THE ROLE OF EFFICIENCY WAGES IN DETERMINING THE INTER-INDUSTRY WAGE DIFFERENTIALS: EVIDENCE FROM NORTH MACEDONIA

Dimitar Nikoloski
University "St. Kliment Ohridski"-Bitola
Faculty of Economics-Prilep

ABSTRACT
The efficiency wage theory states that the workers' productivity depends on their wages, thus firms find beneficial to pay higher than the market clearing wages by expecting an increase in labour productivity. Hence, this alterative approach to orthodox economic theory assumes a reversed causality established between wages and labour productivity. The efficiency wage models take into account the potential influence of institutional arrangements. For instance, the ICT industry characteristics such as possibility for platform work affect wage levels and contribute to paying wage premium (exposure to the global competition). The evolution of real wages in North Macedonia over the last decade shows an outstanding inter-industry wage differentials, where Information and communication; and Finance and insurance appear as sectors with constantly high average real wages compared to the national average level. In order to explore the possible reversed causation between labour productivity and real wages, we estimate a homogeneous panel vector autoregression (VAR) model by fitting a multivariate panel regression of each dependent variable on lags of itself and on lags of other dependent variables using generalized method of moments (GMM). The results confirm the efficiency wage theory assumption since we found statistically significant impact of real wages on labour productivity and not vice-versa. This conclusion opens a wide room for justifying the policies that favour increases of real wages by tying them to increases in productivity. The identified wage premium, particularly from working in the ICT sector, suggests that the policy need to focus on stimulating widespread adoption of digital technologies across other sectors through education and training.

Keywords: *Labour productivity, efficiency wages, industry, vector autoregression*

JEL classification: *J24, J31, E24*

1. INTRODUCTION

The labour market is the mechanism through which workers and jobs are matched. The actions of employers and workers in the labour market serve both to allocate and to set prices for various kinds of labour. From a social perspective, these prices act as signals or incentives in the allocation process, which relies primarily on individual and voluntary decisions. From the worker's point of view, the price of labour is important in determining income and purchasing power. The wage that prevails in a particular labour market is heavily influenced by labour supply and demand, regardless of whether the market involves a labour union or other nonmarket forces. The wage rate at which demand equals supply is the market-clearing wage, which is the going wage that individual employers and employees must face. In other words, wage rates are determined by the market and 'announced' to individual market participants (Ehrenberg and Smith, 2008).

Evidence on industry wage differences indicates that large differentials remain that are quite difficult to explain in terms of differences in labour quality or differences in important nonpecuniary aspects of work requiring compensating differentials. The persistence of industry wage premiums for long time periods implies that they are not just transitory differentials

arising to facilitate the sectoral reallocation of labour in a dynamic market economy. Large, persistent wage differentials for similar workers and types of jobs provide strong evidence in favour of the importance of some type of efficiency wage behaviour by many firms (Katz, 1986; Ricx and Tojeorow, 2007).

The relationship between real wages and labour productivity is complex. According to the microeconomic theory wage correspond to the marginal productivity of labour and can be derived from the profit-maximizing behaviour of firms. The relationship between wages and productivity is through the labour demand curve, given the state of technology, the price of inputs and the market price of the goods produced. Hence, the orthodox economic theory assumes that wages follow the development of productivity (Van Biesebroeck, 2015). From a position of imbalance, if marginal labour productivity is higher than the real wage, companies would consider it profitable to hire more labour and put pressure against wage increases. Conversely, if marginal productivity is less than wages, companies will find it profitable to reduce labour, thereby generating downward pressures on wages. The mechanism thereby creates a simple stability dynamic towards equilibrium (Meager and Speckesser, 2011).

In contrast, the efficiency wage theory states that the workers' productivity depends on their wages (Schlicht, 2016). Consequently, firms find beneficial to pay higher than the market clearing wages by expecting an increase in labour productivity. Hence, this alterative approach to orthodox economic theory assumes a reversed causality established between wages and labour productivity. The efficiency wage models take into account the potential influence of institutional arrangements (Bulow and Summers, 1985). For instance, the ICT industry characteristics such as possibility for platform work and associated exposure to the global competition affect wage levels and contribute to paying wage premium.

The wages as the most important part of the household disposable income in North Macedonia mark continuous increase during the last decade (ILO, 2019). At the same time, there is a relatively stable inter industry wage dispersion. Namely, outstandingly high average wages are registered in two industries: information and communication; and, financial and insurance activities. The inter-industry wage differentials arise when workers in the same occupation and the same area but in different industries are paid different wages. Inter-industry differentials reflect skill differentials. The industries paying higher wages have mostly been industries with a large number of skilled workers, while those paying less have been industries with a large proportion of unskilled and semi-skilled workers. Other factors influencing inter-industry differentials are the extent of unionisation, the structure of product markets, the ability to pay, labour-capital ratio, and the stage of development of an industry.

