Analysis

A new method to measure structural unemployment via labour market flows

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AUTHORS

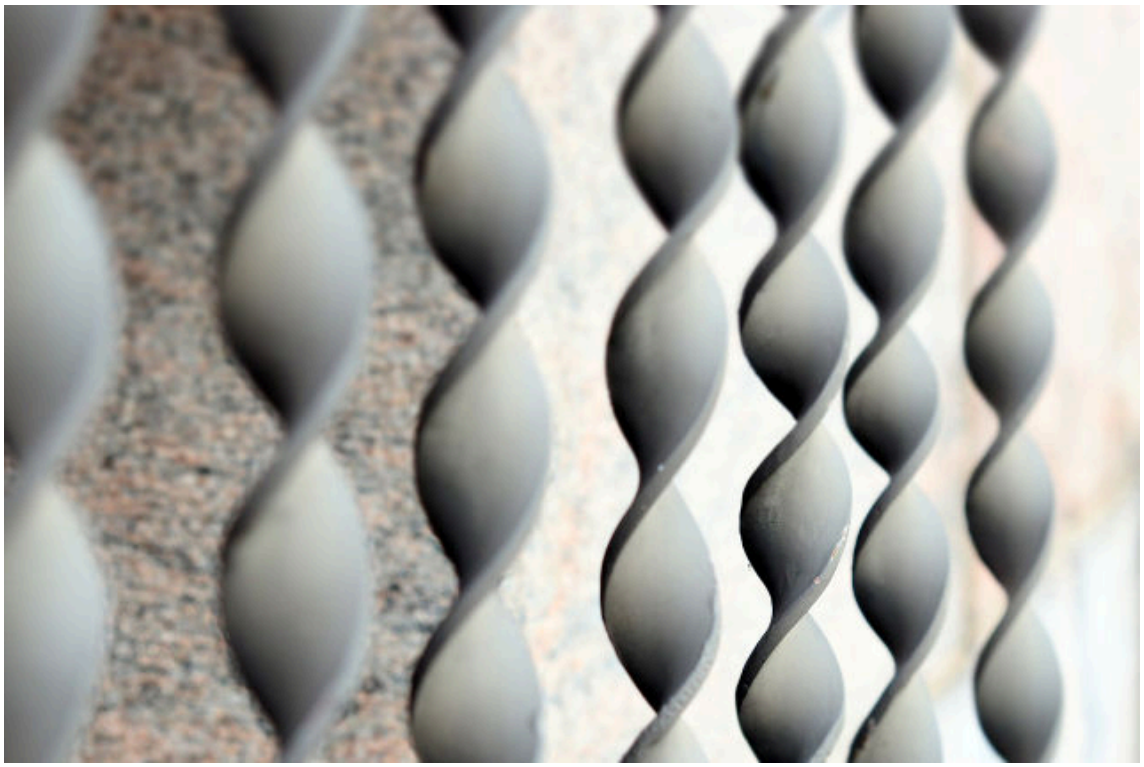


Meri Obstbaum
Adviser to the Board



Petteri Juvonen
Senior Economist

According to a new structural unemployment indicator based on labour market flows developed by the Bank of Finland, unemployment is currently close to the structural level in Finland and cannot therefore be expected to decline very rapidly in the immediate years ahead. After the financial crisis, structural unemployment grew almost without a pause until very recently, since the flow out of unemployment dried up. This reflects the fact that, during the recession following the financial crisis, people who have lost their jobs have experienced difficulties in finding a new job, possibly because new jobs may have been created in sectors and/or geographical locations other than those where they disappeared. However, with the upturn in economic growth the probability of finding a job has begun to improve, which will with time also reduce structural unemployment.



How is structural unemployment measured?

At the beginning of a cyclical upswing, unemployment usually declines for some time without growth in wage pressures, as labour is readily available. Unused labour market resources are traditionally estimated on the basis of structural unemployment, which reflects the structures of the economy and the labour market. When unemployment is higher than structural unemployment, a reduction in unemployment brought about by economic growth will not lead to wage pressures jeopardising a balanced development of the economy.

The reduction in unemployment in Finland has been limited in recent years, despite the strengthening of economic growth. This could indicate that unemployment is already close to the structural level. On the other hand, wage growth has been relatively modest, which is consistent with the perception that there is still slack in the labour market. In this article, we introduce an indicator based on international research literature that is suitable for estimating structural unemployment and hence labour market slack. Based on the indicator, we present a quantitative estimate of structural unemployment in Finland and assess particularly developments since the global financial crisis.

