysis of the negotiation of employment contracts in Romania (*Wcoord*) and government intervention in these negotiations (*Govint*) reveals that during 1993-2010 the level varied by a maximum of collective bargaining in 2001, 2002, 2005 and 2006 when trade unions have negotiated contracts across the economy, with further negotiations at sector or industry level (level 4 on Kenwort intensity scale<sup>6</sup>) compared with the two remaining years when the level is representative for a joint negotiation at industry and company level with a low power of collective agreements at industry level (Figure 1).

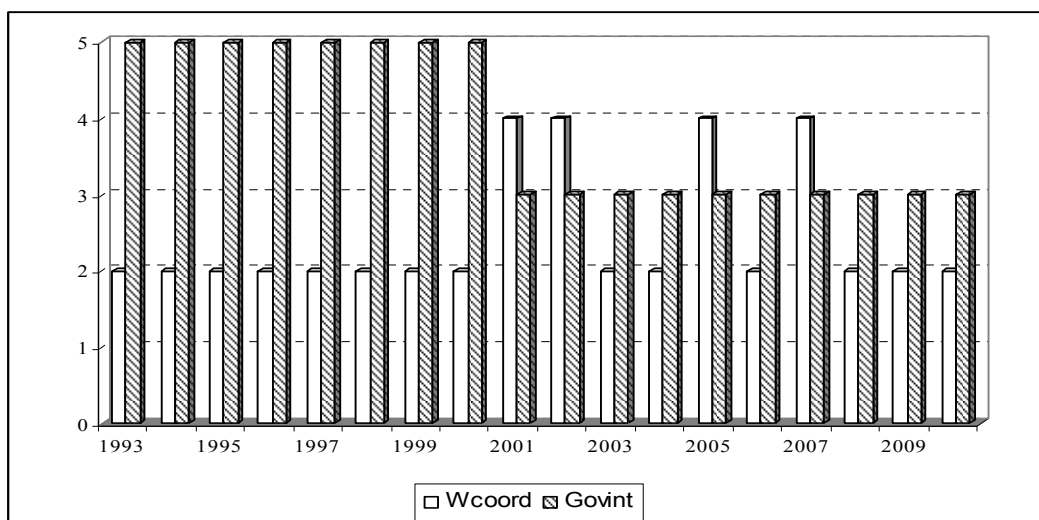
Collective bargaining agreements set the level of wages usually over more than a year. This may lead, sometimes, to the decoupling of the wage dynamics from the labour productivity evolution, companies having limited freedom to adjust salaries in case of shocks. This explains the pressure to limit collective bargaining, a process made difficult by strong unions or state interventions in setting salary levels.

In terms of government intervention in wage determination, in Romania since 2001, there has been an indirect, limited state involvement in setting wage levels – indirect intervention referring to the wage indexation system, establishing minimum threshold requirements (the minimum wage) or that the private sector wages follow the development of public sector wages. In Romania there has been a shift from a position in which the state may or may not be required to interfere if wage negotiations failed (level 5, between 1993 and 2000) to the one in which the state sector wages are milestones guiding private sector wage policy (level 3 as shown in figure 1).

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<sup>6</sup> Note: This classification is based on the Kenwort 5 points score methodology (Kenworthy, 2001a, b) on coordination in wage determination. For most of the periods, the score of the indicator noted *Wcoord* is the same except in cases of governments intervenes directly in wage setting (for which the score is 5). The evaluation considers an identical scale of 1 to 5 for government intervention in wage determination, wage level 5 means wages being imposed by the government in the private sector (the indicator for this is *Govint*).





