# EMPIRICAL ANALYSIS OF THE ELASTICITY OF EMPLOYMENT TO OUTPUT GAP IN THE REPUBLIC OF CROATIA

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## ABSTRACT

This article deals with the impact of cyclical activity of GDP on employment in the Republic of Croatia in the period from 2000 to 2020. According to the prevailing economic paradigm, employment growth follows GDP growth in the long run, but cyclical changes in GDP are also an important factor in monitoring economic developments and require adjustments by economic policy makers in the short term. Okun's law, based on the natural unemployment rate, is often used as a guide for the purpose of determining corrective economic policy measures. In practice, the unemployment rate is not a particularly reliable labour market variable, so this study sought to empirically examine how cyclical GDP activity affects a much more reliable labour market variable - the number of employed. Empirical studies of the impact of the income gap on employment are very rare compared to those dealing with the impact of GDP growth on employment, so this study on the example of the Republic of Croatia aimed to show that employment elasticity with respect to income gap can serve as a measure of the impact of cyclical economic activity on the number of employees. Empirical analysis of the impact of the income gap on employment was conducted using the vector error correction model (VEC). The results of the analysis indicate a statistically significant impact of the cyclical component of GDP on cyclical employment in the Croatian economy and therefore the authors suggest that this approach should be used as a complementary to Okun's law.

## KEY WORDS

## CLASSIFICATION

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## INTRODUCTION

The number of employees and labour productivity are among the most important factors in generating GDP in the economy. Many theoretical and empirical analyses deal with their relationships and correlations, as well as with estimates of the degree of labour intensity of economic growth [1]. The income gap represents the difference between current and potential GDP. Potential GDP is considered to be the aggregate level of economic activity at which the optimal use of all economic resources is established. The optimum use of productive resources is established at so-called full employment [2], which represents the level of employment corresponding to the current intensity of economic activities. Such a definition of full employment does not mean that there are no unemployed. On the contrary, the complete disappearance of the unemployed would upset the market balance and cause inflationary pressures. This occurs when current GDP is higher than potential, which is a sign that economic activity is so strong that demand outweighs supply and puts pressure on the general price level to increase [3].

That the correlation between cyclical changes in the labour market and cyclical changes in GDP is a very important factor at the macroeconomic level is also confirmed by Okun's law [4]. Since neither potential GDP nor full employment are directly measurable quantities, their relation is subject to various interpretations, but, despite controversies and exceptions, Okun's law is accepted as a useful guide for assessing the impact of cyclical economic activity [5, 6].

The relevance of this topic is given by the recent expert controversy over the methodology of measuring the income gap at the level of the European Union, in which a number of economic experts criticize the income gap assessment methodology on the one hand [7], while on the other hand the European Commission defends its views. From this controversy, a research question arises about the justification of observing the income gap as a macroeconomically relevant variable if the methods of its assessment are so questionable. The authors of this article believe that it is not so much important how precisely determined last year's income gap, but more important to determine whether and with what approximate intensity its variability affects, for example, labour market movements over a longer period. This can provide a new macroeconomic characteristic of an economy, which improves macroeconomic forecasts and provides comparative values when considering the accuracy of one-year income gap estimates. Therefore, this article contributes to the ongoing expert discussion, by empirically investigating the relevance of observing the income gap through its impact on the most reliably measurable labour market variable – employment. This, in addition to confirming the usefulness of income gap monitoring, eliminates the possibility of the impact of the lack of measuring the unemployment rate on the assessment of the impact of the income gap on the labour market and improves the orientation value obtained by applying Okun's law.

The aim of this article is to empirically investigate whether the cyclical activities of GDP in the Republic of Croatia have an impact on the number of employees. The existence and intensity of this impact indirectly indicates the quality of long-term domestic economic policy.