Structural unemployment can be measured either purely with statistical indicators or using methods originating from economic theory. In the case of the latter, the most well-known estimate of structural unemployment is the NAIRU.[1] Equally well known is that significant uncertainty

attaches to the estimation of the NAIRU and the estimates for past as well as present developments are subject to considerable revisions over time.

In this article, we present a structural unemployment indicator alternative to the NAIRU, based on labour market search theory and equilibrium unemployment. The indicator is grounded in an equilibrium unemployment theory, based on research by Nobel laureates Peter Diamond, Dale Mortensen and Christopher Pissarides, which lays emphasis on labour market frictions relating to job search and job creation.[2] Equilibrium unemployment is determined by transition probabilities, i.e. flows from employment to unemployment and vice versa, derived from worker flows. Equilibrium unemployment refers to an unemployment rate that would prevail if transition probabilities were observable but the unemployment rate remained unchanged at a given time. In accordance with research by Tasci (2012), we estimate trends from transition probabilities. The transition probability trends determine the trend of equilibrium unemployment, which can be referred to as structural unemployment.

The structural factors affecting equilibrium unemployment are not constant over time, and therefore the level of equilibrium unemployment also varies. According to the theory, equilibrium unemployment rises if, for example, the job destruction rate grows, pay demands (the reservation wage) edge higher or minimum wages rise. Long-term or permanent changes in worker flows cause variation in structural unemployment, too. Flows into unemployment, i.e. the job destruction rate, can permanently rise if, for example, employment protection against dismissal is diluted. Flows out of unemployment can diminish if, for example, unemployment benefits and reservation wages increase. The probability of finding work can also weaken if a protracted recession leads to an erosion of skills or weaker job-seeking activity by the unemployed, i.e. via so-called hysteresis.

The trend of equilibrium unemployment is structural unemployment, just like the NAIRU, but their definitions differ slightly. The NAIRU is generally a useful indicator in determining the stance of monetary policy because it is directly linked with the relation between macroeconomic activity and price developments. For the purposes of labour market analysis, however, equilibrium unemployment provides a more robust approach. Unlike in the case of the NAIRU, the equilibrium unemployment trend is not affected by short-term changes in wages and prices, nor by inflation expectations. Instead, equilibrium unemployment reflects the genuine structural factors underlying structural unemployment, such as the economic environment, labour market institutions, demographic changes and technological advances.

Flows into and out of unemployment determine the level of unemployment

The fundamental concepts associated with our structural unemployment indicator are those used in labour market search theory, namely the job-finding rate and the job destruction rate.[3] Worker flows between unemployment and employment can be large and fluctuating even when unemployment remains unchanged. Basically, unemployment may grow either because the flow into employment decreases and the flow into unemployment does not decrease correspondingly, or because the flow into unemployment increases without a corresponding increase in the flow into employment.

The job-finding and job destruction probabilities can be measured on the basis of monthly unemployment statistics using a method developed by Shimer (2012). The job-finding probability measures flows out of unemployment, while the job destruction probability measures flows into unemployment; hence changes in unemployment can be measured as the difference between these flows. The measurement of labour market flows has featured in recent years' economics literature, especially in connection with cyclical fluctuations in unemployment, when the focus has been on analysing which of the two flow types drives changes in unemployment. According to the older research literature, the most important factor explaining structural unemployment is the fact that during cyclical downturns the job destruction rate rises, i.e. the flow into unemployment increases.[4] The more recent view is that the job destruction rate has been relatively stable over time but that the job-finding probability declines strongly in a cyclical downturn, i.e. the flow out of unemployment moderates.[5]

Measured labour market flows can be used in estimating the structural component of unemployment. In this article, we apply the method of Tasci (2012), in which the structural component of unemployment is calculated by using labour market flows and an unobserved components model. The model includes three equations for changes in real GDP, job finding probability and job destruction probability. Each variable is simultaneously decomposed in the model into an unobserved component (i.e. trend) and a cyclical component. The model produces trends in labour market flows that can be used to calculate structural unemployment.

How are labour market flows measured?

At the heart of the measurement of labour market flows is an equation in which a change in unemployment is determined by labour market flows.

