



REAL WAGES IN THE MANUFACTURING INDUSTRY IN MACEDONIA: THE ROLE OF MACROECONOMIC FACTORS, WITH REFERENCE TO RECESSION TIMES

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ABSTRACT

In this paper we analyze the determinants of real wages in Macedonia's manufacturing sector. We emphasize the macroeconomic aspects involved, and use econometric panel data techniques to model the behaviour of real wages for the period 2005-2010, using monthly data. We find non-negligible persistence of real wages. We further find a role for overall unemployment, real exchange rate and the tariff index in determining real wages.

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I. INTRODUCTION

During the last twenty years, Macedonian economy has lived through different stages. Many now characterize 1990s as the core period of economic transformation, marked by mild growth rates frequently halted by shocks from economic and political nature. Although 2000s continued the economic transformation, many agree that the after-conflict period (after 2001) could be regarded as a distinct economic period. The economy had to get back on the normal track after the conflict, with steady growth rates at the beginning of the decade (2002-2004), which accelerated in the period afterwards. However, this trend was again halted by the world economic crisis of 2008.

During these stages, the labour market has also undergone significant changes, in terms of reduction of open unemployment and massive layoffs in the process of privatisation of the formerly socially-owned enterprises, in legislative terms, towards flexibilisation of the labour market and so on.

The main objective of this paper is to analyze one particular aspect of the labour market - the evolution and determinants of real wages in the manufacturing sector, during the last two stages of Macedonian economic evolution – the period of intensified growth (2005:M1-2008:M9) and the crisis period (2008:M10-2010:M12). This paper departs from a rather common approach in labour-market studies. Firstly, because it exclusively concentrates on the macroeconomic factors involved; secondly, because it narrows the focus of the research. Namely, while we study how the macro-economy contributes to the determination of real wages, we do not study the impact of real wages on the macro-economy and on employment (although we control for the possible reverse causation). However, separating one way of this causality link does not lessen the importance of studying the labour market and the determinants of wages, as the latter are important for their effect on costs, prices and inflation, and on income distribution.

The paper is organized as follows. The next section surveys the theoretical arguments developed in relation to wage determination. Then, a brief snapshot of the recent evolution of the Macedonian manufacturing sector is provided. Section 4 pursues econometric analysis, relying on panel data for all 23 manufacturing branches for the period 2005:M1-2010:M12, using monthly data, seeking to explain the determinants of real manufacturing wage in Macedonian recent development. Section 5 summarizes the results and offers some discussion. The last section concludes.

II. THEORETICAL DISCUSSION

When analyzing real wages, it should be noted that the real wage is the outcome of two processes. The first refers to how nominal wages are established. The second has to do with the way (consumer) prices are set by firms. We begin our discussion with the first part of the real wage equation. There are many competing or complementary theories. It is not the purpose here to evaluate which of the theories is more appropriate, and here we rely mainly on theories based on the assumption of imperfect labour markets, especially wage-bargain theory and insider-outsider models (Doeringer and Piore, 1985). The reasons these theories are found more appropriate for analyzing the Macedonian experience have to do with the institutional features of the labour market in Macedonia. In particular, the high unemployment and relatively high wages reveal that the labour market in Macedonia does not clear out. In addition, though the labour market is characterised with high unemployment, the rigid and relatively expensive dismissal procedure protects insiders' power. This legislation was reformed only several years ago.

Regardless of the historical weakness of the unions at the firm level, Macedonian workers have had a certain degree of bargaining power at the political level. Accordingly, we can analyze

wage bargaining thorough union's or an insider-outsider model, both of which purport to specify a situation where wages are settled through a bargaining process between employers and workers. In the first case, it can be argued, workers, government and firms bargain a certain wage level. In the second case, the model establishes that given the different types of rotation costs that generate rents and market power among insider workers, or, alternatively, due to situations where the entrepreneur fixes wages – that is, situations branded as moral hazardous or perceived as an adverse selection type – the settled wage will be above the reserve wage level of the outsiders (workers unemployed by this type of firms). One way or the other, the bargained money wage rate will depend on the monopolistic power of both, workers and entrepreneurs. In this way, unions, on behalf of their members, will be concerned about the real wage, and in their bargain, they will take into account the price expectations for the next period considered in the contract; which of course, cannot be certainly known in advance.