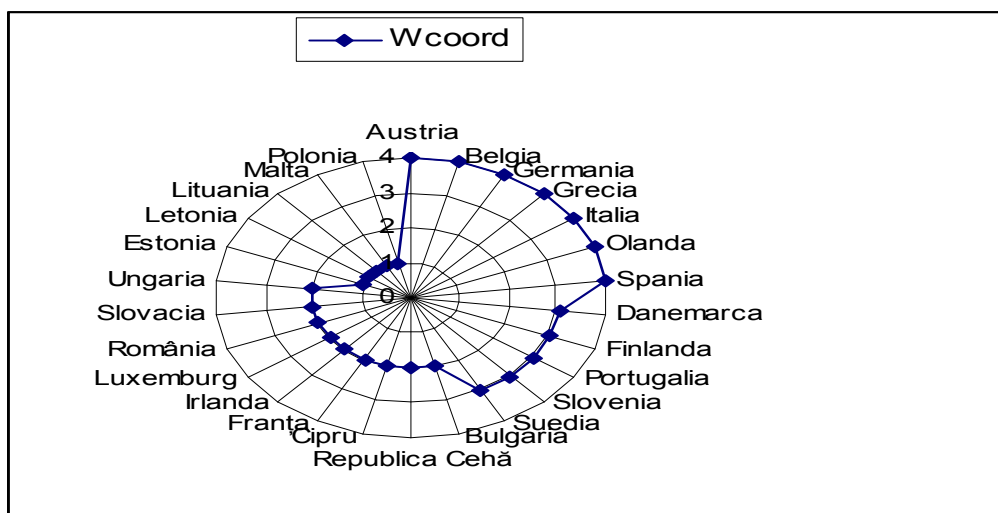
**Figure 1.** The level at which wage negotiations take place in Romania.

*Note:* Wcoord indicates the level at which wage bargaining takes place and is rated on Kenwort scale from 1 to 5 with the following meaning: 5. negotiations at national level strengthened by agreements between trade unions and employers or salary caps imposed by governments; 4. mixed negotiations at industry and economy level; unions negotiate permissive agreements at national level; key unions and employee associations negotiate for the entire economy; 3. industry-wide negotiations with or without setting caps; limited involvement of central organizations and a limited freedom for negotiations at company level; 2. joint or alternative systems of negotiations at industry and firm level with a reduced mandatory part at industry-wide negotiations; 1. fragmented negotiation, often at the firm level.

For Govint a 1 to 5 scoring system is used, similar to that applied by Hassel, 2006, p. 75, with some modifications: a) to mark the differences between the social pact case and the negotiated pact case (level 4); no government implication (level 5) which may or may not be requested to interfere when negotiations fail; b) to add the role of public sector in wage setting (level 3, the public sector is used as an example in the evolution of private sector wage) c) to grant more arbitration power to the Parliament or state in case of dispute resolution (level 2) and d) to distinguish the case of non-intervention of government in facilitating negotiations for large organizations (level 2) from the pure liberal or pluralistic non-intervention case to a liberal pluralistic regime in favour of companies trade unions and / or individual negotiations (level 1).

**Source:** ICTWSS: The Database on Institutional Characteristics of Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts, compiled by Professor Jelle Vissert the Amsterdam Institute for Advanced Labour Studies, May 2011.

The level at which wage bargaining takes place in Romania is similar to that in other countries like the Czech Republic, Hungary, Slovakia, Bulgaria, France, Luxembourg and Ireland, as shown in figure 2.



**Figure 2.** The level of wages negotiation in Romania and other countries in 2010.

**Source:** ICTWSS: The Database on Institutional Characteristics of Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts, compiled by Professor Jelle Vissert the Amsterdam Institute for Advanced Labour Studies, May 2011.

This level is still high compared to other countries that have a more flexible market (USA, United Kingdom, Poland, Malta, Latvia, Lithuania) and where the coordination of collective bargaining is done at the company level (level 1 on Kenwort scale). Among the euro area countries a heterogeneity exists in the coordination of wage negotiations: in countries like Germany, Greece, Austria, Belgium, negotiation is done at industry and national level (level 4 on Kenwort scale), compared with mixed systems negotiations at the firm and industry level (level 2 on Kenwort scale) that are found in France, Ireland, Luxembourg.