On the basis of the job destruction probability (S_t) and the job creation probability (F_t)

$$\frac{du_t}{dt} = S_t l_t - F_t u_t$$

A change in unemployment at a given time equals the difference between the number of workers who have lost their job *(l_t)* and the number of unemployed persons who have found a job *(u_t)*.

The job finding probability F_t is calculated using the following equation:

$$F_t = -\log\left(\frac{u_{t+1} - u^s_{t+1}}{u_t}\right)$$

where u^s_{t+1} is short-term unemployment (in monthly data less than 4 weeks and in quarterly data less than 12 weeks).

The job destruction rate can in turn be derived from the following equation:

$$u_{t+1} = \frac{(1 - e^{-F_t - S_t})S_t}{F_t + S_t}(l_t + u_t) + e^{-F_t - S_t}u_t$$

The labour market flows are calculated on the basis of data on unemployed job-seekers from the Employment Services Statistics of the Ministry of Economic Affairs and Employment. The data extends from the first quarter of 1981 to the second quarter of 2017. It is essential that the data be broken down according to the duration of unemployment, since flows into unemployment can be calculated in the selected calculation method on the basis of short-term unemployment and total unemployment. In the baseline calculation, we produce quarterly time series from the data because the unobserved components model also uses data on real GDP published on a quarterly basis. Short-term unemployment is defined in the calculation as an unemployment spell of less than 12 weeks.[6]

The calculation could also be based on the unemployment statistics of Statistics Finland's Labour Force Survey, from which the official unemployment rate is calculated. However, we use the

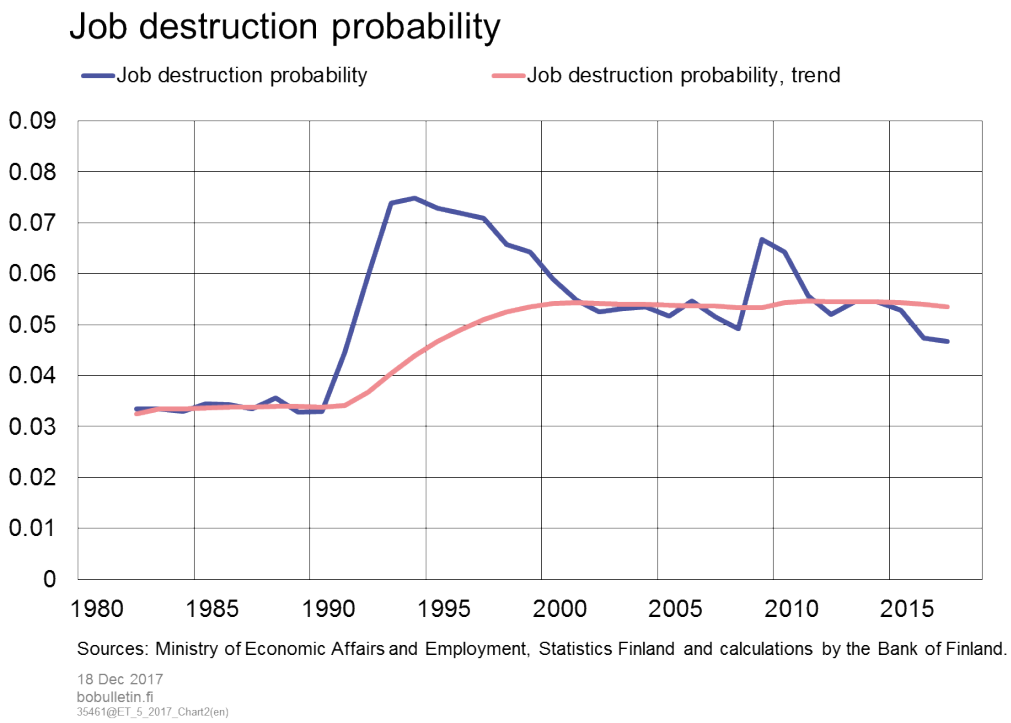
register data of the Ministry of Economic Affairs and Employment, as this data is available for a longer period and can also be regarded to better reflect the genuine duration of unemployment. The reason is that, strictly speaking, Statistics Finland's Labour Force Survey measures the duration of job-seeking and not necessarily the duration of unemployment. This is because the Labour Force Survey categorises only those persons as unemployed who have reported as having actively sought employment during the past four weeks.