The analysis of the efficiency wages as a source of inter-industry wage differentials in North Macedonia has still not been in the focus of the academic research. Hence, the aim of this paper is to assess the possible reversed causality between wages and labour productivity in North Macedonia on an industry level, thus investigating the evidence about the eϕficiency wage hypothesis. Having in mind these considerations, the paper is structured as follows. In the next section we provide the main theoretical backgound related to wage setting mechanism and efficiency wage theory. The literature review is subject of the section 3, while in section 4 are explained the data sources. In section 5 we present the main findings from the empirical analysis, while in section 6 are stated the conclusions and policy implications.

2. THEORETICAL BACKGROUND

The market-clearing wage often cannot be reached in practice. Because labour services cannot be separated from the worker, and because labour income is by far the most important source of spending power for ordinary people, the labour market is subject to forces that impede the adjustment of both wages and employment to changes in supply or demand. Some of these barriers to adjustment are themselves the result of economic forces. For example, changing jobs

often requires an employee to invest in new skills or bear costs of moving. On the employer side of the market, hiring workers can involve an initial investment in search and training, while firing them or cutting their wages can be perceived as unfair and therefore have consequences for the productivity of those who remain (Ehrenberg and Smith, 2008).

The labour market transactions that are mutually beneficial implies that output should be produced in the least-costly manner so that the most can be obtained from scarce resources. This goal suggests how we can define what it means to be overpaid. We shall define workers as overpaid if their wages are higher than the market-clearing wage for their job. Because a labour surplus exists for jobs that are overpaid, a wage above market has two implications. First, employers are paying more than necessary to produce their output; they could cut wages and still find enough qualified workers for their job openings. In fact, if they did cut wages, they could expand output and make their product cheaper and more accessible to consumers. Second, more workers want jobs than can find them. If wages were reduced a little, more of these disappointed workers could find work. A wage above market thus causes consumer prices to be higher and output to be smaller than is possible, and it creates a situation in which not all workers who want the jobs in question can get those (McConnell *et al.*, 2003).

The idea of the efficiency wage theory is that increasing wages can lead to increased labour productivity because workers feel more motivated to work with higher pay (Bulow and Summers, 1985; Schlicht, 2016). Therefore if firms increase wages, some or all of the higher wage costs will be recouped through increased staff retention and higher labour productivity. The efficiency wage theory assumes that paying workers at their marginal productivity of labour does not provide enough of an incentive for workers to remain loyal to the company. In such a case, the company should increase the employer's wage to gain loyalty and boost productivity at work. Optimal efficiency wage is achieved when the marginal cost of an increase in wages is equal to the marginal benefit of improved productivity to an employer.

Several efficiency wages mechanisms have been put forward in the literature. A crucial assumption in all the models is the dual role played by the wage rate. In the traditional neoclassical model wages perform only an allocative role, i.e. equating supply and demand for labour, while in the efficiency wage models wages play an additional role, which varies depending on the model's assumption. For instance, the incentive-driven model states that as wage level increases, workers will be more motivated to keep their jobs and will therefore try to increase the level of their productivity. The argument is that if workers are paid a higher wage, they have more to lose from being made redundant. Therefore, if they have a job with a wage significantly higher than benefits or alternative jobs, they will have greater motivation to impress their boss and keep it.

In addition to this basic argumentation, there are other alternative theoretical models of efficiency wages. According to the 'shirking model' developed by Shapiro and Stiglitz, workers with a higher wage will work at an effort level which involves no shirking. This wage is above market-clearing levels. The 'gift exchange' model is based on the assumption that high wages change the relationship between an employer and an employee in the way that the employee will be more attached to the employer and will try to increase his own productivity. As a consequence, companies could pay wages above market-clearing levels, and in return, workers would take on more responsibility and initiative. Furthermore, higher wages reduce workers quits and labour turnover costs. Namely, higher wages discourage workers to quit, which is especially important if hiring and training new workers is a time-consuming and costly pursuit. Finally, higher wages attract more applicants and increase hires. If a company pays above the market clearing level, it will attract a better quality worker who will feel they can get a relatively better-paid job (Katz, 1986; Burki, 1995; Schlicht, 2016).

3. LITERATURE REVIEW

The low and sometimes negative growth in labour productivity in North Macedonia has been identified as a key contributing factor to the low growth rate observed during the past three decades (World Bank, 2020). In addition to its critical role for economic growth, productivity are also important in the wage setting. While more productive companies contribute fewer jobs to the economy than less-productive ones, their jobs pay more. For instance, in services wages paid by the most productive companies are 88 percent higher than those paid by the least productive. In addition, it has been detected that rise in productivity is associated with high-quality and better-paid jobs.