The bargaining power of trade unions and professional organizations depends on their degree of concentration in confederations, on the one hand, and union membership of employees, on the other. Thus, as the number of members is higher, the bargaining power of unions is higher, which is evidenced by a higher index of union density, calculated as a percentage of net salaries of union members in total net salaries, as resulting from data in Table 1.

**Table 1**  
*Union density in the EU and other countries*

Country	1990	2000	2007	2009	2010
Austria	46,9	36,6	33,3	28,6	28,1
Belgium	53,9	49,5	52,9	51,9	...
Bulgaria	81,2	27,7	20,0	19,8	...
Czech Republic	...	27,2	17,9	17,3	...
Cyprus	76,0	65,5	58,9 <sup>1</sup>	54,3 <sup>2</sup>	...
Denmark	73,5	74,2	69,1	68,3	....
Estonia	61,9	14,9	7,3	6,7	...
France	9,9	8,0	7,6	7,6 <sup>2</sup>	...
Finland	72,5	75,0	70,3	69,2	70,0
Germany	31,2	24,6	19,9	18,8	18,6
Greece	34,1	26,5	24,5	24,0 <sup>2</sup>	...
Ireland	56,7	40,4	32,2	33,7	...
Italy	38,8	34,8	33,5	34,7	35,1
Luxembourg	46,4	42,5	38,7	37,3 <sup>2</sup>	...
Lithuania	32,7 <sup>3</sup>	19,9 <sup>4</sup>	8,8	9,5	...
Latvia	28,3 <sup>3</sup>	...	16,3	14,8 <sup>1</sup>	...
Malta	66,3	60,2	54,7	51,0	...
Netherlands	27,0 <sup>5</sup>	26,0	20,0	19,0	....
Poland	30,4	42,2	15,2	15,1	15,0
Portugal	28,0	21,6	20,8	20,1	19,3
United Kingdom	39,3	30,5	28,3	27,5	...
<b>Romania</b>	<b>80,2<sup>6</sup></b>	<b>45,1<sup>7</sup></b>	<b>34,4<sup>1</sup></b>	<b>32,8<sup>2</sup></b>	...
Slovakia	67,3 <sup>8</sup>	32,3	18,8	17,2 <sup>2</sup>	...
Slovenia	61,1	43,1 <sup>7</sup>	...	29,7 <sup>2</sup>	...
Spain	12,5	16,7	14,9	15,9	...
Sweden	81,5	80,1	71,1	68,8 <sup>2</sup>	68,9
Hungary	83,1	21,7	16,9	16,8 <sup>2</sup>	...
Japan	...	21,5	18,1	18,5	18,5
USA	15,5	12,8	11,6	11,8	11,4

*Note:* ... data not available; 1 = year 2006; 2 = year 2008; 3 = year 1995; 4 = year 2001; 5 = year 1992; 6 = year 1991; 7 = year 1998; 8 = year 1993

**Source:** ICTWSS: The Database on Institutional Characteristics of Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts, compiled by Professor Jelle Vissert the Amsterdam Institute for Advanced Labour Studies.

It is noted that Romania and other countries have seen a continuing reduction in union density, a rate of 32.8%, in 2008, positioning it among countries with medium density, compared with peak levels in northern European countries (Norway, Finland, Sweden and others).

To highlight the influence of wage evolution on macroeconomic variables a model was built based on a multiple linear regression between

the index of average gross nominal wage in the economy (ISAL\_B\_SA) as dependent variable and the following explanatory variables: GDP deflator index (IDEF\_PIB\_SA), GDP index (in constant prices 2000, IR\_PIB\_SA), growth rate of non-wage costs (R\_COST\_NESAL\_SA), the minimum wage index (ISAL\_MI\_SA), growth index of M2 in EU definition and a dummy variable (dummy1) representing the policy measure to reduce wages by 25% in the public sector in July 2010 (which was assigned 1 for 3rd Quarter 2010 and 0 otherwise).