How has job-finding probability varied?

The flow out of unemployment was relatively strong in Finland in the 1980s (Chart 1, blue line). Job-finding probability was high and peaked during the period of overheating preceding the recession of the 1990s.

During the recession, in turn, job-finding probability dropped to the lowest level throughout the review period, until it began to grow steadily immediately after the recession. Prior to the global financial crisis, the flow out of unemployment temporarily picked up again, but turned onto a downward trend during the subsequent recession. The downward trend continued almost to the present day.

Chart 1.



The trend of job-finding probability has naturally been slightly more stable than the actual

developments (Chart 1, red line).

The probability of finding a job has since the 1990s recession remained permanently lower than before the recession. In the late-1990s, the flow out of unemployment started to strengthen, until it turned downwards during the protracted recession that followed the financial crisis. Since 2012, the flow out of unemployment has decreased uninterruptedly, to the lowest level in the period under review, and turned onto an upward trend only recently.

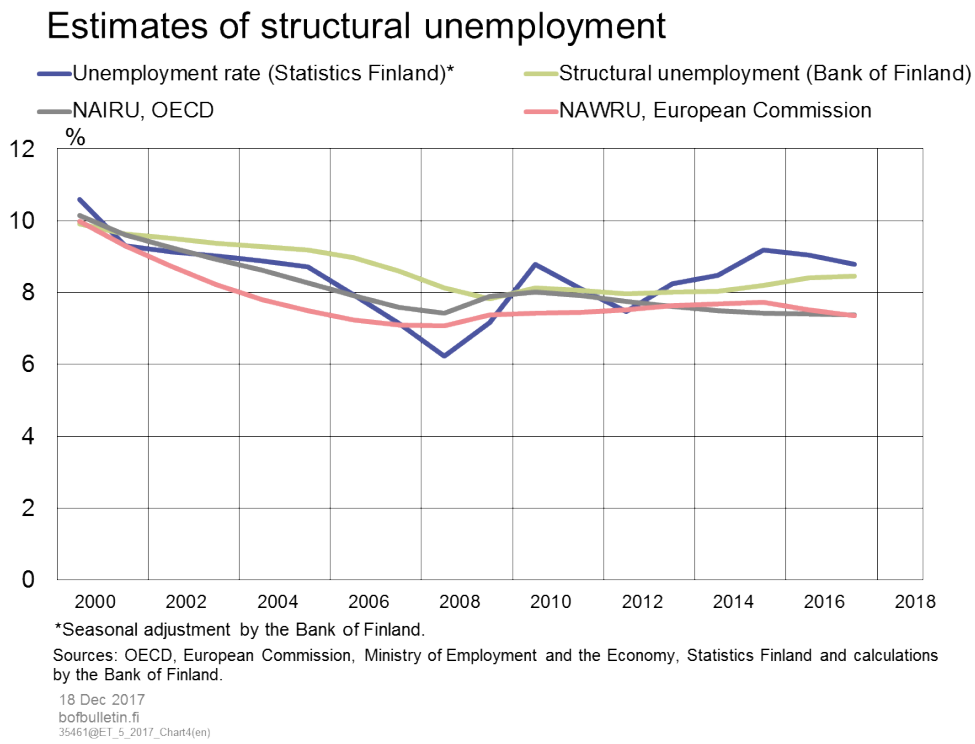
The decline in the job finding probability since the financial crisis reflects the worsening of structural problems in the labour market. The duration of unemployment has become longer and as a result, a person's activity of seeking employment may have decreased and the skills required in employment may have eroded. Due to structural changes in the economy, new jobs are created partly in different sectors than in which they were lost, and this too decreases the job-finding probability. At the same time, incentives to work have even weakened.[7]

What is the probability of job destruction?

The flow into unemployment was in Finland very small in the 1980s, but in the 1990s recession, it more than doubled, contributing to the emergence of mass unemployment (Chart 2, blue line).

Following the 1990s recession, the flow into unemployment slowed in Finland at a quite steady pace until the onset of the financial crisis, and in 2009 it strengthened very sharply. Thereafter, the flow into unemployment has slowed again, notwithstanding the small increase in 2014 and 2015, in the second phase of the double-dip recession that followed the financial crisis. The flow into unemployment has weakened recently and is now even slower than before the financial crisis.

