PROCESS EFFICIENCY SEARCHING AND MATCHING ON THE LABOUR MARKET IN POLAND AND PORTUGAL – COMPARATIVE ANALYSIS

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Abstract. The article compares the effectiveness of the matching processes at the labour market in Poland and Portugal. The relationship between the job vacancy rate and the unemployment rate has been illustrated by the Beveridge curve. In the analysed period, covering the years 2009–2015, the mechanism of adjustments in both countries was found to proceed in a similar manner. A shift of the curve was observed, which may indicate the formation of a short-term point of market equilibrium. However, in the case of the Polish labour market, at the end of the aforementioned period, the curve returned to the previous status, which may indicate an improvement in the efficiency of matching. The aim of the study was to present the relationship between the job vacancy rate and the unemployment rate in Poland and Portugal and to compare processes and trends occurring in the matching mechanism of demand and supply of labour in these two countries.

Key words: labour market, matching function, Beveridge curve

INTRODUCTION

One of the significant features of the EU labour market, but at the same time, the labour markets in the individual EU countries, is that the unemployment rate remains at a fairly high level. It should be noted that a number of measures taken within the framework of the employment policy, only slightly contributes to the improvement of the situation. The improvement of other macroeconomic indicators (such as inflation or the actual average gross salary) does not translate into any significant processes occurring in the labour markets in the European Union (EU). Therefore, it would be reasonable to say that the efficiency of the searching and matching mechanism, between employers looking for workers and job seekers, is on the decrease. This state of affairs could result

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in the sustained high unemployment levels of a structural nature, even in the conditions of a growing economy.

The searching and matching theory may be applied to the analysis of labour markets where frictional or structural unemployment occurs. An important issue tackled as part of the theory is the efficiency of matching of vacancies and job seekers, and the function of matches is an important feature of its model. It describes the relationship between the flow of newly filled job openings, the number of vacancies and the number of job seekers. The matching function enables you to take into account the frictions in the labour market. Due to such frictions, at any given time, only some job seekers will find a job, and on the other hand, only a part of the vacancies will be filled. These values, in turn, depend on another measure, namely the tightness of the market, i.e. the ratio of the number of vacancies to the number of the unemployed. The higher the ratio of these two values, the more difficult it is for employers to find employees [Pissarides 1984]. This relationship was illustrated by the Beveridge curve in the 1940s.

The results of the studies of the relationship between the level of unemployment and the number of vacancies in the European Union (EU) conducted to date, indicate that the shape of the empirical curve, which is the closest to the theoretical model of the Beveridge curve, occurs in such countries as Bulgaria, France, the Netherlands and Poland, while such dependencies cannot be observed in Member States with the highest unemployment rates [European Commission 2013].

The aim of the article is to present the relationship between the vacancy and unemployment rates on the labour markets in Poland and Portugal. A hypothesis has been formulated that the searching and matching process on the labour markets in the analysed countries is characterised by the same dependencies. In order to verify this hypothesis, the theoretical model of the Beveridge curve, translated into empirical data, has been used.

MATERIAL AND METHODS

In the models of the labour market without frictions, wages are the main determinant of adjustment of demand and supply of labour, whereas unemployment in the state of equilibrium does not exist. On the other hand, in the approach under consideration, taking into account the imperfection of the searching and matching process, it is assumed that not every employer looking for an employee will find one and not every job seeker will find a suitable employer. Therefore, there is always unemployment in the short term as some vacancies remain unfilled, while at the same time, a part of job seekers are unsuccessful in their job search. Wages are determined in the process of negotiation and depend on the surplus, both on the part of the employer and the employee, generated after the employment contract has been signed. Accordingly, the balance in this model is not defined by wages and employment levels, but in the categories of vacancies and unemployment rates [Pissarides 2000].