Given the expected price level, the wage specifically bargained for will depend on many factors. Labour productivity, the state of the labour market, and specially, the unemployment rate, to name a few. As is generally agreed, unions will be able to bargain a higher wage when unemployment is low, as any threat they pose (a strike threat, for instance) will be more credible and difficult to dismiss. If, simultaneously, the whole of the economy is expanding, entrepreneurs will willingly concede wage hikes before risking a production halt. In a similar way, a high unemployment level weakens unions' bargaining power. As it is probable that some other member of the family is out of work, the income loss for a household related to a strike will be much more harmful as it will be more difficult to find a temporary job (this potential cost of striking rises further as the economy turns downwards). From employer's perspective, the balance between the cost of a strike and a certain wage hike moves away favourably as unemployment rises, further resisting any salary hike petition (Alogoskoufis and Manning, 1988). From the viewpoint of insider-outsider models, a lower unemployment level will enhance the power of insider workers, which will push their wage rates above the market clearing level.

With regard to the second part of the real wage equation, it is believed that in Macedonia prices are set by firms operating in imperfect competition markets. For that reason, Kalecki (1954) is followed and prices are assumed to be set according to the following simple rule:

$$p = m \cdot u + n \cdot \rho \quad (1)$$

where p is the price, u is unit prime costs and ρ is the average price prevailing on the market. Here coefficients m and n are positive and represent firm price-determination policy, reflecting the degree of competition which exists in its area of activity. Notice that if nominal wages increase (i.e. u increases), prices will not increase in the same proportion, for two reasons. First, because wages are only one component of prime costs (u); second, because the average price prevailing on the market (ρ) may not increase.

Nowadays, unlike in Kalecki's times, the influence of foreign competition should be considered in the price equation, because foreign competition affects parameters m and n , as well as the average market price ρ . Clearly, import prices directly affect ρ ; but they also affect the price of intermediate goods, and through the latter channel they affect the ratio of the wage bill cost to the aggregate cost of materials; i.e. this ratio will increase (decrease) if the domestic price of imports decreases (increases). Moreover, we may expect that a change in the ratio of the wage bill cost to the aggregate cost of materials will also influence the elasticity of the price to a given change in wages (i.e. m in equation (1) will vary), since the relative change in the unit costs depends on this ratio.

III. SOME STYLIZED FACTS

This section provides some basic insights of the characteristics of the manufacturing industry, from the viewpoint of our earlier discussion. The next three figures present the real wage, employment and production of the manufacturing sector in Macedonia. The blue line presents the raw series, while the red line the seasonally adjusted series. All three indicators for the manufacturing industry exert some seasonal pattern, but it is not much pronounced.

