



Cross-Country Comparison of Macroeconomic Indicators of the Labour Market

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Abstract

The global pandemic triggered a global economic recession, resulting in high unemployment and labour market imbalances, which were reflected in changes in macroeconomic indicators in the US, Japan, and Russia. While the timing and scale of job losses and post-pandemic recovery varied significantly across these economies, they also shared some common characteristics.

The aim of the work is to analyze macroeconomic indicators of the labour market in the USA, Japan and Russia using the Beveridge curve, which shows changes in unemployment and vacancies during the phases of the economic cycle and the impossibility of a simultaneous reduction in the number of vacancies and job seekers.

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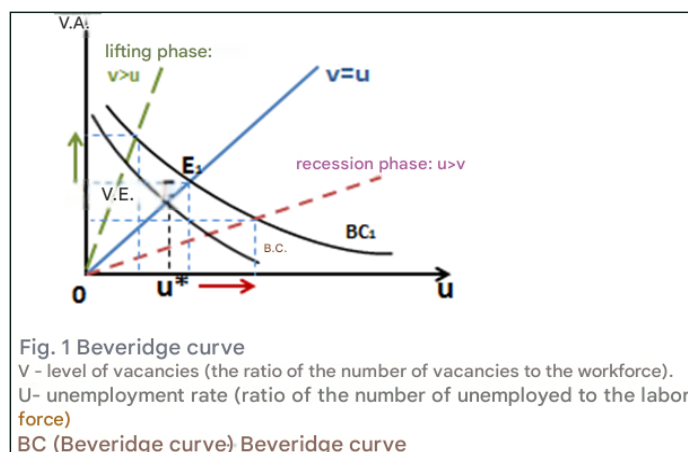
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Methodology

We will begin the analysis of macroeconomic indicators of the labour market by constructing the Beveridge curve (BC - Beveridge The Beveridge curve is plotted in the coordinates "vacancy rate – unemployment rate." The horizontal axis of the Beveridge curve plots the unemployment rate, and the vertical axis plots the vacancy rate (v), which is calculated as the ratio of vacancies to the labour force (Fig. 1); that is, relative indicators of unemployment and vacancy rates are used.



The labour market equality curve (bisector (OEE 1) shows the equality of the unemployment rate and the level of vacancies ($v = u$). All points on it correspond to the level of full employment, that is, unemployment is at the natural level and includes frictional and structural unemployment. In addition, this curve is also called the labour force participation rate (LFPR) - the job creation line (JCL) or the active labour force line (employed, unemployed and the working-age population, or, in other words, the population 15 and older who is not in the labour force). The BC curve is constructed using points reflecting the equality of the vacancy rate and the unemployment rate on a certain date. Point E - the intersection of the BC curve with the JCL - is the point of the natural rate of unemployment on the most convex to the origin of the BC curve, it is the point of full employment. When the BC curve shifts upward to position BC 1, equality in the labour market is established at point E 1, resulting in the establishment of equilibrium between Vacancies and unemployment are at a higher level than the indicators studied. This is possible due to a mismatch between the quality of workers and existing vacancies, both in terms of qualifications and inflated salary expectations. In turn, potential employees are unable to find the jobs they desire.

Further graphical analysis reveals deviations of the labour market from its equilibrium. In the first case, when there is an excess of vacancies in the labour market ($v > u$), this indicates that the economy is in the expansion phase of the economic cycle, firms are

creating a large number of vacancies, and therefore, labour demand is high, and the unemployment rate is minimal. In the second case, conversely, when the unemployment rate is higher than the vacancy rate ($u > v$), the economic cycle is in a recession phase, firms are reducing their supply in the labour market, the number of vacancies decreases, and the unemployment rate rises. Based on this, it can be concluded that the growth rate of new vacancies in the labour market is an important indicator of macroeconomic dynamics.

The US labour market: employment, unemployment, and job vacancies.