The friction unemployment model in the state of equilibrium has been used in order to verify the formulated hypothesis. In this model, the unemployment in the state of equilibrium is graphically interpreted as the intersection of two curves (Fig. 1): the Beveridge curve (*BC*) and the job creation curve (*JC*). The first curve (*BC*) shows a negative rela-

tionship between vacancies and unemployment rates, while the other curve (*JC*) illustrates decisions of employers regarding job creation. This model is used to study the growth of the natural rate of unemployment [Pissarides 2000].
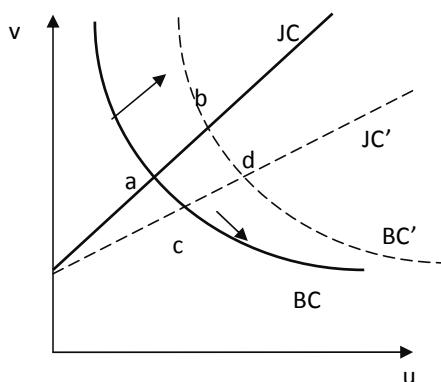

Fig. 1. Stationary equilibrium in the labour market and *BC* & *JC* shifts
Source: Mortensen and Pissarides [1994].

Before we proceed to explain how the relationship between the Beveridge curve and the job creation curve determines the levels of vacancy and unemployment rates, each of these curves should be analysed individually. The Beveridge curve shows the negative correlation between the number of job vacancies and the unemployment rate. The equilibrium unemployment rate drops with the increasing degree of adjustment in the labour market, which is graphically represented by a shift in the curve closer to the origin of the graph. The outward shift in the curve, with the corresponding simultaneous increase in the number of vacancies and the unemployment rate may indicate an opposite situation, i.e. a drop in the quality of adjustment [Buttler et al. 2011]. A lower efficiency of adjustment results in the increase of the frictional or structural unemployment levels, i.e. also the natural rate of unemployment. A movement along the Beveridge curve illustrates cyclical changes in demand for labour. For instance, in a situation where demand for labour is falling, the number of vacancies decreases and the unemployment rate is on the increase (a shift to the right and downward shift along the curve).

In order to analyse this issue in full, we also need to take into account the job creation curve, which is determined by the behaviour of businesses in the area of creation of new jobs. Entrepreneurs create vacancies until the expected value of adjustment of the employee to the post is aligned with the expected cost of filling a vacant post. The first value is determined by the marginal product of labour [Blanchard and Diamond 1989].

In the case of the model concerned, the probability of filling a vacant post increases together with the unemployment rate. Accordingly, the *JC* has a positive slope, which in turn means that businesses report increased demand for labour when unemployment grows (Fig. 1). According to Daly et al., the angle of the curve depends on the structure of the product and the labour markets, the type of wage negotiations, the cost of recruitment, as well as external factors, such as discount or interest rates [Daly et al. 2012].

The fundamental claim of the theory in question is that the unemployment rate in the state of equilibrium is determined by the intersection of the two previously defined curves: *BC* and *JC*.

Changes to the unemployment rate in the state of equilibrium may occur in the following cases [Daly et al. 2011]:

• as a result of the outward shift in the *BC* (in Fig. 1 – the movement of the unemployment rate from point *a* to point *b*);

• as a result of the downward shift in the *JC* (in Fig. 1 – the movement of the unemployment rate from point *a* to point *c*);

• as a result of occurrence of both these changes (in Fig. 1 – the movement of the unemployment rate from point *a* to point *d*).

The main conclusion from the above graphic analysis is that the sole analysis of the Beveridge curve does not provide any basis for insightful conclusions about unemployment in equilibrium. Without the information on the job creation curve, we are not able to determine the possible changes to the unemployment rate.

The subject matter literature indicates two directions of empirical analysis. The first direction involves an analysis of factors affecting the increase in the unemployment rate with the simultaneous study of variables that affect the creation of new jobs. Another direction involves an analysis of causes of the shifts in *BC* and *JC* curves, in order to separate the two components of the increase in unemployment, i.e. cyclical changes in demand for labour and one-off stimuli of temporary and permanent nature.

RESULTS AND DISCUSSION

The analysis of the labour market situation in Poland indicates a sustained (i.e. continuing for some time) and relatively high level of unemployment and a low level of utilisation of job vacancies (job vacancy rate) [Idczak 2014]. Starting from the first quarter of 2009, the level of unemployment is characterised by a growing trend, and a reversal of its direction can be observed only at the beginning of 2013. A slightly different form of phenomenon can be observed in the case of job vacancies. At the beginning of the period under consideration, the job vacancy rate is characterised by volatility; at first it drops, and then, after three quarters, it goes back to the level observed at the beginning of the period (in 2009, it amounted to 0.7%). Starting from the first quarter of 2011, until the end of 2012, there is a drop in the job vacancy rate. During the following year, this rate stabilises at a level of 0.4%, resulting in a slight year-on-year increase (Fig. 2).