The relationship between labour productivity and wages in North Macedonia has been already a subject of reaearch interest. For instance, Trpeski and Tashevska (2009) found out a significant positive impact of net wages on labour productivity in several industries such as: Construction; Agriculture, fishing and forestry; and Mining and watter management. Considering this, current employers can expect that by increasing the wages of workers, they will achieve an above-proportional growth in labour productivity. Petreski and Mojsoska-Blazevski (2013) by applying panel data econometric modelling investigate the determinants of real wages in Macedonian manufacturing sector. 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. Among the industry-specific factors they did not find significant effect of productivity, but the overal unemployment rate is found to be negatively associated with the real wages. Furthermore, Nikoloski (2020) exlored the factors of labour productivity in North Macedonia and showed generally low aggregate labour productivity compared to more economically developed countries. However, several industries make exception and are characterized with higher levels of labour productivity. Those are: Electricity, gas, steam and air conditioning supply; Mining and quarrying; Financial and insurance activities; and, Information and communication. In addition, the empirical findings confirm that the higher levels of capital intensity, higher wage levels, good job experience and task-based contracts characteristic for the 'gig economy' are the most relevant factors that influence the labour productivity at industry level.

The interference of other factors in the productivity-wage nexus have been also considered by several authors. For instace, Trpeski *et al.* (2016) investigate the impact of the financial recession and found out that changes in productivity did not exert an additional impact on the real net wages during the crisis. Namely, when an economy is coming out of recession productivity tends to rise more rapidly because labour gets used more effectively, but real wages do not rise as rapidly as productivity. Trpeski *et al.* (2022) analysed the importance of the 'reverse decoupling' phenomenon in North Macedonia and concluded that there is a significant increasing gap between the labour productivity and workers' compensation that corroborates with the worldwide trends. The widespread thesis that 'a rising tide will lift all boats' does not correspond to practice, that is, there is an ever-lower increase (in some sectors and stagnation) of labour productivity in relation to the growth of workers' compensation. Nikoloski *et al.* (2023) analysed the impact of the gig economy on employment and wages in both traditional and gig economy sector by using a two-sectoral model. They concluded that the gig workers in developing countries more often face the reality of long working hours, with no social security, with relatively low wages, and with high stress related to irregularity of work or high customer demands. In this context, the main government challenge is to create a situation for gig workers to gain from the improvements in efficiency and productivity that digital platforms create, at the same time adjusting the informal dimensions of the gig in the formal economy to generate value.

4. DATA AND VARIABLES

The data are collected on quarterly basis for the period 2012-2022. With respect to industries we use the high-level aggregation of NACE Rev.2 sections into 10 categories, presented in Table 1.

Table 1. High-level aggregation of NACE Rev.2 sections

No.	Category	Description
1	A	Agriculture, forestry and fishing
2	B	Mining and quarrying
	D	Electricity, gas, steam and air-conditioning supply
	E	Water supply, sewarage, waste management and remediation
3	C	Manufacturing
4	F	Construction
5	G	Wholesale and realtrade, repair of motor vehicles and motorcycles
	H	Transportation and storage
	I	Accommodation and food service activities
6	J	Information and communication
7	K	Financial and insurance activities
8	M	Professional, scientific, technical activities
	N	Administration and support service activities
9	O	Public administration and defence, compulsory social security
	P	Education
	Q	Human health and social work activities
10	R	Arts, entertainment and recreation
	S	Other service activities
	T	Activities of households as employers

(Source: NACE Rev.2 Introductory Guidelines, European Commission)

Variables under consideration in this analysis are as follows. Nominal wages are averaged on quarterly basis from the monthly data and additionaly aggregated according to the high-level NACE sections. Consumer Price Index (CPI) is expressed at the end of the current quarter with respect to the same quarter of the previous year. Furthermore, CPI is used to calculate the real wages by dividing the nominal wages with CPI and multiplied by 100.

The labour productivity is calculated as a Gross Domestic Product divided by the number of employees in each activity. The labour productivity based on gross output shows the time profile of how productively labour is used to generate gross output. When measured as gross output per unit of labour input, labour productivity growth also depends on how the ratio of intermediate inputs to labour change. Gross output based labour productivity traces the labour requirements per unit of physical output. It reflects the change in the input coefficient of labour by industry and can help in the analysis of labour requirement by industry. The advantage of this concept can be viewed in the ease of measurement and readability. In particular, the gross output measure requires only prices indices on gross output, not on intermediate inputs as is the case for the value added based measure.

The unemployment rate is provided on quarterly basis from the Labour Force Survey for the entire economy. The vacancy rate is provided from the administrative sources of the State Statistical Office on quarterly basis and aggregated according to the high-level NACE Rev.2 sections. Furthermore, labour market tightness is calculated as a ratio between the number of vacancies and number of unemployed for each economic activity. A comprehensive overview of the variables under consideration and their description is presented in Table 2.

