Theoretical and Applied Economics
Volume XVIII (2011), No. 2(555), pp. 181-194

The Natural Rate of Unemployment and its Implications for Economic Policy*

Monica DOBRESCU
Bucharest Academy of Economic Studies
monicam_dobrescu@yahoo.com
Claudia PAICU
Bucharest Academy of Economic Studies
claudiapaicu@yahoo.com
Silvia IACOB
Bucharest Academy of Economic Studies
popescusilviaelena@yahoo.com

Abstract. *The analysis of the inflation-unemployment tradeoff has undergone several stages during the post-war era. The first was marked by the acceptance of A.W. Phillips' 1957 hypothesis and the subsequent Phillips curve. The next stage – marked by Friedman's contributions – revealed a vertical long-run Phillips curve and introduced the natural rate of unemployment, designating that level of unemployment consistent with stable inflation. This paper explores the theoretical and empirical implications that have emerged since the introduction of the natural rate concept. At the theoretical level, we find that, far from questioning its existence, the theoretical debates revolve around two main questions: Can we actually determine the precise level of the natural rate and what are the appropriate techniques? and How does the natural rate change over time and what are the factors that influence it? Empirical knowledge, on the other hand, lags behind. Despite numerous empirical studies, economists are a long way from an appropriate quantitative understanding of the determinants and variability of the natural rate, either across time or across countries.*

Keywords: natural rate of unemployment; vertical long-run Phillips curve; expectations-adjusted Phillips curve.

JEL Codes: E24, E31.
REL Codes: 8G, 8I.

* Ideas in this article were presented at the Symposium „The global crisis and reconstruction of economics?", 5-6 November 2010, Faculty of Economics, Bucharest Academy of Economic Studies.

Up to the beginning of the seventies, the vast majority of research in mainstream economics was focused upon the essential role of the Phillips curve in explaining business fluctuations. Following an extensive empirical study of the growth rate of nominal wages and the growth of the unemployment rate, in 1958, A.W. Phillips had concluded that there existed a negative relation between the two variables (Phillips, 1958). Based on this study, subsequent research extended the analysis: economists examined the existence of a correlation between changes in the inflation rate and changes in the gross national product and discovered a similar negative relationship between the two variables. The most important consequence of these findings was their immediate implication for economic policy: the stable relationship between inflation and output suggested that monetary authorities would be able to reduce the unemployment rate by accepting a higher inflation rate; similarly, the authorities can reduce the inflation rate at the cost of higher unemployment.

The existence of a stable relationship between inflation and unemployment was easily accepted by economists, for it filled a gap in Keynes' theoretical construct and seemed to be the equation that Keynes himself said was missing. In addition, it offered a very useful policy tool, which was accepted as long as it was in line with empirical evidence. Later on, economists noticed that it was hard to maintain this hypothesis in its simple initial form and that higher rates of inflation were required in order to maintain acceptable levels of unemployment.

In reaction to the emergence of stagflation, numerous attempts to fix or correct the hypothesis were made, particularly by taking into account "special" factors, but none of these versions were confirmed by empirical evidence. A more radical revision was needed and this resulted in the incorporation of economic agents' anticipations, which focused on the importance of surprises, namely the differences between the expected and the real levels of various variables. It put forward once again the importance of the distinction between real and nominal variables, by demonstrating the existence of a natural rate of unemployment, always determined by real factors. This rate tends to occur when anticipations coincide with real evolutions in the economy. On the other hand, unanticipated changes in the nominal aggregate demand and in the inflation rate trigger systematic misperceptions among both employers and employees, which initially will determine the deviation of the unemployment rate from its natural level. Still, these deviations are transitory, even though a long period may at times be required to eliminate them, as the adjustment of agents' anticipations occurs.

This apparent consensus was, however, very short-lived: in 1968, Milton Friedman and Edmund Phelps formulated solid theoretical arguments against