For the purpose of better understanding of the situation on the Polish labour market, the data describing the actual state of affairs should be juxtaposed with the theoretical model of the Beveridge curve. Figure 3 shows the empirical Beveridge curve, estimated on the basis of data provided by Eurostat. It combines the official unemployment rate with the job vacancy rate, calculated as a ratio of the number of vacancies to the sum of total employment and number of vacancies. It is interpreted as the frequency at which open, but not occupied, jobs appear in the economy [Daly et al. 2012]. Quarterly data from the years 2009–2015 were used for the purpose of curve estimates.
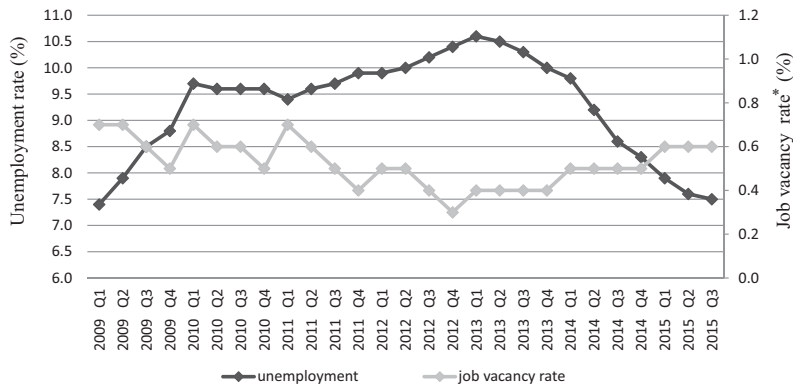
* Job vacancy rate represents the proportion of vacant posts offered by the economy, calculated as the ratio of job vacancies to the total number of occupied and unoccupied posts.

Fig. 2.   The dynamics of the level of the job vacancy utilisation rate and the unemployment rate in Poland in the years 2009–2015 (quarterly data)

Source: Developed by the author on the basis of data provided by Eurostat.

The analysis of the data shown in Figure 3 indicates several characteristic periods. The first period, i.e. the three quarters of 2009, demonstrates a significant increase in the unemployment rate and a decline in the utilisation of job vacancies. This is a typical distribution corresponding to the Beveridge curve, and the location of the points demonstrates a downward movement along the curve. This phenomenon occurs during the economic downturn and reflects changes of cyclical nature, i.e. a decline in demand forces down the number of jobs created and contributes to the growth of unemployment. In the last quarter of 2009, there was a simultaneous increase in both indicators. This is reflected by the
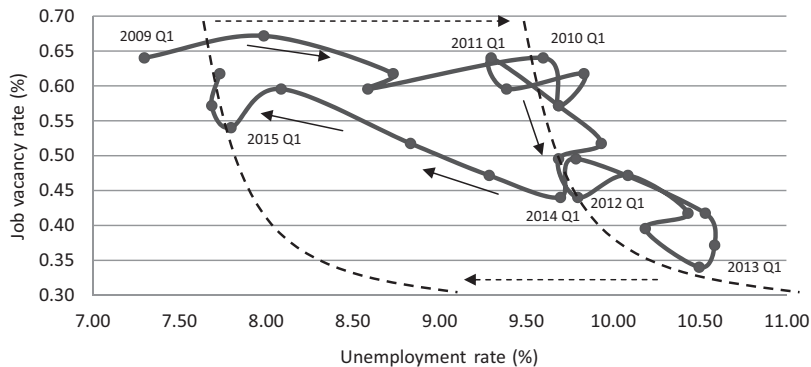

Fig. 3.   Beveridge curve for Poland, demonstrating the relationship between job vacancies and unemployment in the years 2009–2015 (data excluding seasonal effects)

Source: Developed by the author on the basis of data provided by Eurostat.

movement of the points from the origin of the graph, which in turn indicates absence of adjustment in the labour market, manifested by difficulties in filling vacancies due to the mismatch between qualifications and employer needs, and the limited labour mobility. In the following period, starting from the first quarter of 2010, the empirical Beveridge curve once again began to take the form similar to the theoretical model. The job vacancy rate began to decrease, while the unemployment rate underwent only minor changes. In the last period, which began in the fourth quarter of 2012, there was a steady decline in the unemployment rate, combined with a slight increase in the job vacancy rate. Such a situation indicates a reduced mismatch between qualifications and employer needs, and improved labour mobility. In terms of the graphic interpretation of such a situation, this corresponds to a shift of the curve to the left.