The model was developed with EViews, using quarterly data from Q1 2000 to Q4 2011. Series were seasonally adjusted using X-12-ARIMA program and were tested for stationarity – according to ADF and Philips Perron test results all series are stationary. The model has an R sq. value of 0.8486, R sq. adjusted of 0.8247, while the DW value is 2.23, indicating no error autocorrelation. Statistical tests (hypothesis tests on errors and the four coefficients) indicate that the regression model assumptions are met.

The resulting equation is:

$$\begin{aligned}
 \text{ISAL\_B\_SA} = & -0.31798 + 0.07239 \cdot \text{ISAL\_MI\_SA} + 0.09867 \cdot \text{IM2\_SA}(-1) + \\
 & \begin{array}{ccc}
 [2.0977] & [2.16294] & [2.40445] \\
 (0.0052) & (0.0335) & (0.04104)
 \end{array} \\
 & + 0.56764 \cdot \text{IDEF\_PIB\_SA}(-1) + 0.25683 \cdot \text{IR\_PIB\_SA} + \\
 & \begin{array}{cc}
 [5.43079] & [1.78556] \\
 (0.10452) & (0.14384)
 \end{array} \\
 & + 0.00062 \cdot \text{R\_COST\_NESAL\_SA} - 0.0298 \cdot \text{DUMMY1} \\
 & \begin{array}{cc}
 [+4.5440] & [-1.86876] \\
 (0.00071) & (0.01599)
 \end{array}
 \end{aligned}$$

Data in square brackets are *t*-statistic values while the errors can be found in the parenthesis.

Results show that all coefficients have the expected sign, in accordance to economic theory. The coefficient for GDP deflator variable is significant, indicating that wage policy in Romania is affected by inflation, as ex-post indexation mechanism applied in public sector wages and extended to many companies. It is noted that, usually the wage adjustment is smaller than the inflation index given by the GDP deflator, an explanation being that in Romania indexing is done by consumer price index.

Union power in wage negotiations is highlighted by the positive relationship (coefficient + 0.11) between average monthly nominal gross

wage growth and minimum wage growth, trade unions seeking to protect employees in front of companies that are trying to provide salaries below the minimum wage.

There is a significant positive correlation (coefficient + 0.2568) between real GDP growth, money supply growth (coefficient + 0.0986) and average monthly nominal gross wage growth, as expected.

Also it is noted that the non-wage component has a great statistical significance (t statistic more than 2). The coefficient is small, above zero. Decision to reduce wages significantly affects the growth of average monthly nominal gross wage, the coefficient is negative (– 0.0298).

#### 4. Conclusions

The analysis performed shows that the labour market in Romania was quite stiff. Government policies meant to improve flexibility (social aid law, the unions' law, retirement law, unitary pay law, the new Labour Code) were needed to insure greater support in front of labour market shocks, as Romania will lose the exchange rate policy through accession to the EMU.

Regression results revealed a correlation between the average gross wage and a number of fundamental variables which have a major influence on its evolution: the growth rate of real GDP, inflation, wage policy decisions in the state sector, bargaining power of unions in setting the minimum wage.

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ASSESSING THE LINKS BETWEEN WAGE SETTING, COMPETITIVENESS, AND IMBALANCES <http://gesd.free.fr/wagecomp11.pdf>

### Regression equation

Dependent Variable: ISAL\_B\_SA

Method: Least Squares

Sample (adjusted): 2000Q3 2011Q3

Included observations: 45 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ISAL_MI_SA	0.072394	0.033470	2.162940	0.0369
IM2_SA(-1)	0.098671	0.041037	2.404446	0.0212
IDEF_PIB_SA(-1)	0.567638	0.104522	5.430790	0.0000
IR_PIB_SA(-1)	0.256834	0.143842	1.785532	0.0822
R_COST_NESAL_SA	0.003234	0.000712	4.544047	0.0001
DUMMY1	-0.029884	0.015991	-1.868763	0.0694
C	-0.317975	0.152389	-2.086605	0.0437
R-squared	0.848628	Mean dependent var	1.047151	
Adjusted R-squared	0.824727	S.D. dependent var	0.036620	
S.E. of regression	0.015331	Akaike info criterion	-5.375814	
Sum squared resid	0.008932	Schwarz criterion	-5.094777	
Log likelihood	127.9558	F-statistic	35.50612	
Durbin-Watson stat	2.325977	Prob(F-statistic)	0.000000	