Table 2. Description of the variables

Variable	Description
Nominal wages	averaged on quarterly basis from the monthly data and additionaly aggregated according to the high-level NACE sections
Consumer Price Index	expressed at the end of the current quarter with respect to the same quarter of the previous year
Real wages (*W*)	Calculated by dividing the nominal wages with CPI and multiplied by 100
Labour productivity (*PROD*)	Calculated as a Gross Domestic Product divided by the number of employees in each activity
Unemployment rate	Provided on quarterly basis from the Labour Force Survey for the entire economy
Vacancy rate (*VACR*)	Provided from the administrative sources of the State Statistical Office on quarterly basis and aggregated according to the high-level NACE Rev.2 sections
Labour market tightness (*TIGHTNESS*)	Calculated as a ratio between the number of vacancies and number of unemployed for each economic activity

(Source: Author's explanation)

5. METHODOLOGY

The methodological approach in our analyses are based on vector autoregression (VAR) model with panel data, while generalized method of moments (GMM) is used as an estimation technique. Time-series vector autoregression (VAR) models originated in the macroeconometrics literature as an alternative to multivariate simultaneous equation models. All variables in a VAR system are typically treated as endogenous, although identifying restrictions based on theoretical models or on statistical procedures may be imposed to disentangle the impact of exogenous shocks onto the system. With the introduction of VAR in panel-data settings, panel VAR models have been used in multiple applications across fields (Abrigo and Love, 2016).

The vector autoregression (VAR) model with two endogenous variables (real wages and labour productivity) has the following specification:

$$\ln(W)_{i,t} = \beta_{11} \ln(W)_{i,t-1} + \beta_{12} \ln(PROD)_{i,t-1} + \varepsilon_{i,t}$$

$$\ln(PROD)_{i,t} = \beta_{21} \ln(W)_{i,t-1} + \beta_{22} \ln(PROD)_{i,t-1} + \varepsilon_{i,t}$$

In addition, the wage-setting mechanism takes into account the conditions in the labour market i.e. the tighter the labour market, the higher is the real wage (Blanchard and Katz, 1999). This negative relationship between the level of the real wage and unemployment, given the reservation wage and the level of productivity is known as 'wage curve'. The labour market tightness is potential exogenous determinant that can be represented either by the uemployment rate which is time variant but industry invariant, or by the vacancy rate which is both time and industry variant. Because the unemployment rate is observed for the entire economy, in adition to vacancy rate, we use the ratio between the number of vacancies and number of unemployed as measure of labour market tightness.

The dependence between unemployment rate and vacancy rate is observed through the Beverige curve. The Beveridge curve depicts the relationship between the unemployment rate and the vacancy rate for several distinct points in time. Hence, it shows dynamics of the matching process between workers and vacant jobs. The robust finding across countries shows that this relationship generally is negative (Destefanis & Mastromatteo, 2015). Flows of newly hired

workers depend on both unemployment and vacancies in a given economy (Blanchard & Diamond, 1989). The Beveridge curve can be interpreted as the vacancy rate at which the current unemployment rate would be in its steady state. A flow steady state is named since the Beveridge curve involves measurement of flows from one labour force status to another and occurs when these flows do not cause a change in the unemployment rate.

Having in mind the evidence from other analyses, in the next two alternative model specifications we include variables of labour market tightness as exogenous variables (Wakeford, 2003).

The vector autoregression model with two endogenous variables (real wages and labour productivity) and one exogenous variable (vacancy rate) has the following specification:

$$\ln(W)_{i,t} = \beta_{11}\ln(W)_{i,t-1} + \beta_{12}\ln(PROD)_{i,t-1} + \beta_{13}\ln(VACR)_{i,t} + \varepsilon_{i,t}$$

$$\ln(PROD)_{i,t} = \beta_{21}\ln(W)_{i,t-1} + \beta_{22}\ln(PROD)_{i,t-1} + \beta_{23}\ln(VACR)_{i,t} + \varepsilon_{i,t}$$

In addition, the vector autoregression model with two endogenous variables (real wages and labour productivity) and one exogenous variable (vacancies/unemployed ratio) is stated as follows:

$$\ln(W)_{i,t} = \beta_{11}\ln(W)_{i,t-1} + \beta_{12}\ln(PROD)_{i,t-1} + \beta_{13}\ln(TIGHTNESS)_{i,t} + \varepsilon_{i,t}$$