The article is structured in six parts. The introductory part is followed by the theoretical background of this research. The following is a review of the relevant literature, whose data will also serve as a source for comparison with the results obtained by our research. In the fourth part, we present the economic model that is empirically researched, the data used and their preparation, and the statistical research method used. The fifth part consists of the results of the analysis of the set model, and the article ends with the sixth part in which we make our conclusions and recommendations.

## THEORETICAL BACKGROUND OF OUTPUT GAP

In theoretical terms, there are important differences between the neoclassical school of economics and the Keynesians in interpreting the way GDP is generated. According to neoclassical economic theory, a stable balance in the labour market is established at full employment and the aggregate supply is the initiator of economic activities. In doing so, a natural unemployment rate is established in the long run, which corresponds to equilibrium conditions in the labour market, and this level of equilibrium unemployment is price inelastic in the long run [8]. Keynes's theory disagrees with this explanation and argues that aggregate demand is the most important factor driving economic activity, and labour market equilibrium is a dynamic phenomenon, accompanied by cyclical GDP activity, in which GDP often shifts between the inflationary and recessive gap [9]. It is this cyclical activity of GDP, called the GDP gap or income gap, that reflects the constant oscillations of economic activity, which according to Keynesians are immanent to a market economy.

Bad experiences related to economic recessions throughout economic history have prompted members of the progressive group of economic experts in the United States to propose that the state should influence the cyclical behaviour of the economy without monetary measures through appropriate fiscal policy. Expansive fiscal policy should be used in the event of a recessive income gap and restrictive fiscal policy should be used in the event of inflationary income gap [10]. In doing so, Keynes goes the furthest and argues that in the absence of rational investment opportunities for the government, it is better to take irrational forms of spending money, just to stimulate market demand.

In addition to theoretical considerations of the employment-to-GDP ratio, there are also empirically derived guidelines for assessing their interrelationship. Okun [4] states that the point of full employment is at the level of unemployment of about 4 %, and for every 1 % increase in unemployment, the current GDP will decrease by 2 % compared to the potential. Okun emphasizes that the potential GDP is not the maximum product that the economy can reach in the observed period, but the highest GDP at which there are no inflationary pressures. Current GDP may therefore be lower than potential because aggregate supply may sometimes be insufficient to bring the economy to full employment. This concept of the income gap is often called Keynesian, although Okun did not look at the income gap identical to Keynes [11]. Okun believed that the income gap, except in emergencies, always takes on positive values in terms of the existence of a recessive income gap and that government intervention is almost always needed to achieve an optimal situation.

After Okun's law, the concept of the income gap was given an alternative in the form of a monetarist approach, initiated by Milton Friedman and shaped by Perloff and Wachter [12]. According to the monetarist concept, the income gap can take on both positive and negative values, and is positive in the case of an inflationary income gap. The monetarist concept of the income gap is prevalent today, and in most countries it is considered better to use monetary than fiscal measures to achieve short-term price stability and aggregate demand because it is more a technical than a political issue [11].

Today, the income gap is one of the important factors monitored by aggregate economic activity and is an argument for the action of the central political and monetary government. However, the determination of potential GDP is not reliable enough for many authors [13], so taking appropriate monetary policy measures and the quality of economic policy action in the event of an income gap depend significantly on the income gap calculation error [14]. Responsible economic policy would require timely and effective measures to prevent too long periods of under capacitated economy and excessive cyclical unemployment, and to curb inflationary pressures in the event of a longer duration of the positive income gap. In theory,

employment should increase in the long run at approximately the rate at which GDP grows, and the elasticity of employment in relation to GDP growth and the income gap should be lower the higher the level of economic development.