Chart 2.

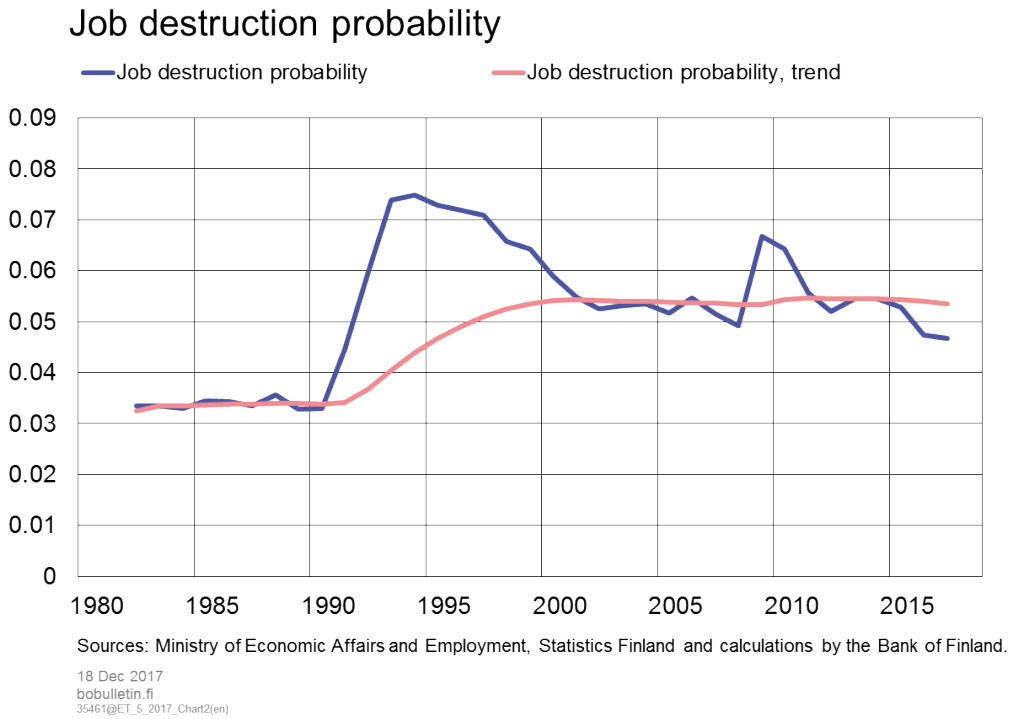


In structural terms, too, the job destruction rate jumped to a new level during the 1990s recession and has remained virtually unchanged since (Chart 2, red line).

How has structural unemployment varied in different decades?

The trend of equilibrium unemployment, which can be interpreted as structural unemployment, is calculated based on trend changes in worker flows.[8] Structural unemployment in Finland remained stable and low in the 1980s (Chart 3, red line), because the underlying labour market flows were also very stable. The probability of job destruction was low and the probability of finding a job was high. Reflecting the small flow into unemployment and the high probability of finding a job, the structural unemployment rate was very low, approximately 5% throughout the decade.[9]

Chart 3.



As a result of the 1990s recession in Finland, structural unemployment reached a new high of approximately 10%, where it has since remained, with the exception of some small changes. During the recession, the flow into unemployment increased and the flow out of unemployment decreased, and therefore both these factors contributed to the growth in structural unemployment.

Structural unemployment started to decline slowly only after the turn of the millennium, reflecting improvements in job-finding probability in structural terms and a decrease in the probability of job destruction. Both flows contributed to the slight decline in structural unemployment until the onset of the financial crisis. Structural unemployment nevertheless remained significantly higher than in the period preceding the 1990s recession.

Following the financial crisis, structural unemployment in Finland initially remained unchanged, after which it started to grow at a rather slow pace. As the rise in unemployment remained significantly smaller than in the period following the 1990s recession, the trend of job destruction probability rose only very little, leading to a slight increase in structural unemployment. In contrast, flows out of unemployment continued to increase and dampened growth in structural unemployment. In fact, the trend of job-finding probability turned downwards only in 2012.

Flows out of unemployment have slowed through until the most recent observations, thereby

increasing structural unemployment. Job-finding probability is now at its lowest in the entire review period. At the same time, the job destruction rate has decreased only slightly and, as a result, the downward impact on structural unemployment has remained smaller than the upward impact caused by the decline in job-finding probability.