The employment and unemployment rates as macroeconomic indicators are used to formulate views on the labour market, demonstrating maximum employment of the working-age population. On the other hand, another indicator – the natural rate of unemployment, or NAIRU – is also important for economic decision-makers. The natural rate of unemployment is not a fixed value; it is subject to change over time under the influence of numerous factors, such as demographics, labour market regulation, cyclical changes in the economy, and others. There are many reasons for fluctuations in the unemployment rate, and therefore it must be considered in conjunction with other macroeconomic indicators of the labour market, such as job vacancies, which provide a more complete picture of the labour market situation. Figure 2 shows the dynamics of unemployment in the United States, Japan and the Russian Federation in the period from 2000 to 2023:

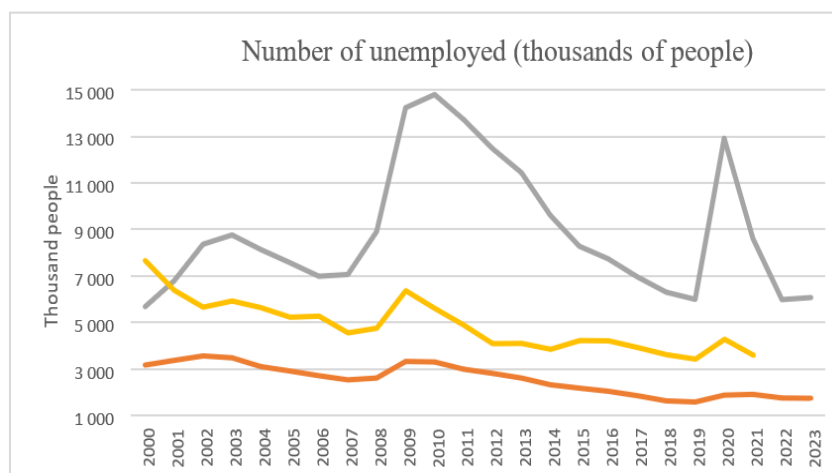


Figure 2: The number of unemployed in the USA —, Japan — and Russia —. Source: OECD

The data presented demonstrate high unemployment in the United States throughout the entire period under study. As noted above, the US labour market has exhibited significant fluctuations over more than two decades, indicating that maximum employment has fluctuated over the course of the economic cycle. We begin our analysis with the Great Recession of 2008-2009. Prior to its onset, the unemployment rate reached a minimum of 4.4%, and by October 2009, it had risen to its maximum of 9.9% (Figure 3).

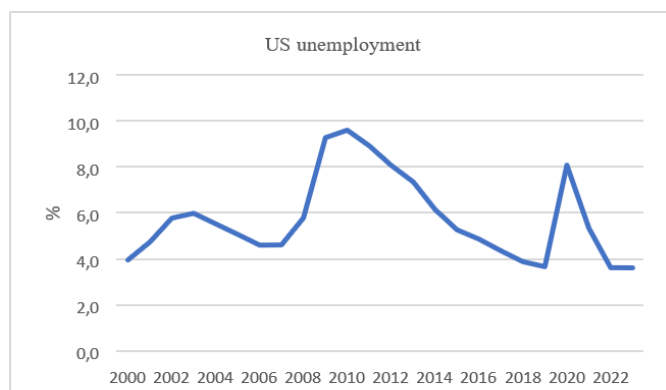


Figure 3: Unemployment rate in the USA from 2000 to 2023.

Source: Federal Reserve

During the Great Recession, unemployment in the US doubled, many companies went bankrupt, and people lost their jobs and remained unemployed for extended periods. Cyclical unemployment, which poses a particular threat to macroeconomic stability, was particularly acute during this period. A significant jump in unemployment was also observed in 2019-2020, associated with the onset of the COVID-19 pandemic. During the coronavirus pandemic, the number of unemployed in the US increased by 6,947,000. Many companies switched to remote work and were forced to significantly reduce staff, which led to such a significant jump in unemployment.

The data presented in Figures 2 and 3 illustrate different labour market situations. The unemployment rate after the Great Recession reflects the depth and persistence of the labour market downturn, with the long-term unemployment rate—the percentage of unemployed workers unemployed for 27 weeks or more—almost twice as high as during the 1980s recession. Longer periods of unemployment erode workers' skills, making it more difficult for them to find employment again, which in turn leads to higher

unemployment rates. This phenomenon, known as hysteresis, is a key factor in the stagnation that occurs during periods of high unemployment.

It took eight years after the Great Recession for the unemployment rate to reach its pre-crisis low in 2016. It then continued to fall to 3.5% by September 2019 and remained close to that level until the onset of COVID-19 in 2020.

The US unemployment rate peaked at 14.9% during the COVID-19 recession. A distinctive feature of this rise in unemployment was its timing. It increased over two months. By December 31, 2020, the unemployment rate had fallen to 6.4%, meaning the period of high unemployment during the pandemic lasted months rather than years, as it did in 2007-2009. This labour market situation was primarily due to temporary layoffs, which essentially characterizes frictional unemployment rather than cyclical unemployment. During the post-pandemic recovery, the unemployment rate fell to 3.4% by April 2023.