## LITERATURE REVIEW

Most empirical studies of employment elasticity to date have focused on the relationship between employment and economic growth. For example, the ILO, OECD, WBG, and IMF [15] conducted a comprehensive analysis of the impact of economic growth on employment, on a sample of G20 countries, from 1991 to 2014. Employment elasticities relative to GDP growth were close to 0,2 in that period, with a smaller decline during the global financial crisis. Since the G20 mostly includes the world's most developed economies, it can be argued that the analysed level of employment elasticity is characteristic of a high degree of technological development which reduces the labour intensity of GDP growth. Compared to the group of the most developed countries in the world, the average global coefficient of employment elasticity in relation to GDP growth, measured on data from 139 countries, is slightly higher and according to Kapsos [1] ranges from 0,30 to 0,38. At the same time, the weakest economically developed countries have employment elasticities well over 0,40.

Crivelli, Furceri, and Toujas-Bernate [16] published the results of their global study on a sample of 167 countries and argued that there is large variability in employment elasticity coefficients relative to GDP between regions. The values of the elasticity coefficients ranged between 0 and 1, while most countries were in the range of coefficients from 0,3 to 0,8. African Development Bank [17] analysed 47 African countries and found that in the period from 2000 to 2014 in Africa the average elasticity of employment in relation to GDP was 0,41. Among the analysed countries, lower employment elasticity coefficients were found in better economically developed countries and higher employment elasticity coefficients are found in underdeveloped and slow-growing economies. For example, in 19 % of the least economically developed African countries, the coefficient of elasticity of employment in relation to GDP is above 1, while in the most developed African countries it is below 0,41. Asian Development Bank [18] investigated the elasticity of employment to GDP in 45 Asian countries and found that elasticities range from 0,2 to 0,8, with an average employment elasticity coefficient of about 0,6. During the observed period, most Asian countries had a decrease in employment elasticity coefficients, which is attributed to the increase in labour productivity. Hanusch [19] found a range of employment elasticity coefficients to GDP from 0,22 to 0,42 in a sample of 8 more developed East Asian countries. On a sample of 25 developing countries Prieto, Ghazi and An [20] find that in 88 % of the analysed developing countries there is a positive correlation between employment and real GDP.

Among the very few studies on the impact of the income gap on employment is Seyfried [21]. Seyfried [21] investigated the relationship between employment elasticity and economic growth on two comparative models, one with economic growth expressed through GDP growth and the other with economic growth expressed as the income gap. The study, based on the example of the 10 largest US states, gives results that show that the coefficients of employment elasticity in relation to the income gap, after correcting autocorrelation in employment data series, are usually at levels close to the coefficient of employment elasticity in relation to GDP growth, and both approaches result in the same signs of elasticity coefficients.

There is also a large number of sceptics in the scientific community regarding the usefulness of measuring the income gap and the accuracy of its assessment. Brooks and Fortun [8] problematize the method of estimating potential GDP and thus the income gap, making a

comparison among the contradictory results of the income gap assessment for several countries, by the IMF, OECD and the European Commission. They are among the initiators of a major campaign to change the methodology for estimating potential GDP. These are important issues that persistently remain outside the public perception. Dunkelberg and Scott [22] argue that data from the late 1990s cannot be used as a basis for comparisons in calculating the income gap because of the unusual psychological impact that prevailed during that period, causing particularly irrational consumption and employment levels. If excess employment is overestimated in determining the size of the income gap, there is a high risk of miss-timing the implementation of economic policy decisions.

The income gap assessment model, used by the European Commission, has a dominant role in setting fiscal rules at EU level and has therefore been the subject of much controversy recently. Barkema, Gudmundsson and Mrkaic [23] analysed the movement of the income gap in 197 countries in the period from 1995 to 2018. The results showed the existence of a median income gap of –0,7 % and a mean income gap of –1 %. This means that in the period of the observed 23 years, the world economy functioned on average below the optimum. Such predominantly negative values of the income gap were also confirmed by a study by Kangur, Kirabaeva, Natal and Voigts [24], conducted on a sample of European countries. This empirically confirms Okun's more than half-century-old belief in the predominantly recessive characteristic of the income gap. Since the authors of the mentioned studies additionally found that during the observed period the median amount of the estimated income gap is constantly declining, this indicates the need for special caution in determining fiscal and monetary policy positions when they are based only on the current income gap estimation.