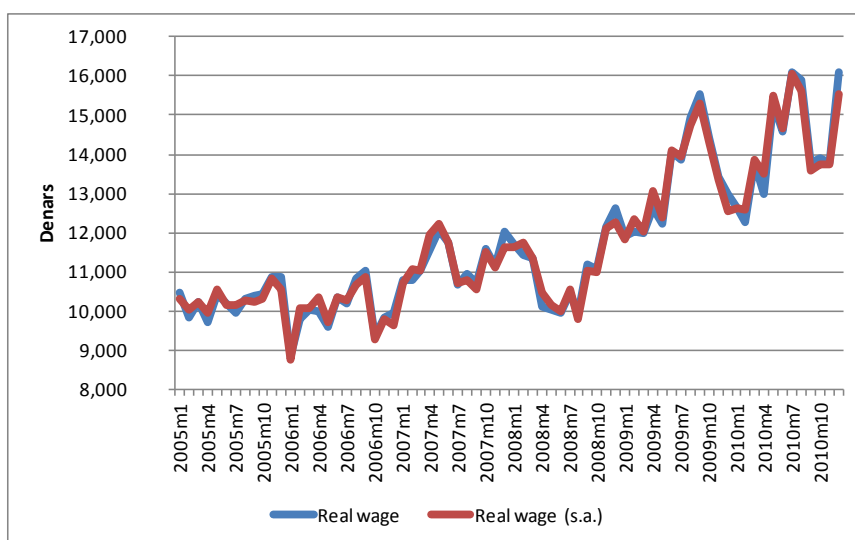


FIGURE 1 - REAL WAGE IN THE MANUFACTURING SECTOR

Source: State Statistical Agency

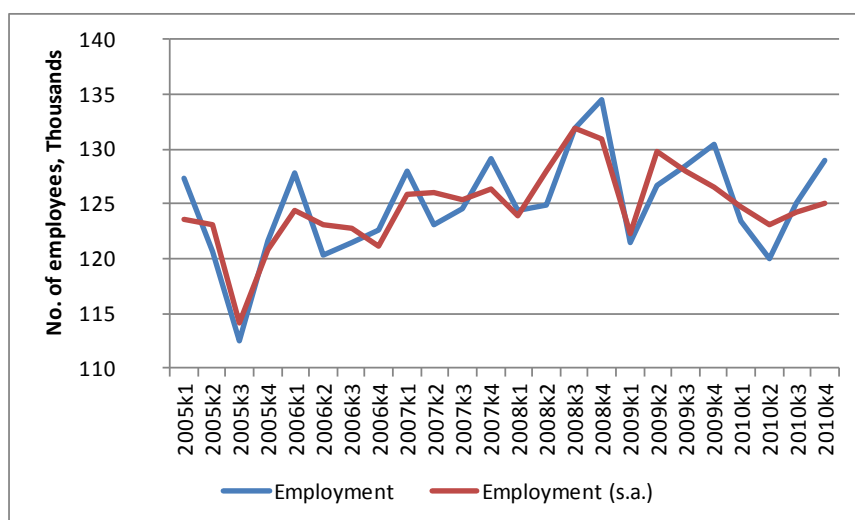


FIGURE 2 - EMPLOYMENT IN THE MANUFACTURING SECTOR

Source: State Statistical Agency

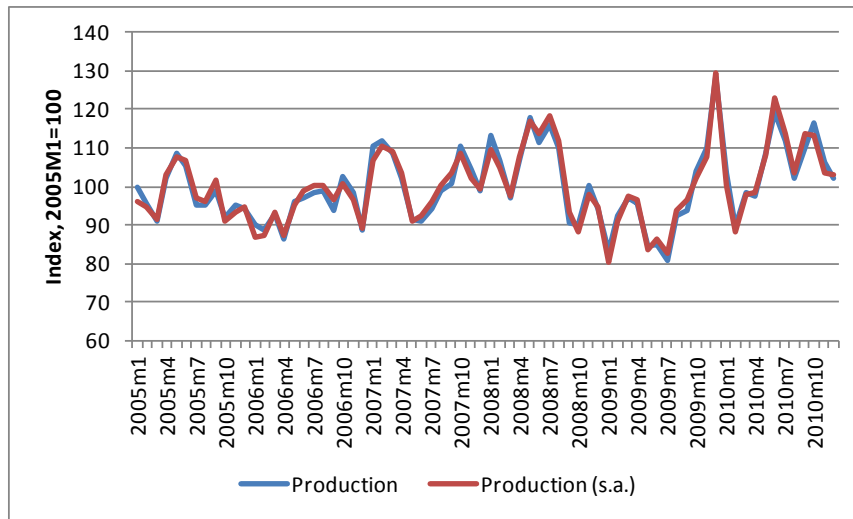


FIGURE 3 - PRODUCTION IN THE MANUFACTURING SECTOR

Source: State Statistical Agency

Figure 1 presents the real average manufacturing wage. It marks a very modest increase in the period 2005-2008, and then rises over 2009. However, this rise is mainly due to the introduction of the concept of gross wage in the entire system, so that the real increase is of lower magnitude. Despite this, the effects of the global financial crisis are felt onto the real manufacturing wage in the last quarter of 2009 when the wage starts declining. Employment (Figure 2) and production (Figure 3) in the manufacturing sector follow similar pattern as the real wage. A modest trend of increase is observed in both employment and production, with considerable volatility. However, the effects of the global crisis are more rapidly transferred onto production than on employment, since a declining trend is observed as of the second half of 2008. This is due to the partial export orientation of this sector; the main channel of crisis transmission in Macedonia has been the export, i.e. the decline of the external demand.

This analysis suggests that there should be a general association between the real wage in the manufacturing industry and the business cycle in Macedonia. However, to pursue this further, we specify a small model for the real wages in the next section.