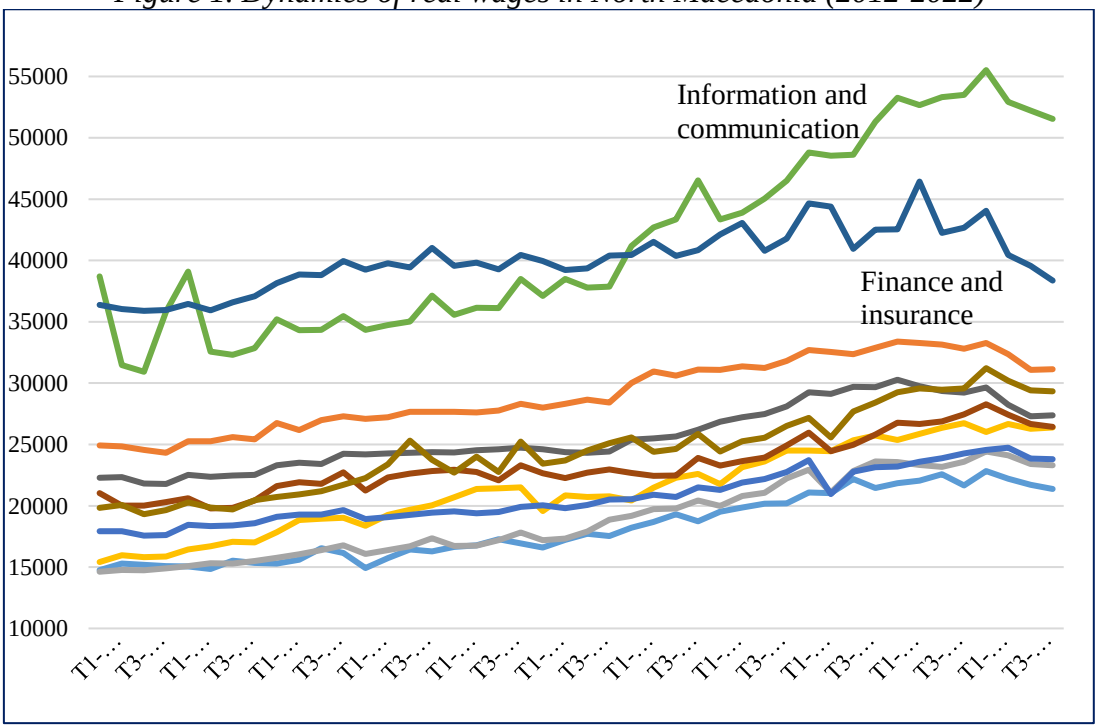
$$\ln(PROD)_{i,t} = \beta_{21}\ln(W)_{i,t-1} + \beta_{22}\ln(PROD)_{i,t-1} + \beta_{23}\ln(TIGHTNESS)_{i,t} + \varepsilon_{i,t}$$

The alternative VAR model specifications will be used to cheque the robustness of the model and its validity when labour market conditions are taken into consideration.

6. EMPIRICAL ANALYSIS

The evolution of real wages in North Macedonia over the last decade shows an outstanding inter-industry wage differentials. In particular, Information and communication; and Finance and insurance appear as sectors with constantly high average real wages compared to the national average level (Figure 1).

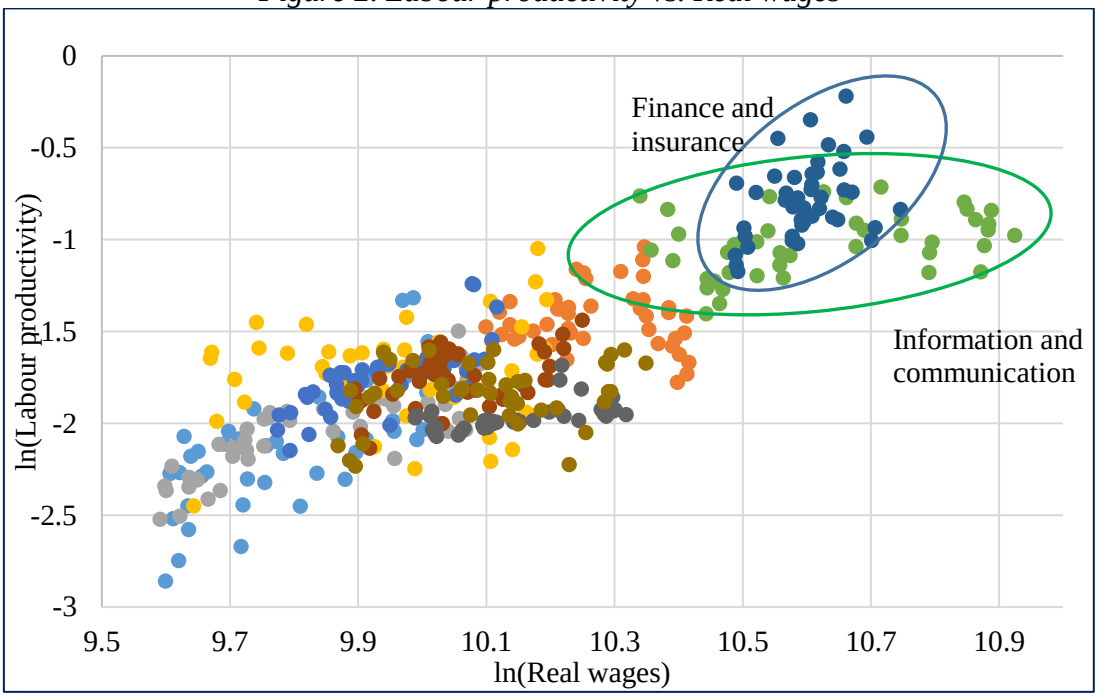
Figure 1. Dynamics of real wages in North Macedonia (2012-2022)