There are also many authors who, in their empirical studies, assess the applicability of Okun's law. In most cases they identify significant or large discrepancies in the results of the application of the Okun's law between the analysed countries. Balakrishnan, Das and Kannan, [25] analysed a sample of 21 countries, over a period of 20 years, and found there are significantly different effects of GDP on unemployment among the observed countries, with all unemployment elasticity coefficients between 0 and 1 in absolute value. In addition, they found evidence of an average increase in the unemployment elasticity coefficients in each of the countries during the observed period, which increased from an average of 0,25 in the 1990s to an average of 0,36 in the 2000s. Ball, Furceri, Leigh and Loungani [6] in a sample of 20 countries, over a period of 21 years, also find large variations in the coefficients of elasticity of unemployment to changes in GDP. Their results show that for every 1 % increase in GDP, unemployment in most of the observed countries fell by 0,23 % to 0,54 %, and an average coefficient of elasticity of unemployment in developed countries was twice as large compared to developing countries.

Such large variations in the results of the analysis of the impact of GDP trends on labour markets require additional research of new ways to determine this impact more reliably, which was one of the motivating factors for the authors of this research.

## METHODOLOGY

Previous literature in this area has analysed the empirical basis of Okun's law and the relationship between employment and GDP growth, but paper that deal with the impact of the income gap on employment are very rare. The impact of the income gap on cyclical employment has not previously been analysed in empirical literature. That kind of analysis of the impact of the income gap on the labour market could be complementary to Okun's law and serve as a supplement for assessing the impact of cyclical economic movements.

### DATA

The estimated proposed economic model assumes causality between variables in such a way that the income gap is an independent variable and employment is a dependent variable.

Authors used quarterly data on GDP and the number of employees from the first quarter of 2000 to the second quarter of 2020, which were downloaded from the Eurostat website [26, 27] Data on gross domestic product refer to the quarterly calculation of gross domestic product according to the expenditure method at constant prices of the previous year, where the reference year is 2015 [26]. Data on the number of employees refer to the total number of employees in thousands aged 15 to 64 according to the Labor Force Survey [27].

In order to eliminate the problem of heteroscedasticity, a logarithmic transformation of variables was performed. The income gap was estimated based on a time series of logarithmic values of gross domestic product using the Hodrick-Prescott [28, 29] filter. The cyclical component of logarithmic values used for the employment variable is also extracted using the Hodrick-Prescott [28, 29] filter. The value of the smoothing parameter is $\lambda = 1600$, according to the original values of Hodrick and Prescott [28, 29] for quarterly data.

## MODEL

To examine whether there exists cointegration between the income gap and the rate of change in the number of employees, Johansen's approach to cointegration is used.

Although the vector autoregression model (VAR) model is general enough to analyse variables with stochastic trends, it is not appropriate if the interest is on cointegration relations, since they are not explicitly observable [30]. Specific parameterization which allows analysis of the cointegration structure is required [31]. The resulting models are called vector error correction (VEC) models.

The vector model of error correction is given by [31]:

$$\Delta y_t = \Pi y_{t-1} + \Gamma_1 \Delta y_{t-1} + ... + \Gamma_{p-1} \Delta y_{t-p+1} + u_t, \tag{1}$$

where $\Pi = -(I_k - A_1 - \cdots - A_p)$ and $\Gamma_i = -(A_{i+1} + \cdots + A_p)$ for $i = 1, ..., p-1$, and $I_k$ is a unit matrix of order $k$. The part $\Pi y_{t-1}$ contains cointegration relations. Parameters $\Gamma_j$ for $j = 1, ..., p-1$ are short-run parameters , and $\Pi y_{t-1}$ is long-run model. A detailed description of the VEC model is given in Lütkepohl [31] and Enders [32].