IV. MODEL AND DATA

In this section we set a real wage equation that attempts to consider the macroeconomic factors behind the behaviour of real wages in Macedonia. The real manufacturing wage can be explained as follows:

$$W_{it} = f(W_{i,t-1}; P_{v_{i,t}}; N_{i,t}; U_t; P_t; ATI_t; XC_t; RER_t) \quad (2)$$

whereby W_{it} is the average real wage in manufacturing-sector's industry i in period t , and is dependent upon its own lagged value, $W_{i,t-1}$, and a set of additional variables: the productivity level ($P_{v_{i,t}}$) and the level of employment ($N_{i,t}$) in each production branch over period t . A rise in any of these variables is expected to bring about to a rise in the bargained real wage. The overall unemployment rate is also included (U_t), assuming that there is a negative association between U_t and the real wage. Prices (P_t), as measured by the GDP deflator, also enter the model, since the

bargain considers expectations of future prices, and any mismatch between expected and actual inflation will affect real wages. The average tariff rate index (\mathbf{ATI}_t) and the export coefficient (\mathbf{XC}_t) are included to account for the effects of trade liberalization. A reduction of \mathbf{ATI}_t implies a greater liberalization, which is expected to increase real wage. \mathbf{XC}_t is computed as the coefficient of exports over GDP and greater export is expected to increase real wage. The real exchange rate (\mathbf{RER}_t) is also included and, since an increase of \mathbf{RER}_t (i.e. an appreciation) implies a lower relative price for imports, and thus cheaper inputs, hence reducing the pressure onto domestic prices, which frees a space for the real wage to increase. Hence, we expect to find a positive association between RER and the real wage rate.

Our estimated wage equation will be of the following kind:

$$w_{i,t} = \alpha_1 w_{i,t-1} + \beta' (L) X_{i,t} + \eta_i + v_{i,t} \quad (3)$$

Where all variables are expressed in logarithms, L is the polynomial lag operator and $w_{i,t}$ is the average real wage for industry i in year t . The vector $X_{i,t}$ contains all the explanatory variables we mentioned before (see equation 2). η_i denotes the unobservable individual specific effect and $v_{i,t}$ denotes the remaining disturbance. The α_1 parameter measures the persistence or inertia of wages; i.e., it provides information about the dynamics of wage determination, once the presence of individual unobserved effects (η_i) is controlled for.

The dynamic panel data regression described in (3) is characterized by two sources of persistence over time: i) autocorrelation due to the presence of a lagged dependent variable; and ii) individual effects characterizing the heterogeneity among industrial branches. This renders the OLS estimators inconsistent and biased. So, the dynamic structure of the model demands usage of the system Generalized Moments Method (GMM), as proposed by Arellano and Bond (1991) earlier, but advanced by Arellano and Bover (1995) and Blundell and Bond (1998) later, and following the most recent suggestions by Roodman (2009) regarding the instrumentation pattern.

The estimation period is 2005M1-2010M12. We utilize a shorter period of time in order to avoid any methodological breaks that persisted in the data in the period before and to reap a full benefit of data availability. Data is compiled for all 23 branches/industries of the manufacturing sector. This gives a total sample of 1656 observations, which gives sufficiently rich dataset for credible analysis. All series have been tested for seasonality and where needed the seasonal component has been removed by applying the Census X-12 method. Sources of data are the State Statistical Agency, the National bank of Macedonia and the Ministry of finance. Descriptive statistics and a cross-correlogram of the included variables are presented in Tables 1 and 2.

TABLE 1 – DESCRIPTIVE STATISTICS

<i>Variable</i>	<i>Obs</i>	<i>Mean</i>	<i>Standard deviation</i>	<i>Minimum</i>	<i>Maximum</i>
Real manufacturing wage (denars)	1656	12,986.63	5,974.18	1,704.00	49,956.31
Industrial employment (index 2005:M1=100)	1420	96.42	9.03	52.90	153.30
Industrial productivity (index 2005:M1=100)	1440	130.14	388.43	-1.90	10,089.20
Prices (index 2005:M1=100)	1656	102.03	7.84	83.20	121.10
Unemployment (%)	1656	34.37	2.03	30.90	38.70
REER (index 2005:M1=100)	1656	99.17	1.72	95.60	101.70
Tariff index (% of tariffs in imports)	1656	2.06	1.01	0.01	3.74
Export variable (% export in GDP)	1656	39.43	18.38	0.41	56.59

Source: State Statistical Agency, National bank of Macedonia and Ministry of finance