(Source: State Statistical Office)

The relationship between labour productivity and real wages by sectors shows positive association which means that sectors with lower levels of labour productivity manifest lower real wages and vice-versa (Figure 2).

Figure 2. Labour productivity vs. Real wages



(Source: State Statistical Office)

We further estimate a homogeneous panel vector autoregression (VAR) model by fitting a multivariate panel regression of each dependent variable on lags of itself and on lags of all other dependent variables using generalized method of moments (GMM). The panel is balanced and composed of 44 time periods (quarters) and 10 economic activities (industries). All variables are logarithmically transformed, which means that the estimated parameters are interpreted as elasticity coefficients. In order to chose the optimal lag order in panel VAR specification we calculate the coefficient of determination for the first four lags as presented in Table 3.

Table 3. Selection order criteria

lag	Coefficient of determination
1	0.9954715
2	0.9957568
3	0.9956637
4	0.9960975

(Source: Author's calculations)

From Table 3 we notice that the coefficients of determination do not increase significantly with higher lags, hence we chose to use a first lag of each variable. In the first two columns are presented the dependent and independent variables respectively. As Model 1 is designated the baseline specification of the VAR model that includes only real wages and labour productivity. In Model 2 and Model 3 are additionally included the variables Vacancy rate and Labour market tightness respectively as exogenous variables.

The results from estimated econometric models together with performed Granger causality tests are presented in Table 4.

Table 4. Estimation results by using generalized method of moments

Dependent variable	**Independent variable**	**Model 1**	**Model 2**	**Model 3**
$\ln(\text{real wage})_t$	$\ln(\text{real wage})_{t-1}$	0.9794641*** (0.000)	0.974688*** (0.000)	0.8570128*** (0.000)
	$\ln(\text{productivity})_{t-t}$	0.0080803 (0.814)	0.0182425 (0.714)	0.0699862 (0.402)
	$\ln(\text{vacancy rate})_t$		-0.0003971 (0.962)	
	ln(tightness)			0.0172401 (0.421)
$\ln(\text{productivity})_t$	$\ln(\text{real wage})_{t-1}$	0.6557796*** (0.000)	0.8791676*** (0.000)	3.53375** (0.020)
	$\ln(\text{productivity})_{t-t}$	0.3907872*** (0.006)	0.1478338 (0.503)	-0.9551602 (0.223)
	$\ln(\text{vacancy rate})_t$		-0.0953021* (0.060)	
	ln(tightness)			-0.4301474** (0.038)
VAR - Granger causality Wald test				
Equation	Excluded	Chi-square	Chi-square	Chi-square
ln(real wage)	ln(productivity)	0.052 (0.819)	0.134 (0.714)	0.702 (0.402)
ln(productivity)	ln(real wage)	14.120*** (0.000)	12.256*** (0.000)	5.399** (0.020)