Structural unemployment has continued to grow through until the most recent observations, and, according to the structural unemployment indicator presented in this article, unemployment is close to its structural level.

The fact that the unemployment rate is already close to the rate of structural unemployment does not, however, mean that virtually none of the job-seekers currently unemployed could find a job. On the contrary, flows in and out of unemployment are large, and only some of the unemployed remain unemployed for a long period of time. In October 2017, of the slightly less than 300,000 unemployed jobseekers, over 90,000 had been unemployed for more than a year, and slightly less than 30,000 for more than 3 years. The number of persons who have been unemployed for more than a year does, however, still account for nearly 35% of all the unemployed. In 2016, the proportion of long-term unemployed reached a level that was significantly higher than after the 1990s, and it has decreased only a little since.

How else can we assess structural unemployment?

The Bank of Finland's new indicator of structural unemployment provides a similar picture assessed based on both the Labour Force Survey of Statistics Finland and data from the Ministry of Economic Affairs and Employment (Chart 4). Structural unemployment derived from worker flows is close to the current seasonally adjusted official unemployment rate.

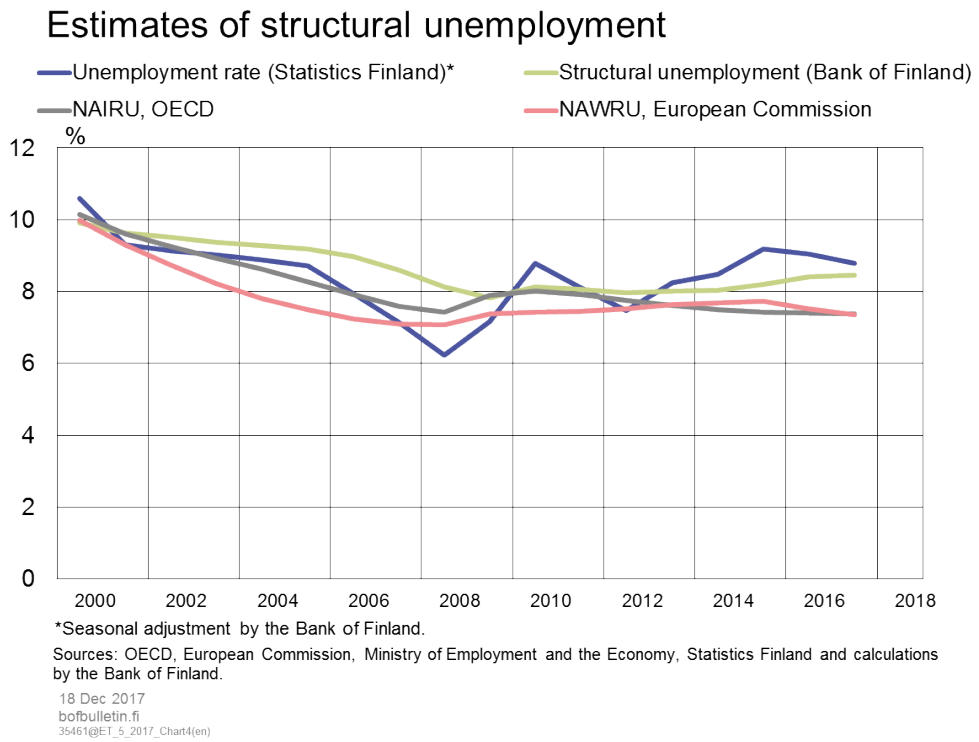
Structural unemployment according to the European Commission's production function methodology for calculating potential output, i.e. the NAWRU,[10] has throughout the 2000s been significantly lower than the indicator of structural unemployment based on labour market flows. The Commission's indicator, too, points to an increase in structural unemployment in the period following the financial crisis, even though according to this indicator structural unemployment declined already in 2016 and continued on a downward trend in 2017, reaching 7.3%.

According to the OECD's NAIRU estimate, structural unemployment in Finland has been declining already since 2010, despite the protracted recession and rise in unemployment. In 2010–2016, the number of long-term unemployed doubled, which is difficult to square with the idea that structural unemployment declined in the period in question. According to the OECD estimate, the structural unemployment rate is at present approximately 7.4% and the labour force reserve larger than based on the worker flow estimate; therefore unemployment could decline more

rapidly if the economy continues to grow.