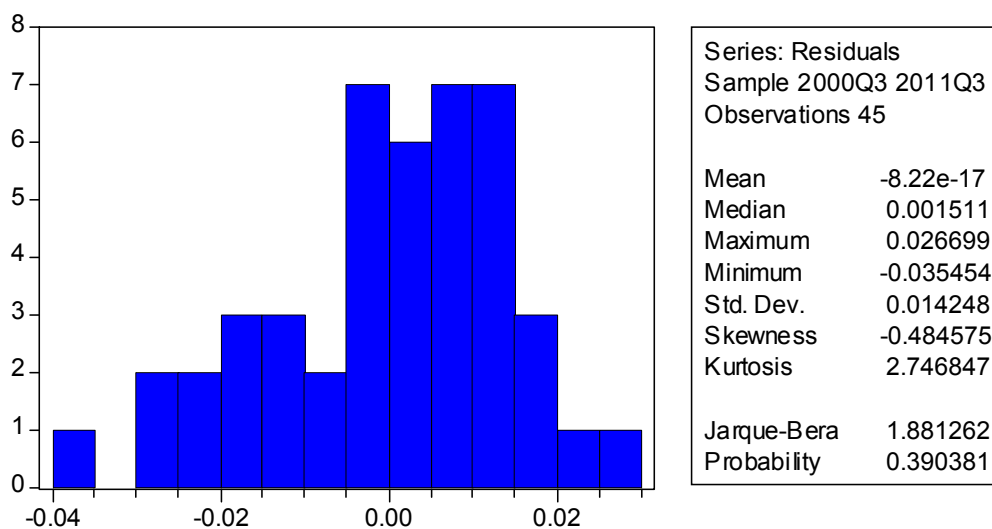
**Residual Tests**  
**Error autocorrelation Test**

Sample: 2000Q3 2011Q3

Included observations: 45

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
.*.	.*.	1	-0.125	-0.125	0.7531	0.385
.*.	.*.	2	-0.145	-0.163	1.7811	0.410
. .	. .	3	0.114	0.076	2.4397	0.486
. .	. .	4	0.264	0.280	6.0295	0.197
. .	. .	5	0.035	0.159	6.0928	0.297
. .	. .	6	-0.007	0.096	6.0957	0.413
. .	. .	7	0.047	0.024	6.2166	0.515
. .	. .	8	0.220	0.164	8.9784	0.344
. .	. .	9	-0.097	-0.094	9.5319	0.390
. .	. .	10	-0.078	-0.123	9.9003	0.449
. .	. .	11	-0.019	-0.188	9.9231	0.537
. .	. .	12	0.081	-0.095	10.342	0.586
. .	. .	13	-0.053	-0.070	10.527	0.650
. .	. .	14	-0.080	-0.044	10.968	0.689

**Test for normal distribution of errors**





Annex 2 (continued)

**Breusch-Godfrey Serial Correlation LM Test**

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.882460	Probability	0.166895
Obs*R-squared	4.260575	Probability	0.118803