Cointegrated variables are related in the long-run, i.e. there is a long-run equilibrium between them. A set of economic variables that are in long-run equilibrium is observed:

$$\beta_1 x_{1t} + \beta_2 x_{2t} + ... + \beta_n x_{nt} = 0. \tag{2}$$

Let $\beta$ and $x_t$ denote vectors $(\beta_1, \beta_2 ... \beta_n)$ and $(x_{1t}, x_{2t}, ..., x_{nt})$. The system is in long-run equilibrium $\beta x_t = 0$. The deviation from long-term equilibrium is given by:

$$e_t = \beta x_t. \tag{3}$$

If there is equilibrium, the deviation $e_t$ is a stationary process. It should be noted that the term "equilibrium" is used differently in the econometric sense in relation to how the term is used in the field of economic theory. Economic theorists use this term in terms of equality between real and desirable states of economic phenomena. In econometric terms, this term refers to the long-run relationship of nonstationary variables. Cointegration does not require long-run equilibrium to be the result of a market mechanism. The components of a vector are cointegrated of order $d,b$ if all components of the vector are integrated of order $d$ and there is a vector such that the linear combination:

$$\beta x_t = \beta_1 x_{1t} + \beta_2 x_{2t} + ... + \beta_n x_{nt} \tag{4}$$

is integrated of order *(d-b)*, where $b > 0$. Vector $\beta$ is called cointegration vector [32] from (1).

To determine the number of cointegration relations, the Johansen procedure is used, according to which it is necessary to determine the rank of the matrix $\Pi$ from equation (1). If the rank of the matrix $\Pi$ is equal to the number of variables in the model, the $Z_t$ is stationary. If the rank of the matrix $\Pi$ is equal to $r$, where $r$ is less than the number of variables in the model, the matrix can be decomposed into:

$$\Pi = \alpha\beta',$$ (5)

where $\alpha$ and $\beta$ are matrices of order $k \times r$. In that case $y_t$ is nonstationary vector and there exist $r$ cointegration relations among variables in the model. Thus, if matrix $\Pi$ is a zero-matrix or a regular matrix whose rank is equal to the number of variables $k$, then there is no cointegration between the variables. When matrix $\Pi$ is a singular matrix whose rank $r$ is less than the number of variables $k$, there exist $r$ cointegration relations between the variables. Matrix $\beta$ is called a cointegration matrix and its columns contain the parameters of the corresponding long-run equations. Matrix $\alpha$ is the error correction speed matrix, and its elements are interpreted as the speed of adjustment of the variables to the equilibrium state. The number of cointegration relations is determined using the Johansen procedure based on determining the rank of the matrix $\Pi$ using the eigenvalues of the estimated matrix $\hat{\Pi}$. The rank of the matrix is equal to the number of eigenvalues of the matrix which are different from zero. The VEC model is estimated, and the eigenvalues of the matrix $\hat{\Pi}$ are calculated [30].

## THE RESULTS OF EMPIRICAL ANALYSIS

### DETERMINING THE NUMBER OF COINTEGRATION RELATIONS

Initially, an appropriate model was selected with respect to the existence of deterministic components (constants and trends) in the VEC model (see, for example [32]).

**Table 1.** The results of the trace test and the maximum eigenvalue test. Source: authors' calculation using EViews 9.

| Number of cointegration vectors | Eigenvalue | Test statistic (Trace test) | Critical values (Trace test) (5 %) | Test statistic (Maximum eigenvalue test) | Critical values (Maximum eigenvalue test) (5 %) |
|---|---|---|---|---|---|
| 0* | 0,205732 | 24,72041 | 20,26184 | 17,50541 | 15,89210 |
| 1* | 0,090567 | 7,214997 | 9,164546 | 7,214997 | 9,164546 |

*rejection of the null hypothesis at a significance level of 5 %

A comparison of the information criteria for selecting one of the five possible models was performed. A model in which the constant is present only in the long-run model (cointegration space) is selected. In the selected model, the constant is not present in the short-term model (VAR model). The influence of the constant in the VEC model is reflected through the error correction term. After selecting the model, the number of cointegration relations was determined using the trace test and the maximum eigenvalue test, as shown in Table 1. Both tests indicate that the number of cointegration relations is equal to one.