In the past 25 years, unemployment was below the OECD's current NAIRU estimate only in 2007–2008. The low level of the NAIRU estimate in recent years may also be due to subdued developments in actual wages and prices. In the present exceptional economic situation, it may, however, not necessarily reflect structural unemployment. Secondly, the European Commission and OECD estimates for present structural unemployment are also affected by forecasts for developments in the years ahead. Continuation of the cyclical upswing in the next few years and a decline in unemployment will also lower the estimate of present structural unemployment. In the new indicator of structural unemployment presented in this article, the results are not affected by the forecast.

Chart 4.



What is the impact of the business cycle?

According to the new structural unemployment indicator developed by the Bank of Finland, unemployment in Finland is currently already close to the structural level, despite having declined only slightly.

According to a strictly theoretical interpretation of structural unemployment, this would mean that a continuation of the cyclical upswing alone would be insufficient to significantly reduce

unemployment without an increase in wage pressures.

The job destruction probability has been decreasing for a number of years already, and it is therefore unlikely that the flow to unemployment would continue to slow significantly and hence reduce unemployment. In contrast, the probability of finding a job is still small and the flow out of unemployment is at its weakest since the recession of the 1990s, despite signs of an upturn. A reduction in unemployment to the pre-financial-crisis level would also require a rise in the job-finding probability to the pre-financial-crisis level. Unemployment is, however, still far from that level.

There is variation in both structural unemployment according to the new structural unemployment indicator based on labour market flows and the estimates of structural unemployment based on the NAIRU method, reflecting changes in labour market structures and to some extent also actual cyclical fluctuations in unemployment. The impact of cyclical changes in unemployment on structural unemployment is called hysteresis. The impact of actual cyclical fluctuations on the quantitative estimate of structural unemployment depends ultimately on the cyclical adjustment by statistical methods applied in the various models of the actual labour market flows or fluctuations in unemployment.

The use of each model is preceded with a selection process involving the model's structure and parameters, and therefore there is a fine line between cyclical unemployment and structural unemployment. There is no unambiguous way of assessing at precisely which stage cyclical unemployment develops into structural unemployment, or to distinguish between the effects of hysteresis and structural factors.

According to the structural unemployment indicator presented in this article, structural unemployment in Finland is currently high and very close to the observed rate of unemployment. In future, unemployment can decline either as a result of a prolonged period of robust economic growth or new structural measures. Measures that boost the supply of labour and improve the professional and regional compatibility of jobs and workers could promote the strengthening of employment in the current economic upswing.

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Notes

1. Non-accelerating inflation rate of unemployment. ↑
2. For equilibrium unemployment theory, see e.g. Pissarides (2000) Equilibrium Unemployment Theory. MIT Press. ↑
3. In this article, we use the common terms for labour market flows from the research literature even though, strictly speaking, the 'job finding probability' is here 'flow out of unemployment' and the 'job destruction rate' is 'flow into unemployment'. Namely, our labour market flow calculations do not take into account flows out of the labour market (inactivity) or flows from inactivity into unemployment or directly to employment. We intend to discuss these flows in further research. In addition, in this article we do not differentiate between the job destruction rate and the job separation rate (people quitting), even though in reality a job may not be destroyed when an employee quits the job. ↑
4. E.g. Darby, M. et al. (1986). ↑
5. E.g. Hall, R. (2005). ↑
6. The labour market flows calculated from the monthly data of the Ministry of Economic Affairs and Employment are similar to the flows calculated from the quarterly data. Equally, the results for structural unemployment are similar to results based on the quarterly data if the unobserved components model uses labour market flows calculated from monthly data and data on the monthly trend indicator of real output. ↑
7. Kotamäki, M. (2016). ↑
8. Equilibrium unemployment is calculated using the equation Structural unemployment can in turn be derived based on the trends of transition probabilities. ↑
9. The unemployment rate in Chart 3 is the ratio of unemployed jobseekers (data from Ministry of Economic Affairs and Employment) and the labour force, which consists of Ministry of Economic Affairs and Employment data on the number of unemployed and Statistics Finland data on number of employed. ↑
10. Non-accelerating wage rate of unemployment. ↑

Keywords

employment, labour, labour market flows, structural unemployment, unemployment