such policy recommendations (Friedman, 1968, Phelps, 1968). Starting from microeconomic foundations, the two economists argued that this empirical relationship between inflation and unemployment would collapse if the authorities attempted to exploit it. First of all, they argued that, according to theoretical principles, an artificially-sustained inflation could not have any effect on output and unemployment, because people cared about the real – and not the nominal – variables in the economy. Thus, according to Friedman, excess demand or excess supply on the labour market does not depend on the nominal wage, but on the real wage, because economic agents are rational and they tend to adjust the wages in line with the anticipated price increase. As a consequence, the real issue underlying the Phillips curve concerns the identification of a correlation between the nominal wages growth rate – adjusted with the anticipated inflation rate – on the one hand, and the unemployment rate, on the other. Founded on a quite different approach, Phelps' analysis reaches a similar conclusion: the author constructs models of the labour market, where people strive to find the most advantageous terms of employment. Depending on the information costs and other restrictions on these markets, a certain time passes between leaving a job and finding a new one, which engenders an inherent frictional unemployment. Job seekers will accept that nominal wage which encompasses the anticipations of the price level – in real terms. If the workers' anticipations underestimate the inflation rate, then they will be inclined either to supply more labour – in Freidman's approach – or to reduce the search time – according to Phelps. In essence, the explanation is the same: by anticipating an inflation rate beneath the real rate, economic agents actually overestimate the real wage. At the policy level, this reduction in unemployment is made possible by means of adopting an expansionist monetary policy; in the short run, such policy measures can indeed be effective: by determining an unexpected rise in inflation above the level anticipated by agents, they will lead to a temporary decrease in unemployment. In this manner, over the short term, agents can be "fooled" by the monetary illusion, but only temporarily; economic agents are not blind however, and therefore they will eventually revise their expectations to accommodate the unexpected inflation. As information is disseminated and agents' perceptions are corrected, the gap between the real inflation rate and the anticipated rate will gradually diminish, and unemployment will return to its previous, higher level. Hence follows that monetary authorities will only manage to reduce unemployment temporarily; moreover, they will be confronted with ever higher inflation rates, which will be more difficult and costly to control. In other words, the negative relationship postulated by the Phillips curve is only valid in the short run; over the medium and long term, this relationship does not hold, meaning that the long-run

Phillips curve is vertical. The subsequent economic events came to confirm the theories of Friedman and Phelps: during the seventies, inflation rose constantly, without a permanent reduction in unemployment. The central message of this line of reasoning is pragmatic in nature and has an immediate practical corollary: monetary authorities will never be able to influence unemployment over the medium and long term, because the unemployment rate tends towards a so-called *natural level*, a term introduced by Milton Friedman in 1968 in his Presidential Address to the American Economic Association.

The natural rate assumption incorporates the initial Phillips curve as a particular case, offering interpretations for a much larger scale of economic phenomena, and in particular, stagflation. Still, there exists one phenomenon that this assumption cannot account for, namely the association of higher inflation and higher unemployment. This association may reflect the joint impact of certain events – such as the oil crises – or of certain independent forces that determined a rising trend for both inflation and unemployment.

A feasible explanation refers to a transition period that implies the adaptation of attitudes and institutions to the new monetary framework. Not only is inflation higher, but it is also highly volatile and is accompanied by enhanced state intervention in the price setting process. The increased volatility together with the deviation of relative prices from market prices render the economic system less efficient, introduce perturbations on all markets and are probably the cause of rising unemployment.

Friedman's model assumes that, in the long-run, labour markets clear (i.e. supply of and demand for labour are equal at a single wage rate and level of employment). The actual level of the natural rate itself is determined by the inherent characteristics of the labour market, such as any market imperfections or informational problems. In Friedman's own words, the natural rate of unemployment designates *"the level which would be ground out by the Walrasian system of general equilibrium equations, provided that there are imbedded in them the actual structural characteristics of the labor and commodity markets, including market imperfections, stochastic variability in demands and supplies, the cost of gathering information about job vacancies and labor availabilities, the costs of mobility and so on."* Very importantly, in Friedman's approach, labour market equilibrium and the natural rate do not depend on the growth rate of the money supply, but on the labour supply and labour demand, the optimal search times, as well as other microeconomic considerations.

Over the last four decades a lot of research has attempted to formalize Friedman's definition and to identify the determinants of the natural rate of unemployment, and it is only fair to say that progress in this field has been

considerable. Starting from the natural rate hypothesis – as initially defined by Friedman – macroeconomic research has further extended the analyses, so that today economists speak of the existence and estimation of NAIRU; the acronym NAIRU stands for Non-Accelerating Inflation Rate of Unemployment and reflects that level of unemployment consistent with stable inflation. Note, however, that there are certain differences between the original concept of Friedman and the NAIRU.

The NAIRU hypothesis is based on the New Keynesian imperfect competition model of labour markets. This model assumes that both labour and product markets are imperfectly competitive, due to certain market imperfections – such as trade unions and oligopolistic firms. Labour (through the process of collective bargaining) can therefore demand a *bargained real wage*, whilst firms can set a *price-determined real wage* at which they can earn supernormal profits. The firms' *price-determined real wage* consists of the actual value of output (as determined by the marginal product of labour) minus a profit per worker for the firm.

In the NAIRU model, labour's *bargained real wage* increases with the level of employment. This is because increased employment means that there are fewer unemployed workers looking for jobs, so labour markets become tighter and the bargaining power of labour increases. Unemployment disciplines the workforce. The *price-determined real wage* remains fixed at a set wage rate, on the other hand. This is because it represents the claims of firms on output per worker. The wage rate and level of employment at which the *bargained real wage* and the *price-determined real wage* are equal is known as the NAIRU. This is the wage rate and level of employment at which the competing claims of labour (the workers) and capital (the firms) are satisfied.