An analysis of the presented data shows that the US labour market during the recovery periods after two recessions demonstrated the achievement of maximum employment and an unemployment rate of 3.4-3.5%. That is, during an upswing, the US economy is capable of maintaining unemployment at a level of 3.5%, and this once again characterizes the countercyclical nature of this macroeconomic indicator.

However, it's premature to conclude that this level represents the natural unemployment rate. As noted above, the labour market depends on many factors, including unfilled positions.

Let us consider the number of unfilled vacancies and unemployed people in the US labour market, which are reflected in Table 1 and Fig. 4.

Table 1: Number of Vacancies and Unemployed People in the US Labour Market (Millions of People)

Time period	2018	2019	2020	2021	2022	2023	2024
Unfilled job openings in the US economy as a whole.							
	7103750	7156667	6361084	9984917	11181000	9352333	8015584
Unfilled vacancies, US private sector.							
	6471084	6432834	5643500	9072583	10 13080	8323750	7097084
Unfilled vacancies, US public sector.							
	632 667	723 833	717 583	912 333	1 04917	1028583	918500
Unemployment Rate in the United States (end of year).							
	6512 thousand	6412 thousand	6200 thousand	6597 thousand	5747 thousand	6149 thousand	6849 thousand

Source: Calculated based on OECD and Fed data.



Figure 4: Level of vacancies in the US labour market.

Source: Federal Reserve

A characteristic feature of the presented data is the excess of unfilled job openings over the number of unemployed, with the exception of 2020, the year of the COVID-19 pandemic. The US economy would undoubtedly benefit if the number of vacancies were effectively filled by existing unemployed workers (Table 1 and Fig. 4). However, it is absolutely impossible to instantly reduce the number of workers and unfilled positions to zero, as this depends on many factors, such as the phase of the economic cycle; newly unemployed workers need time to find work, and filling vacancies requires time to find candidates with the necessary skills and professional training.

The presented data and brief analysis of the US labour market can be summarized using the Beveridge curve (Fig. 5).

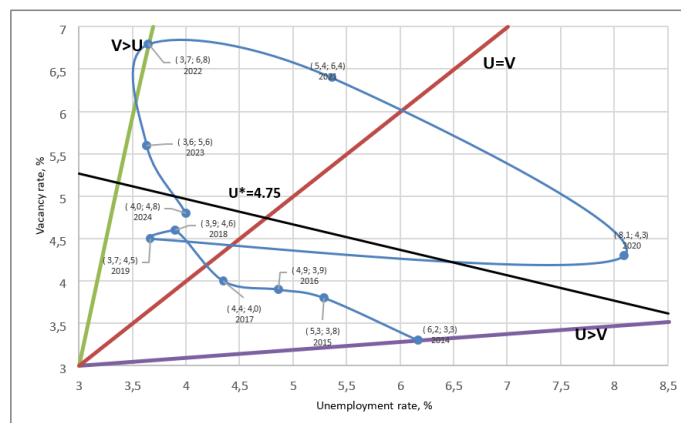


Figure 5: Beveridge curve – US labour market.

Source: Based on Federal Reserve data

The Beveridge curve for the US labour market shows that cyclical fluctuations in business activity influence changes in the ratio between the unemployed and job vacancies in opposite directions. During an expansion (a positive shock), from the Great Recession to the COVID-19 pandemic recession, job vacancies increase (4.5% in 2019) and unemployment decreases (3.7% in 2019), reducing labour market competition. During a negative shock, conversely, job vacancies decrease, unemployment increases, and competition for jobs intensifies. This is confirmed by the Beveridge curve's position in the recession zone during the COVID-19 pandemic, with high unemployment and the lowest number of job vacancies for all the years studied (Table 1). As noted above, this imbalance was short-lived, and the situation reversed in 2021, with a decrease in unemployment and an increase in job vacancies in the US economic expansion zone. The latest US labour market data show a stable situation,

with the unemployment rate in the range of 4-4.2% from May 2024 to April 2025, and the job opening rate declining to 4.3% in March 2025. The job openings-to-unemployment ratio in the US labour market in March 2025 was 1.0, which is below the 2019 average of 1.2. This ratio indicates a continued easing of the labour market situation. Thus, according to the Bureau of Labour Statistics (BLS), the number of job openings decreased to 7.15 million in November 2025, which is below the revised figure of 7.45 million for the previous month. According to JOLTS (Job Openings and Labour Turnover Survey), the job openings-to-unemployment ratio fell to 0.9, the lowest since March 2021. At its peak in 2022, this ratio was 2 to 1. The decline in job openings is due to reduced opportunities in the leisure and hospitality, healthcare, transportation, and warehousing sectors. At the same time, the number of layoffs also declined. These data confirm that the labour market is weakening, although companies have so far avoided mass layoffs. To support the labour market, the Federal Reserve has cut interest rates three times in 2025.