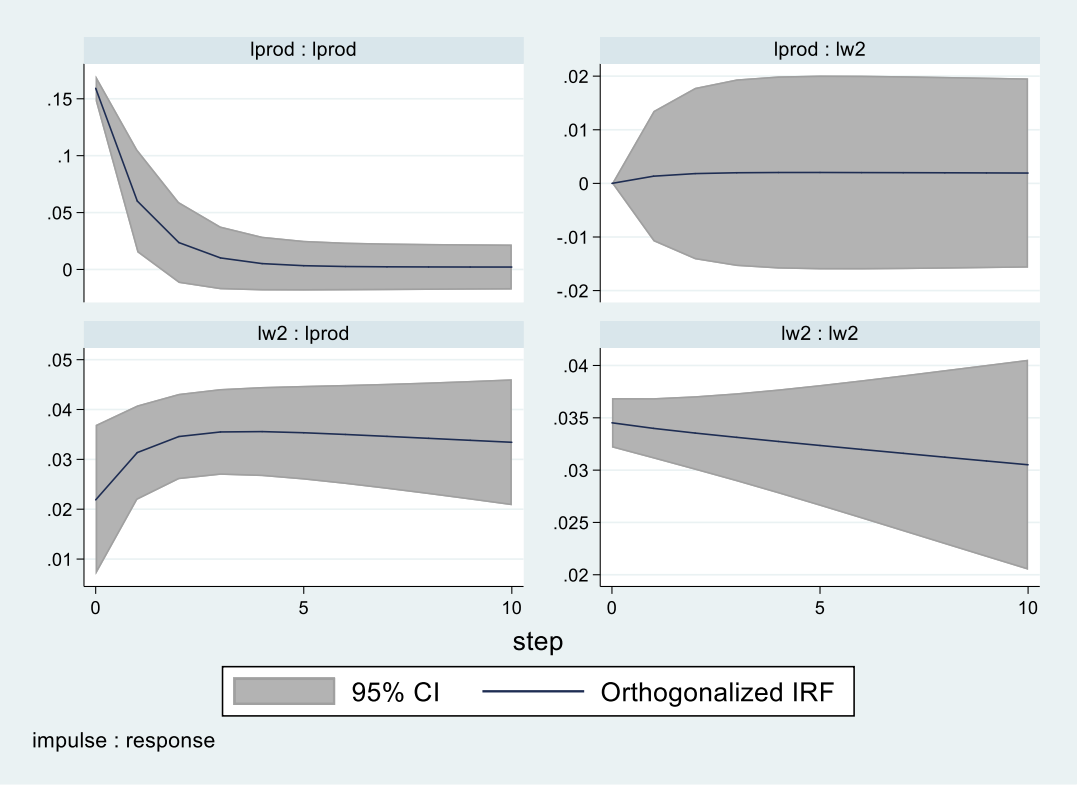
(Source: Author's calculations)

From Table 4, we can notice that labour productivity is not statistically significant determinant of real wages in all model specifications. In contrast, real wages appear as statistically significant determinant of labour productivity. This is the case in all three model specifications, which confirms the robustness of our econometric modelling approach. Particularly, from the last specification it is noticeable that 1 percent increase of real wages is associated with 3.5 percent increase in labour productivity. Hence, we confirm the hypothesis that labour productivity is a positive function of wages.

With respect to the labour market tightness, it is obvious that the vacancy rate and the vacancies to unemployment ratio are not statistically significant determinants of real wages. In contrast, higher labour market tightness causes reduction of the labour productivity. Hence, the labour market tightness interferes in the wages-productivity nexus only through the labour productivity channel.

In addition, the Granger causality tests in all model specifications show that labour productivity depends on real wages and not vice-versa. Therefore, firms in sectors with higher than average wage may be reluctant to reduce wages in the face of excess supply, since the associated decrease in productivity may result in an increase in labour costs. The direction of causality can be also confirmed by the impulse-response functions depicted on Figure 3.

Figure 3. Impulse-response functions



(Source: Author's calculation)

7. CONCLUSION AND POLICY RECOMMENDATIONS

Vastly different ideas are employed in the analysis and design of policies aimed at the labour market depending on where the driving and causal force is found. Without a doubt, an approach where the idea that causality goes from productivity to wages will result in a system where wage increases are regulated by the course of productivity. In this approach it is then acceptable that companies do not raise wages, as long as productivity does not increase. Otherwise, the increase in unit costs will impede competitiveness.

However, the fears cast by this logic are unfounded if real wages constitute a source for engendering changes in labour productivity. The results of this study for quarterly data from the Macedonian economy indicate that causality flows from real wages to labour productivity. As such, there is a wide room for justifying the policies that favour increases of real wages by tying them to increases in productivity.

For instance, in North Macedonia there exists a debate regarding to when to increase it and how much to increase the statutory minimum wage. The advocates for higher statutory minimum wage claim that this measure will strengthen the labour standards and will improve the living condition of the least paid employees. Other benefits include improving the mental and physical health of low-income families, increasing consumption and decreasing government spending for low-income families. On the other hand, the opponents argue that higher minimum wage will impose high cost on employers and in turn, employers will tend to reduce the employed workforce. In addition, higher wages could have upward pressure on inflation, as well as other negative effects on the economy such as increased incentives for informal employment.

The existing literature suggests that the advancement of technology, in particular digital technology, can exert a profound impact on the labour market. Although there are many studies suggesting that digital technologies contribute to wage inequality, there are also an increasing

stream of literature emphasizing the need for enhanced skills and education in generating wage premium across work clusters.

Having in mind the wage premium from working in the ICT sector, the policy need to focus on stimulating widespread adoption of digital technologies across other sectors through education and training. In this context, many developing countries appear to gain only small fraction of the advantages from the ICT sectors. Indeed, developed countries are taking the most of the advantages and opportunities brought by the use of ICT. Therefore, it is necessary to highlight the essential role and the significant relationship of ICT and education for gaining the competitive advantage.