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: 04/26/12 Time: 11:27

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ISAL_MI_SA	0.006037	0.033014	0.182852	0.8559
IM2_SA(-1)	0.002233	0.040356	0.055329	0.9562
IDEF_PIB_SA(-1)	0.009734	0.102317	0.095138	0.9247
IR_PIB_SA(-1)	0.052632	0.143207	0.367522	0.7154
R_COST_NESAL_SA	-0.000294	0.000714	-0.411546	0.6831
DUMMY1	-0.004552	0.016214	-0.280759	0.7805
C	-0.041260	0.150565	-0.274035	0.7856
RESID(-1)	-0.257580	0.173370	-1.485723	0.1461
RESID(-2)	-0.259150	0.171324	-1.512628	0.1391
R-squared	0.094679	Mean dependent var	-8.22E-17	
Adjusted R-squared	-0.106503	S.D. dependent var	0.014248	
S.E. of regression	0.014987	Akaike info criterion	-5.386391	
Sum squared resid	0.008086	Schwarz criterion	-5.025058	
Log likelihood	130.1938	F-statistic	0.470615	
Durbin-Watson stat	2.059369	Prob(F-statistic)	0.868630	

### White Heteroskedasticity Test

White Heteroskedasticity Test:

F-statistic	0.681512	Probability	0.745645
Obs*R-squared	8.330284	Probability	0.683447

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 04/26/12 Time: 11:28

Sample: 2000Q3 2011Q3

Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.031325	0.081910	-0.382431	0.7046
ISAL_MI_SA	0.016868	0.009565	1.763601	0.0871
ISAL_MI_SA^2	-0.007413	0.004172	-1.776916	0.0848
IM2_SA(-1)	0.005513	0.010108	0.545422	0.5891
IM2_SA(-1)^2	-0.002611	0.004662	-0.560003	0.5793
IDEF_PIB_SA(-1)	-0.017229	0.074316	-0.231839	0.8181
IDEF_PIB_SA(-1)^2	0.008505	0.035436	0.240010	0.8118
IR_PIB_SA(-1)	0.110617	0.161216	0.686139	0.4974
IR_PIB_SA(-1)^2	-0.056918	0.080811	-0.704335	0.4862
R_COST_NESAL_SA	-0.000511	0.000575	-0.887920	0.3810
R_COST_NESAL_SA^2	2.52E-06	2.77E-06	0.909563	0.3696
DUMMY1	-0.000156	0.000301	-0.516978	0.6086

R-squared	0.185117	Mean dependent var	0.000198
Adjusted R-squared	-0.086510	S.D. dependent var	0.000265
S.E. of regression	0.000277	Akaike info criterion	-13.32529
Sum squared resid	2.52E-06	Schwarz criterion	-12.84352
Log likelihood	311.8191	F-statistic	0.681512
Durbin-Watson stat	2.381655	Prob(F-statistic)	0.745645

## Stability test

Ramsey RESET Test:

F-statistic	1.027137	Probability	0.368284
Log likelihood ratio	2.497250	Probability	0.286899

Test Equation:

Dependent Variable: ISAL\_B\_SA

Method: Least Squares

Date: 04/26/12 Time: 11:31

Sample: 2000Q3 2011Q3

Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ISAL_MI_SA	-9.673870	7.099830	-1.362549	0.1815
IM2_SA(-1)	-13.21055	9.701434	-1.361711	0.1818
IDEF_PIB_SA(-1)	-75.94161	55.75621	-1.362030	0.1817
IR_PIB_SA(-1)	-34.34347	25.23085	-1.361170	0.1819
R_COST_NESAL_SA	-0.432795	0.317773	-1.361963	0.1817
DUMMY1	3.979361	2.924433	1.360729	0.1821
C	90.73801	66.23161	1.370011	0.1792
FITTED^2	125.4274	91.78796	1.366491	0.1803
FITTED^3	-38.83740	28.54525	-1.360556	0.1821
R-squared	0.856799	Mean dependent var		1.047151
Adjusted R-squared	0.824977	S.D. dependent var		0.036620
S.E. of regression	0.015320	Akaike info criterion		-5.342419
Sum squared resid	0.008450	Schwarz criterion		-4.981087
Log likelihood	129.2044	F-statistic		26.92440
Durbin-Watson stat	2.436875	Prob(F-statistic)		0.000000