Analysis of the constructed Beveridge curve (BC - Beveridge the effective unemployment curve

for the US labour market shows that the effective unemployment rate, including 2024, is 4.75%. Reaching this level in 2025 and 2026 is entirely possible due to the achievement of the 2% inflation target, which is currently above the target at 2.3%.

Features of the Japanese Labour Market.

The unemployment rate dynamics presented in Figure 2 demonstrate that Japan's unemployment rate has been lower throughout the period under review, fluctuating between 2.4% and 3.4%, significantly lower than comparable labour market indicators in the United States and Russia. This situation is linked to the challenging demographic situation of recent decades: Japan's population declined by 2.7 million people between 2015 and 2023, and the proportion of people aged 65 and over continues to grow, while the working-age population aged 15–65 is declining. Furthermore, the historical and mental characteristics of Japanese citizens indicate a unique attitude toward work, dedication to the company where they work, and irregular working hours. Frictional unemployment is virtually nonexistent in Japan.

Below we present and analyse data on the labour market in Japan.

Table 2: Japanese Labour Market Data.

	Total number of jobs (thousand people)	Busy (thousand people)	Number of vacancies (thousands of people)	Unemployment rate, %	Level of vacancies, %
2015	64,883.66	64,018.33	8,65,329	3.4	1.33
2018	67,768.98	66,820.00	9,48,984	2.4	1.4
2019	68,475.58	67,495.84	9,79,741	2.4	1.43
2020	67,931.47	67,102.50	8,28,968	2.8	1.22
2021	67,864.75	67,124.16	7,40,587	2.8	1.09
2022	68,079.47	67,225.84	853.63	2.6	1.25
2023	68,369.03	67,469.16	899.87	2.6	1.32
2024	68,656.73	67,806.66	8,50,068	2.6	1.24

Source : Ministry of Health, Labour and Welfare

URL: <https://www.mhlw.go.jp/stf/>

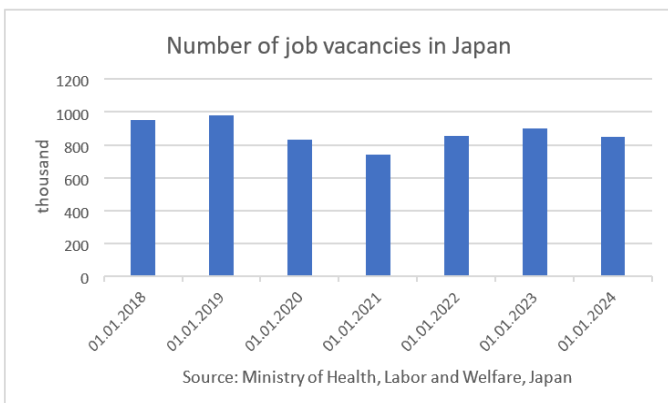


Figure 7: Number of vacancies in Japan.
Source : Ministry of Health, Labour and Welfare

URL: <https://www.mhlw.go.jp/stf/>

Based on the presented data, we will construct the Beveridge curve for the Japanese labour market.

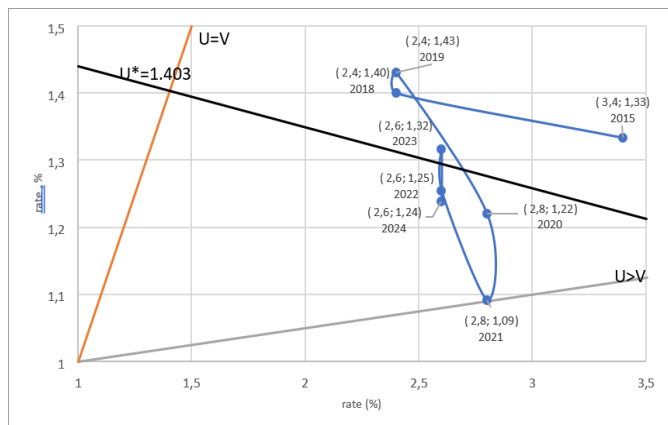


Figure 8: Beveridge curve for the Japanese labour market.