TABLE 2 – CROSS-CORRELOGRAM

	<i>Real manuf. wage</i>	<i>Industrial employment</i>	<i>Industrial productivity</i>	<i>Prices</i>	<i>Unemployment</i>	<i>REER</i>	<i>Tariff index</i>	<i>Export variable</i>
Real manufacturing wage	1							
Industrial employment	-0.095	1						
Industrial productivity	-0.028	0.248	1					
Prices	-0.075	0.244	0.108	1				
Unemployment	-0.256	0.054	-0.025	0.318	1			
REER	0.093	-0.236	-0.071	-0.230	0.154	1		
Tariff index	-0.341	0.059	-0.014	0.062	0.714	-0.003	1	
Export variable	0.276	0.005	-0.104	0.002	0.020	0.021	0.009	1

Source: State Statistical Agency, National bank of Macedonia and Ministry of finance

V. RESULTS

We start our investigation by checking the unit roots of the included variables. Table 3 reports the results of the Maddala and Wu (1999) test for panel unit roots. Results suggest that in all cases, the test rejects the null hypothesis of a unit root presence at the conventional statistical levels. Therefore, we continue the analysis with the variables in their form presented in Table 3.

TABLE 3 – PANEL UNIT ROOT TEST

<i>Variable</i>	<i>Maddala and Wu panel unit root test (p-value)</i>
Log of the real manufacturing wage	0.0018
Log of Industrial employment	0.0453
Log of Industrial productivity	0.0000
Log of Prices	0.0158
Unemployment	0.0000
Log of REER	0.0852
Tariff index	0.0938
Export variable	0.0001

Source: Authors' calculations.

Reported values are probabilities. In the cases of both tests, the null hypothesis is that the series contains a unit root. The tests specify one or two lags and a trend.

The baseline results of the analysis are presented in Table 3. Both first- and second-order serial correlation tests are reported, as well as the Hansen test for the over-identifying restrictions. All diagnostics are fine. The table is organized in the following manner: column 1 reports the entire sample, while columns 2 and 3 make a distinction between non-recession and recession period. Since Macedonia officially entered into recession in 2008Q4, the 2008M9 is taken to distinguish between the non-recession and recession times. However, we also determined the breakpoint based on a test for structural break in the manufacturing production. Namely, we regressed the log of the manufacturing production on a constant, trend, seasonal dummies and three dummies for the structural break – one for the shock (taking unitary value in one month only), one for a level shift (taking unitary value for all the months after the shock), one for a change in the intercept (the level shift, multiplied by the trend). The structural break has been first set to January 2008, and then if all the three dummies were not negative, the structural break was set to the next month and so on. The first period when all three dummies appeared negative and jointly significant has been chosen as the breakpoint. This suggested October 2008 as the most likely breakpoint – the threshold after which the crisis took place.

All obtained coefficients are correctly signed, but not all of them are significant. At the outset, the coefficient in front of the lagged dependent variable is significant. It suggests that the real

wage is modestly persistent. The persistence slightly increases in recession times, although the difference is not statistically significant. With this caution in mind, given that in recession times wages face downward pressure, this persistence may suggest that the wage adjustment in recession is slower than in non-recession times. Industrial employment and productivity are not significant, nor are the prices. However, the unemployment in the overall economy is negatively associated with the real wage overall and in recession times, so that an increase of unemployment by 1 p.p. leads to a decline of real wage by about 2.1 and 3.6 p.p., respectively. This might suggest that the labour market of the manufacturing sector is not industry specific, but rather the general level of unemployment weakens the power of unions, particularly in recession times.

An increase of price level by 1 p.p. determines a real wage increase of about 0.8% in times of expansion. This suggests that the nominal wage is indexed to prices. But, in times of recession, prices are not a significant determinant of real wages, which could be explained with the subdued inflation in the recession period. On the other hand, the real effective exchange rate (defined so that an increase means appreciation) determines manufacturing wage only during recession times. REER appreciation leads to an increase of the real wage. Appreciation makes imports cheaper, which implies lessened price pressure and frees a room for real wage increase.