### LONG-RUN MODEL ESTIMATION

Based on the estimated cointegration vector, conclusions about the long-run relationship of the variables are drawn. The cointegration relation, i.e. the long-run equation with the corresponding t-ratios in parentheses is given by:

$$N = 0,000109 + 1,3938 \cdot GAP \quad (3,837).$$ (6)

In the long-run equation, the GAP variable has a statistically significant positive effect on the *N* variable. The positive effect of the output gap on employment is consistent with the empirical results reported in Seyfried [21], where authors pointed to the positive elasticity of employment to output gap on average equal to 0,31, after correcting autocorrelation in the employment data series. The research was conducted for ten largest US states, using a model with pooled data from all countries, in the period 1990-2003. It should be noted that the labour intensity of economic growth decreases with increasing degree of economic development, so today's values of employment elasticity for countries recording long-run economic growth, such as the United States, will be lower than values a few decades ago.

The error correction term (ECT) in the model is –0,8675 or 86,75 % with a corresponding t-statistic equal to –2,70, which indicates the significance of ECT. A negative sign gives information about the return of variables to the equilibrium, and the amount of ECT indicates the rate of return to equilibrium. Therefore, the variables should return to equilibrium by approximately 1,16 quarters, which is about 3,5 months.

Moreover, the variance decomposition shows the proportion of the variance of the prognostic error due to variations in the variable itself versus variations in other system variables. In empirical research, it is common for the variable itself to explain a large proportion of the variance of its prognostic error over a short period of time. With increasing time horizon, the proportion of prognostic error variance explained by the variable itself decreases [32]. Decomposition of variance allows the analysis of the relative proportion of each of the variables in explaining the variation of the variable in future periods. In case the values of a variable can be adequately predicted based on its previous values, the variance of the prognostic error will be explained by the prognostic errors of the variable itself.

**Table 2.** Variance decomposition of employment. Source: authors' calculation using EViews 9.

| Period | JAZN | JAZY |
|--------|----------|-----------|
| 1 | 100,0000 | 0,000000 |
| 2 | 95,90015 | 4,099853 |
| 3 | 90,38809 | 9,611905 |
| 4 | 86,03984 | 13,96016 |
| 5 | 79,78624 | 20,21376 |
| 6 | 73,61348 | 26,38652 |
| 7 | 70,56037 | 29,43963 |
| 8 | 66,86679 | 33,13321 |
| 9 | 62,26134 | 37,73866 |
| 10 | 59,61176 | 40,38824 |
| 11 | 58,70249 | 41,29751 |
| 12 | 57,79394 | 42,20606 |

Table 2 shows the decomposition of the prognostic error variance of the employment variable. After the first quarter, the variable itself explains 100 % of the variation of its prognostic error. However, after one year (4 quarters) that percentage drops to 86,04 %, while after 12 quarters (3 years) that percentage equals 57,69 %. The shock of output gap after one year explains 13,96 % of the variation of the prognostic error in employment, and after three years the percentage is increased to 42,21 %.

## MODEL DIAGNOSTICS TESTS

Furthermore, model assumptions tests are performed. The result of the White heteroscedasticity test is shown in Table 3, and the Chi-square test statistic of equals 82,1736 with the corresponding empirical level of significance equal to 0,7092, hence at any reasonable level of significance the null hypothesis of homoscedasticity of variance is not rejected.

Moreover, the result of the Serial Correlation Lagrange multiplier (LM) Test is given in Table 4. The LM test of autocorrelation of error terms indicates that, at the significance level of 5 %, the null hypothesis of non-existence of autocorrelation of relation errors up to lag 12 cannot be rejected, since the empirical significance levels are greater than 0,05.