Source: Ministry of Health, Labour and Welfare
URL: <https://www.mhlw.go.jp/stf/>

The Beveridge curve for the Japanese labour market shows that the Japanese economy, from a labour market perspective, has been in a depression phase or, at best, recovery growth throughout the entire period under study. Fernández - Villaverde, Gustavo Ventura, Wen Yao in the article " The wealth of working nations » are of the opinion that Due to population aging, the gap between GDP per capita growth and GDP per working-age adult (or per hour worked) has widened in many developed countries. Countries like Japan, which had been showing sluggish GDP per capita growth, have shown surprisingly strong results in GDP per working-age adult (or per hour worked). From 1991

to 2019, Japan's GDP per working-age adult grew by 1.39% annually. By comparison, the US grew by 1.65%, a difference of only 0.26%. Suddenly, Japan's GDP growth no longer seemed mysterious. This is a consequence of the annual decline in the working-age population of approximately 0.54%. Remarkably, from 1998 to 2019, Japan grew slightly faster than the US in terms of GDP per working-age adult, with a cumulative growth of 31.9% compared to 29.5% in the US. Even more strikingly,

Japan's GDP per capita growth has outpaced that of all other G7 countries

(<https://www.sciencedirect.com/science/article/pii/S0014292125000121>).

In addition, it should be noted that the effective unemployment rate in Japan during the period under study, according to the constructed Beveridge curve, is 1.4%.

Macroeconomic indicators of the Russian labour market.

The labour market and unemployment in the Russian Federation differ significantly from those in the United States and Japan (Figure 2). It is not subject to significant fluctuations during economic crises and downturns due to significant government support. Furthermore, Russian legislation also prevents high unemployment during crises . For example, during the COVID -19 pandemic, employee dismissal could only be by mutual agreement or at the employee's own initiative. Labour market data in the Russian Federation, presented in Table 3, indicate a lower unemployment rate than in the United States (Figure 2). During the pandemic, the unemployment rate in Russia reached 5.8% compared to 14.9% in the United States.

Table 3: Summary Data on the Labour Force, Unemployment, and Job Vacancies for Persons Aged 15 Years and Over for 2017-2024.

Labour force size								
	2017	2018	2019	2020	2021	2022	2023	2024
thousand people	76659.2	76629.6	75880.4	75466.2	75969.2	75632.4	76036.7	76104.7
Labour force participation rate								
V %	62.8	62.8	62.2	61.9	62.3	62.2	62.8	62.9
Number of unemployed								
thousand people	3981.6	3673.0	3487.9	4350.6	3671.4	2988.5	2400.5	1914.9
Unemployment rate								
V %	5.2	4.8	4.6	5.8	4.8	4.0	3.2	2.5
Potential workforce								
thousand people	1130.3	1104.9	1584.9	1676.5	1250.7	1023.8	835.1	771.8
Combined unemployment and potential labour force rate								
V %	6.6	6.1	6.5	7.8	6.4	5.2	4.2	3.5
Stated need for workers								
	2010	2015	2019	2020	2021	2022	2023	2024
thousand people	981.9	1135.2	1488.1	1736.5	1992.4	1608.3	3500.0	2714.3
The unemployed population load per declared vacancy								
Human	1.8	1.0	0.5	1.7	0.5	0.4	1.08*	1.0*

Source: Rosstat, <https://rosstat.gov.ru>

Table 3 reflects official Rosstat data: the overall unemployment rate, which includes the registered unemployment rate; and the number of declared labour needs, i.e., the number of vacancies reported by enterprises to the state employment service. Thus, the overall unemployment rate in 2024 fell to a record low of 2.5%. According to R.I. Kapelyushnikov, a decrease in the unemployment rate below 3-4% can be interpreted as a clear signal of its "fall" below the full employment level. Further examining Rosstat data, it is important to note a feature that reflects the burden of the unemployed population per declared vacancy. Rosstat calculates this burden based on the ratio of declared labour needs to the sum of the total number of unemployed and the potential labour force, i.e., to the combined unemployment rate and potential labour force. The highest burden was observed in 2010 and 2020, during two economic crises associated with the Great Recession and the pandemic. However, if the potential workforce were not included in the calculations, the workload burden would be significantly higher. However, when

analyzing the Russian labour market, we will adhere to the official approach to indicators developed by Rosstat. According to its methodology, the potential workforce is defined as unemployed individuals who express interest in employment for pay or profit, but whose current circumstances limit their active job search or their willingness to begin work. Rosstat effectively recognizes them as unemployed (but not unemployed according to the calculation methodology) and willing to begin work under certain conditions. This balances the situation in the labour market; the workload per declared vacancy is slightly higher than 1.0 in 2023 and 2024.