REFERENCES

Abrigo, M. and Love, I. (2016) "Estimation of Panel Vector Autoregression in Stata", *The Stata Journal*, 16 Number 3, pp.778-804;

Blanchard, O. and Diamond, P. (1989) "The Beveridge Curve", *Brooking Papers on Economic Activity*, 1:1-60;

Blanchard, O and Katz, L. (1999) "Wage dynamics: Reconciling Theory and Evidence", *American Economic Review*, Vol. 89(2), pp.69-74;

Bulow, J. and Summers, L. (1985) "A Theory of Dual Labour Markets with Application to Industrial Policy, Discrimination and Keynesian Unemployment", *NBER Working Paper Series* No.1666;

Burki, A. (1995) "A Review of Efficiency Wage Models of Labor Market: Theory and Evidence", *Asia-Pacific Development Journal*, 1995, 2(2), 73-90;

Destefanis, S. and Mastromatteo, G. (2015) "The OECD Beveridge Curve: technological progress, globalisation and institutional factors", *Eurasian Business Review*, 5: 151-172;

Ehrenberg, R. and Smith, W. (2008) *Modern Labor Economics: Theory and Public Policy* (10th Edition), Pearsons/Addison Wesley;

ILO (2019) "*Decent Work Country Programme* 2019-2022", North Macedonia;

Katz, L. (1986) "Efficiency Wage Theories: A Partial Evaluation", *NBER Macroeconomics Annual* 1986, Volume 1, p. 235 – 290;

Meager, N. and Speckesser, S. (2011) "Wages, Productivity and Employment: A review of Theory and International Data", *European Employment Observatory Thematic expert ad-hoc paper*;

McConnell, C., Brue, S. and Macpherson, D. (2003) *Contemporary Labor Economics*, Sixth Edition, McGraw-Hill Irwin;

Nikoloski, D. (2019) "Determinants of labour productivity in the Republic of North Macedonia with an emphasis on the ICT industry", *Proceedings from the XI International Conference "Digital Transformation of the Economy and Society: Shaping the Future", Prilep, October 19-20, 2019*;

Nikoloski, D. (2020) "The Factors of Labour Productivity in the Republic of North Macedonia", *Southeast European Review of Business and Economics* (SERBE), Vol.1, Issue 2, pp.22-37;

Nikoloski, D., Trajkova Najdovska, N., Petrevska Nechkoska, R. and Pechijareski, L. (2023) "The Gig Economy in the Post-COVID Era". In: Petrevska Nechkoska, R., Manceski, G., Poels, G. (eds) *Facilitation in Complexity, From Creation to Co-creation, from Dreaming to Co-dreaming, from Evolution to Co-evolution*. Contributions to Management Science, Springer, Cham, pp.93-117;

Petreski, M. and Mojsoska-Blazevski, N. (2013) “Real Wages in the Manufacturing Industry in Macedonia: The Role of Macroeconomic Factors, with Reference to Recession Times”, *Economic Research - Ekonomska Istraživanja*, 26:4, 113-126;

Petreski, M., Oviedo, A. M. and Cancho, C. (2019) “Expectations Set High: Understanding Reservation Wage in North Macedonia”, *World Bank Group, Policy Research Working Paper* 9023;

Ricx, F. and Tojeorow, I. (2007) “Inter-Industry Wage Differentials: What Do We Know?”, *Reflets et Perspectives de la Vie Economique* 2007/2, pp.13-22;

Schlicht, E. (2016) “Efficiency Wages: Variants and Implications”, *IZA World of Labour Evidence-based policy making*;

Trpeski, P. and Tashevska, B. (2009) “Labour Productivity and Wages in the Republic of Macedonia”, *The Young Economist Journal*, January 2009, pp.193-112;

Trpeski, P., Eftimov, L. and Cvetanoska, M. (2016) “Labor Productivity and Real Wages in Macedonia: An Overview Before and After the Global Economic Crisis”, *European Scientific Journal*, Vol.12, No.10, pp.352-365;

Trpeski, P. Trenovski, B., Kozheski, K. and Gunter, M. (2022) “Labor Productivity and Labor Compensation in North Macedonia: Sectorial Approach”, *Proceedings from the 3rd international conference "Economic and Business Trends Shaping the Future"*;

Van Biesebroeck, J. (2015) *How Tight is the Link Between Wages and Productivity? A Survey on the Literature*, International Labour Organization;

Wakeford, J. (2003) “The Productivity-Wage Relationship in South Africa: An Empirical Investigation”, *TIPS/DPRU Conference*, Johannesburg, September 2003;

World Bank (2020) Republic of North Macedonia: Action Plan for Recovery of Growth and Jobs, Report No. AUS0001657, June 2020;