In the next stage of the analysis of the relationship between vacancies and unemployment, a dotted line was drawn, representing approximately the shape of dependency between these two variables. The period covered by the study was divided into three sub-periods: 2009–2010, 2011–2013 and 2014–2015. Two curves were estimated, for the first and the third sub-periods, and the second sub-period respectively. The curve for the second sub-period may reflect a shift to the right that took place at that time. Such a shift entails deterioration of the labour market adjustment and a higher unemployment rate at a given rate of job vacancies, and perhaps, also a higher level of natural unemployment. Accordingly, during this period, the labour market is characterised by greater inefficiency of the operation of the matching mechanism. However, it should be noted that in the last two years of the period covered by the study, the curve moved back to the estimated curve from the first period. In literature, such a short-term shift in the curve is interpreted as a new short-term point of market equilibrium, characteristic of periods of economic slowdown [Hobijn and Şahin 2013].

The situation of the labour market in Portugal was analysed in the next part of the study. As with the Polish market, also in this case, a sustained (i.e. continuing for some time) and relatively high level of unemployment and a low level of utilisation of job vacancies could be observed. Starting from the first quarter of 2010, the unemployment level is characterised by a growing trend and a decline in this regard may be observed, as with the Polish market, only in the first quarter of 2013. During these years, the job vacancy rate remains at a relatively constant level, and notably increases in two quarters. In the period from the last quarter of 2013 to the third quarter of 2014, we can observe a strong growth in the job vacancy rate. In the following year, this indicator is fairly stable and ranges between 0.6 and 0.7% (Fig. 4).

As with the Polish market, in the next step, the data, previously devoid of seasonal effects, were moved to the unemployment–job vacancy rate correlation. Figure 5 shows the empirical Beveridge curve. Quarterly data from the years 2010–2015 were used for the purpose of curve estimates.

The analysis of the data shown in the figure below also indicates several characteristic periods. The first period runs from the beginning of the time line, up to the second quarter of 2011. At that time, we could observe a slight increase in the unemployment rate and a decline in the rate of utilisation of job vacancies. This is a typical distribution corresponding to the Beveridge curve, and the location of the points demonstrates a downward movement along the curve. This correlation occurs during the economic downturn. In the

Fig. 4.   The dynamics of the level of the job vacancy utilisation rate and the unemployment rate
in Portugal in the years 2010–2015

Source: Developed by the author on the basis of data provided by Eurostat.

third quarter of 2011, there was a simultaneous increase in both indicators. During the
next three quarters, there was a significant increase in the unemployment rate, combined
with a relatively stable unemployment rate. This is reflected in Figure 5 by the movement
of the points from the origin of the graph. This, in turn, indicates absence of adjustment
in the labour market, manifested by deterioration in the efficiency of the searching and
matching process with regard to employees and job vacancies.

In the following period, starting from the second quarter of 2012, the empirical Bev-
eridge curve once again began to take the form similar to the theoretical model. The job
vacancy rate began to increase, while the unemployment rate underwent a decline (an up-
ward movement along the *BC*). Such a situation indicates the economic upturn. It should
be also noted that in the last year of observation, there was a decline in the unemployment
rate, combined with only minor changes in the job vacancy rate. Such a situation indicates
a reduced mismatch between qualifications and employer needs, and improved labour
mobility. However, this period is too short, and as such, does not enable us to conclude
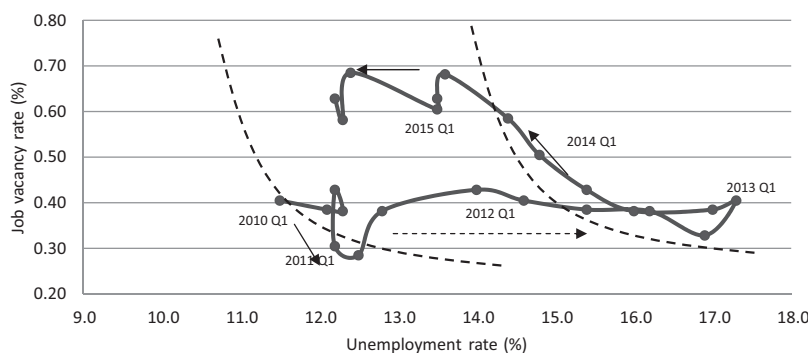that the empirical *BC* moved back closer to the origin of the graph.