**Table 3.** VEC Residual Heteroscedasticity Test. Source: authors' calculation using EViews 9.

| Chi-square statistic | Degrees of freedom | p-value |
|---|---|---|
| 82,1736 | 90 | 0,7092 |

**Table 4.** VEC Residual Serial Correlation LM Test. Source: authors' calculation using EViews 9.

| Lags | LM statistics | p-value |
|---|---|---|
| 1 | 4,050951 | 0,3992 |
| 2 | 4,093157 | 0,3935 |
| 3 | 3,266763 | 0,5142 |
| 4 | 1,841723 | 0,7648 |
| 5 | 9,929733 | 0,0416 |
| 6 | 3,877676 | 0,4228 |
| 7 | 0,085080 | 0,9991 |
| 8 | 4,180200 | 0,3822 |
| 9 | 6,030904 | 0,1969 |
| 10 | 0,259182 | 0,9923 |
| 11 | 3,923050 | 0,4165 |
| 12 | 0,195171 | 0,9955 |

The stability of the error correction model is assessed by calculating the inverse roots of the characteristic AR (1) polynomial using EViews 9. The estimated model with $r$ cointegration relations is stable if $k$-$r$ roots are equal to one and the remaining roots have a modulus less than 1, where $k$ is the number of endogenous variables, and $r$ is the number of cointegration relations [33]. The analysis showed that there is 1 unit root and the remaining roots have a modulus of less than one. Since the model contains two variables, with the existence of one cointegration relation, the model with one unit root is stable.

## DISCUSSION, IMPLICATION AND CONCLUSION

Despite the accelerated technological development, labour is still the most important component of the overall productivity of the economy and it is justified to look at economic indicators primarily focused on employment. In this article the impact of cyclical activity of GDP on cyclical employment in the Republic of Croatia is analysed in the period from 2000 to 2020, using the vector error correction model (VEC). The results of the analysis indicate a statistically significant impact of the cyclical component of GDP on cyclical employment in the Croatian economy.

The elasticity of cyclical employment in relation to the income gap in this analysis for the Republic of Croatia in the observed period was 1,39. First conclusion of this study is therefore that there is a clear, statistically significant, influence of output gap on the employment in Croatian economy, which allows an assessment of the potential use of fiscal and monetary policy measures to increase employment over shorter periods marked by the impact of the cyclical component of economic activity. Moreover, the decomposition of the prognostic error variance of the employment variable indicates that the shock of output gap after one year explains 13,96 % of the variation of the prognostic error in employment, while after three years that percentage is increased to 42,21 %. Since a positive correlation between the income gap and employment gaps was found, this conclusion is indirectly in accordance with the results of studies cited in the literature review, in particular Kapsos [1] and ILO, OECD, WBG and IMF [15]. Since the number of employees, compared to the number of

unemployed, and especially compared to unemployment and employment rates, is the most accurately measurable variable in the labour market and this analysis empirically proves the relationship between employment and income gap, it can be additionally concluded that employment elasticity in relation to income gap, from the point of view of the number of employees, gives probably more precise indicative estimates of the impact of cyclical activity of GDP on the labour market than is the case with Okun's law.

The results of this study and the proposed different approach to observing the impact of the income gap may have implications in practical terms as comparative values for possibly correcting the impact of the income gap on the labour market in the coming periods, and in academic terms opens new topics for discussion in economic analysis.

There are several ways to estimate the income gap. Only the Hodrick-Prescott filter was used in this study, which is a limitation of this article, and in the case of other estimation methods, such as the structural estimation approach using the production function or the use of Kalman filter for unemployment data, the results may differ slightly from the results obtained by this research. Alternative ways of estimating the income gap in the model from this research may be the subject of future studies, after which the comparison of the results will provide new insights into the possibility of using the model. One possibility, in the case of obtaining different results in relation to the results of this study, is to determine the approximate reliability intervals of the coefficients of elasticity of employment in relation to GDP, obtained by different methods of estimating the income gap.

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