The export variable is insignificant. It is possible that its effect is (partially) subdued within the REER effect, but still the export might increase, and hence wages will grow, due to improved firms' competitiveness not coming from price competitiveness. The tariff variable is significant, on the other hand: a decrease of the fiscal burden on imports (a decline of barriers) leads to an increase of real wage. Similarly as in the REER case, the cheaper import makes inputs cheaper and reduces the pressure onto domestic prices, which frees a space for the real wage to increase. However, contrary to the REER effect, this effect emulates from the government policy, whereas the REER effect might be a result of central-bank move and/or producers' move. In times of recession, the impact of tariff barriers on real wage declines, likely because the government, shielding the living standard, is interested to support the economy by expansive fiscal policy (reducing some tariff burdens), as actually happened in Macedonia during the crisis in some particular product categories. This opposes the 'young industry' argument for erecting trade barriers, i.e. suggests that the government might not have an incentive, due to the real wage effect, to protect industries in times of recession until they recover.

TABLE 4 – BASELINE RESULTS

Dependent variable: Log of the real manufacturing wage			
Variable	Entire sample	Non-recession	Recession
	2005:1-2010:12	2005:1-2008:9	2008:10-2010:12
Log of the real manuf. wage (-12)	0.477***	0.404**	0.512***
Log of Industrial employment	-0.052	0.081	0.103
Log of Industrial productivity	0.008	-0.009	0.024
Unemployment	-0.021***	0.039	-0.036***
Log of Prices	0.070	0.817**	-0.317
Log of REER	2.466***	0.556	1.496**
Tariff index	-0.091***	-0.155***	-0.088***
Export variable	-0.002	0.003	0.001
Constant	-5.738	-2.326	-0.107
AR(1)	0.002	0.005	0.007
AR(2)	0.779	0.580	0.951
Hansen test	0.635	0.496	0.555

Source: Authors' calculations.

, * and * signify significance at 10, 5 and 1%, respectively.

Table 5 presents the results of our model by adding the variables one by one and serves for robustness-check purposes. Overall, the obtained results are quite robust to this exercise. The industrial employment became marginally significant in only one specification (column 3), with realistic magnitude, but then the significance has been lost again. Also, when the tariff index is not included, the real exchange rate (column 4) likely picks up the effect that both the appreciated currency and reduced tariff burden exert on lower import prices and, in turn, on higher real wage. Once the tariff burden is included, the coefficient on the REER reduces to a more reasonable magnitude.

TABLE 5 – ROBUSTNESS CHECKS

<i>Dependent variable: Log of the real manufacturing wage</i>					
<i>Variable</i>	<i>(1)</i>	<i>(2)</i>	<i>(3)</i>	<i>(4)</i>	<i>(5)</i>
Log of the real manuf. wage (-12)	0.655***	0.644***	0.684***	0.781***	0.413***
Log of Industrial employment	0.338	0.857	0.361*	0.123	-0.044
Log of Industrial productivity		0.025	0.021	-0.003	0.009
Unemployment			-0.058***	-0.051***	-0.021***
Log of Prices				0.552	0.048
Log of REER				6.158***	2.509***
Tariff index					-0.097***
Export variable					
Constant	1.723	-0.650	3.230	-27.559***	-4.746
AR(1)	0.004	0.006	0.004	0.002	0.002
AR(2)	0.706	0.765	0.659	0.668	0.786
Hansen test	0.133	0.180	0.419	0.398	0.624

Source: Authors' calculations.

*** and ** signify significance at 10, 5 and 1%, respectively.

VII. CONCLUSIONS

The objective of this paper has been to investigate how macroeconomic factors potentially determine the real wages in the manufacturing sector in Macedonia. By doing so, the paper contributes to the analysis of one particular aspect of the labour market in Macedonia. We conducted the analysis for the last two phases of the labour-market development in Macedonia: 2005:M1-2008:M9 – the phase of intensive growth, and 2008:M10-2010:M12 – the phase of worldwide economic crisis.

There are several conclusions from the analysis herein. Firstly, we found that the real wage is modestly persistent, the persistence being slightly higher in recession times, potentially suggesting that wage adjustment in recession is slower than in non-recession times. Industry-specific factors, like industry employment or productivity are found unimportant. However, the unemployment in the overall economy is found to be negatively associated with the real wage, which might suggest that the labour market of the manufacturing sector is not industry specific, but rather the general level of unemployment weakens the power of unions, particularly in recession times. Two 'external' variables – the real effective exchange rate and the tariff index affect real wage, but the latter only during recession. In crisis, an appreciation of the real exchange rate supports real wages by making imports cheaper, reducing price pressure and increasing real wage. The same effect is achieved by reduced tariff pressure, which also makes import cheaper, but emulates from the actions of fiscal nature.