Fig. 5.   Beveridge curve for Portugal, demonstrating the relationship between job vacancies and
unemployment in the years 2010–2015 (data excluding seasonal effects)

Source: Developed by the author on the basis of data provided by Eurostat.

In the next stage of the analysis of the relationship between vacancies and unemployment, a dotted line was drawn, representing approximately the shape of dependency between these two variables. The examined period was divided into two sub-periods: 2010–2012 and 2012–2014. Two curves were estimated, for the first and the second sub-period respectively. The curve for the second sub-period may reflect a shift to the right that took place at that time. Such a shift entails deterioration of the labour market adjustment and a higher unemployment rate at a given rate of job vacancies, and perhaps, also a higher level of natural unemployment. Accordingly, during this period, the labour market is characterised by greater inefficiency of the operation of the matching mechanism.

CONCLUSIONS

Frictional unemployment, as a phenomenon which is not determined by the lack of an adequate number of jobs, is a natural feature of each economy. It results from the transitional mismatch of demand for and supply of labour, and occurs in a situation where employees change jobs. This type of unemployment is inevitable due to the continuous flows of labour in the labour market (mainly internal flows within the economically active population resources). This is an important area of study, and any resulting conclusions could help to diagnose the causes of excessive levels of frictional unemployment, thus improving the mechanism of adjustment in the labour market.

Given the results of the study, we may conclude that the hypothesis of the same dependencies characterising the searching and matching processes in the labour markets in the countries concerned, has been confirmed. The analysis of the dynamics of the job vacancy and the unemployment rates suggests that the operation of the matching mechanism in the Polish labour market complies with the presented model. The study using the Beveridge curve showed that the labour markets in Poland and Portugal had experienced increased inefficiency of the matching mechanism in the analysed period. The *BC* shifted to the right, which justifies the conclusion that a new equilibrium point has been formed. In the case of the Polish labour market, it was a short-term point, as the curve eventually moved back closer to the origin. As a result, the efficiency of matching of supply and demand on the labour market has improved. According to the adjustment (matching) theory, it is a signal that the efficiency of the process of finding employees by employers is deteriorating. Although similar movements are noticeable, such a conclusion cannot be clearly formulated for the labour market in Portugal as the time line of the analysis is too short.

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EFEKTYWNOŚĆ MECHANIZMU DOPASOWANIA NA RYNKU PRACY W POLSCE I PORTUGALII – ANALIZA PORÓWNAWCZA

Streszczenie. W artykule dokonano porównania efektywności procesów dopasowań na rynku pracy w Polsce oraz Portugalii. Zależność między stopą wakatów a stopą bezrobocia została zobrazowana za pomocą krzywej Beveridge'a. W badanym okresie, który obejmował lata 2009–2015, stwierdzono, że mechanizm dopasowań w obydwu krajach przebiegał w podobny sposób. Odnotowano przesunięcia krzywej, co może wskazywać na ukształtowanie się krótkookresowego punktu równowagi rynkowej. W przypadku polskiego rynku pracy na koniec badanego okresu wspomniana krzywa powróciła jednak do stanu poprzedniego, co może wskazywać na poprawę efektywności dopasowania. Celem pracy jest przedstawienie relacji miedzy stopą wakatów a stopą bezrobocia w Polsce i Portugalii oraz porównanie procesów i tendencji zachodzących w mechanizmie dopasowania popytu na pracę i podaży pracy w tych dwóch krajach.

Słowa kluczowe: rynek pracy, funkcja dopasowań, krzywa Beveridge'a