To further analyze the labour market, we construct a Beveridge curve based on the overall unemployment rate and reported vacancies (Figure 8). The zone below the Beveridge curve, from 2015 until the 2020 pandemic, shows the recovery period and unemployment below its natural rate, as well as an increase in vacancies starting in 2021. This characterizes the transition of the Russian economy to the recovery phase

of the economic cycle, where the vacancy rate is above the unemployment rate ($v > u$). Furthermore, the zone above the Beveridge curve demonstrates the short-term period of the Russian economy's recovery phase, a decrease in unemployment, and an increase in reported vacancies.

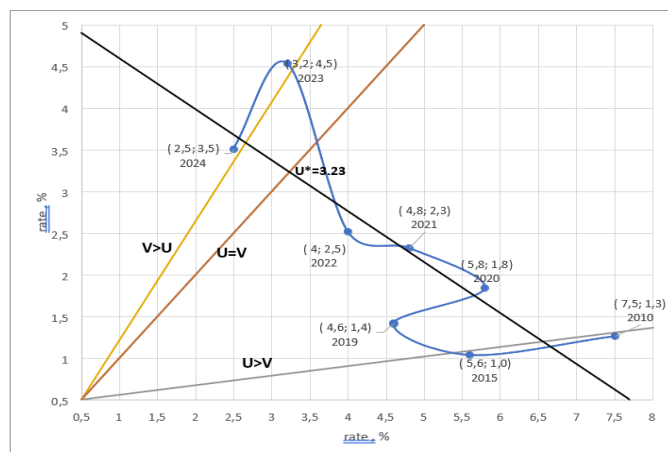


Figure 9: Beveridge curve for the Russian labour market.

Source: Rosstat, <https://rosstat.gov.ru>

Moreover, it is clear that the situation in the 2023-2024 labour market was not solely due to the shock associated with the second sanctions crisis and the shift of the Russian economy to a quasi-war footing, which accelerated the situation but was not the primary cause. Throughout the entire period, with the exception of the pandemic year, the Russian labour market has demonstrated a gradual decline in the overall unemployment rate and growth in job vacancies. Furthermore, it is worth noting that the intersection of the Beveridge curve and the job creation line (JCL) establishes a natural unemployment rate of 3.23%. According to the scenario conditions of the socioeconomic development forecast for the Russian Federation for 2026 and the planning period of 2027 and 2028, unemployment over the medium term will remain at 2.5%. The results obtained from constructing the Beveridge curve and the forecast of the Ministry of Economic Development of the Russian Federation show that the unemployment rate will not exceed 3-3.5%, and this value is below the level of full employment.

Conclusion

A study of labour markets in the United States, Japan, and Russia using the Beveridge curve revealed

an inverse relationship between job vacancies and unemployment, reflected in the phases of the economic cycle. During a recession, the unemployment rate exceeds the number of unfilled positions, while during an expansion, the vacancy rate exceeds the unemployment rate. Furthermore, the current state of the labour markets in both the United States and Russia demonstrates an increase in the number of unfilled positions and a stabilization of the unemployment rate at 4-4.2% in the United States and 2.5% in the Russian economy.

In Japan, the situation in the labour market over the past decade shows that the vacancy rate is 2-2.5 times lower than the unemployment rate, and the actual unemployment rate exceeds the effective rate, which is calculated empirically for the Beveridge curve, indicating that the Japanese economy is in the recovery phase of economic growth.

Experimental data suggest a possible change in the natural rate of unemployment, which on the Beveridge curve is the equilibrium point between the vacancy rate and the unemployment rate, or the intersection of the Beveridge curve and the job creation line (JCL). For the US labour market, the natural rate of unemployment is assumed to be 4-4.5%, while for the Russian labour market, it is 3-3.5%, which is below the full employment level established in both countries [1-21].

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