Hence, overall, real manufacturing wages in Macedonia may be highly influenced by both monetary and fiscal policy. Monetary policy may exert influence through the real exchange rate – stimulating the non-price competitiveness, while fiscal policy through measures for tackling overall unemployment and through reduction of the tariff burden

VIII. REFERENCES

- Akerlof, G.A. and Yellen, J.L.**, (1986), *Efficiency Wage Models of the Labour Market*, (Cambridge, Cambridge University Press).
- Alogoskoufis, G. and Manning, A.**, (1988), "On the Persistence of Unemployment", *Economic Policy*, 7:427-429.
- Anderson, T.W. and Hsiao, C.**, (1981), "Estimation of Dynamic Models with Error Components", *Journal of the American Statistical Association*, 76:598-606.
- Arellano, M. and Bond, S.**, (1991), "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations", *Review of Economic Studies*, 58:277-297.
- Arellano, M. and Bover, O.**, (1995), "Another look at the Instrumental-Variable Estimation of Error Component Models", *Journal of Econometrics*, 68:29-52.
- Bentolila, S. and Jimeno, J.**, (1998), "Regional unemployment persistence (Spain, 1976-1994)", *Labour Economics*, 5(1):25-51.
- Blanchard, D. and Summers, L.**, (1986), "Hysteresis and the European Unemployment Problem", *NBER Macroeconomics Annual*, 15-77.
- Blanchflower, D. and Oswald, A.**, (1994), *The Wage Curve*, (MIT Press, Cambridge).
- Blundell, R. and Bond, S.**, (1998), "Initial Conditions and Moment Restrictions in Dynamic Panel data Models", *Journal of Econometrics*, 87:115-143.
- Im, K. S., Pesaran, M. H. and Shin, Y.**, (2003), "Testing for Unit Roots in Heterogeneous Panels", *Journal of Econometrics*, 115, p.53-74.
- Kalecki, M.**, (1954), *Theory of economic dynamics*, In: Collected works of Michal Kalecki, Vol. II, J. Osiatynsky (Ed.) Oxford University Press, 1991.
- Layard, R., Nickel, S. and Jackman, R.**, (1991), *Unemployment. Macroeconomic Performance and the Labour Market*, (Cambridge University Press).
- Levin, A. and Lin, C.F.**, (1992), "Unit Root Test in Panel Data: Asymptotic and Finite Sample Properties", University of California at San Diego, Discussion Paper No. 92-93.
- Lindbeck, A. and Snower, D.**, (1986), "Wage Setting, Unemployment and Insider Outsider Relations", *American Economic Review*, 76:235-239.
- Lindbeck, A. and Snower, D.**, (2001), "Insiders versus Outsiders", *Journal of Economic Perspectives*, 15(1):165-188.
- Maddala, G.S. and Wu, S.**, (1999), "A Comparative Study of Unit Root Tests with Panel Data and a New Simple Test", *Oxford Bulletin of Economics and Statistics*, 61:631-652.
- McDonald, I and Solow, R.**, (1981), "Wage bargaining and Employment", *The American Economic Review*, 71, p.896-908.
- Nickell, S. and Wadhvani, S.**, (1990), "Insider Forces and Wage Determination", *Economic Journal*, 100:496-509.

Wulfsberg, F. (1997), "An Application of Wage Bargaining Models to Norwegian Panel Data", *Oxford Economic Papers*, 49:419-440.

STVARNE PLAĆE U PROIZVODNOJ INDUSTRIJI U MAKEDONIJI: ULOGA MAKROEKONOMSKIH FAKTORA S OSVRTOM NA RECESIJSKA VREMENA

SAŽETAK

Ovaj rad analizira odrednice stvarnih plaća u makedonskom proizvodnom sektoru. Naglasak se stavlja na povezane makroekonomske aspekte te se koriste tehnike ekonometrijskih panelnih podataka kako bi se modeliralo ponašanje stvarnih plaća za period od 2005-2010, koristeći mjesečne podatke. Pronašli smo nezanemarivu dosljednost stvarnih plaća. Nadalje objašnjavamo ulogu ukupne nezaposlenosti, realnog tečaja i tarifnog indeksa u određivanju stvarnih plaća.

Ključne riječi: stvarne plaće, Makedonija, panelni podaci, generalizirana metoda momenta