A solid theoretical framework has emerged since the natural rate was first introduced and this framework is focused upon two central ideas; first, the labour market is a market with a high level of traffic, with large flows of workers who have either lost their jobs or are looking for better ones. This assumption naturally implies the existence of some frictional unemployment; second, the nature of the relations between workers and firms leads to a wage setting process which often departs from competitive wage setting. And this, in turn, results in a level of unemployment which differs from the efficient frictional level.

As to the theoretical issues surrounding the natural rate hypothesis, nowadays economists do not even question the existence of such a rate; instead the theoretical debates revolve around two main questions: Can we actually determine the precise level of the natural rate and what are the appropriate techniques for an accurate estimation? and How does the natural rate change

over time and what are the factors that influence it? These are crucial issues related to the practical importance of the natural rate: if there exists such a natural rate, but we cannot measure it precisely, then the concept is of no use for policy purposes, but remains a mere theoretical notion; furthermore, if the natural rate is not constant, but changes over time under the influence of certain factors, then we must be able to estimate it effectively at all times, in order to use it in the formulation of economic policy.

Empirical knowledge, on the other hand, sadly lags behind. Despite numerous empirical studies, economists are a long way from an appropriate quantitative understanding of the determinants and variability of the natural rate, either across time or across countries. Several potential factors have been put forward, but economists are still groping for precise answers. However, a major barrier in this direction is the poor integration of the empirical works of labour economists and the theoretical research of macroeconomists, and it is our opinion that such joint work should be encouraged.

Moreover, this slow empirical progress and the lack of coordination with the theoretical research have important consequences for the construction of economic policy; indeed, current analyses are deficient in assessing the policy implications of the NAIRU hypothesis, thus hindering its incorporation into economic policy. Therefore, despite the considerable theoretical progress, public authorities have not significantly changed the way they analyze the economy. The IS-LM model, accompanied by the so-called modern version of the Phillips curve – adjusted to incorporate the rational expectations hypothesis – is still the best framework for the formulation and implementation of economic policy. Governments are reluctant to incorporate the theoretical evolutions of the past thirty years and continue to use very complex macroeconomic models for analysis and forecasting.

Even today, many new Keynesians continue to regard the Phillips curve as an intact structural relationship, once the econometric models of the ’60s were adjusted to incorporate supply-shocks together with a vertical Phillips curve. At that point, the theoretical framework seemed complete, and this self-sufficient approach deterred further research, with one exception: regularly testing the stability of the Phillips curve relationship. This, in turn, was determined by the widely-held view that the essential feature of the Phillips curve after World War Two was its stability.

The new classical economists, on the other hand, reject the possibility of postulating a theoretical relationship between inflation and unemployment, thus questioning the Phillips curve and the natural rate hypothesis. In 1978, Robert E. Lucas, Jr. and Thomas Sargent stated that the Phillips curve was but “an econometric failure on a grand scale”, because, over the long term, the negative

correlation between inflation and unemployment used in the macroeconometric models was strongly contradicted by the positive correlation supported by the data (Lucas, Sargent, 1978). Some of these economists turned their attention towards other more pressing issues, because they believed that the inflationary process in the US was stable and the models constructed in the early ’80s functioned so well, that there were no more “mysteries” to solve. Other macroeconomists reject the natural rate hypothesis because they see it as an unproductive, failed line of research. According to Robert J. Gordon, numerous neoclassical economists stopped paying attention to the empirical research on the inflation – unemployment tradeoff, thus ignoring the new generation of Phillips curves – as of the late `80s, the new estimates incorporated both a vertical long-run Phillips curve, and supply shocks (Gordon, 1997). These economists turned their attention to constructing theories on fluctuations of the real aggregate output; disappointingly, not only did these models fail to explain the inflation mechanism, they were not even focused on this mechanism.

In his Nobel Prize lecture, Friedman stated that the analysis of the inflation-unemployment tradeoff had undergone two stages in the post-war period and was then preparing to enter a third stage. The first stage was marked by the acceptance of A.W. Phillips’ hypothesis, according to which there existed a stable negative relationship between the unemployment level and the rate of wage changes.

By using a simplified model to illustrate the failure of the Phillips curve, Friedman concludes that what really matters is not inflation itself, but rather *unanticipated inflation.* There exists, though, a natural rate of unemployment (corresponding to the second stage of research) which is consistent with the real variables in the economy and with the correct perceptions of economic agents. The unemployment rate can be maintained below this level only by means of accelerating inflation; and, above this level, by means of accelerating deflation. This natural rate of unemployment is not a numerical constant, but depends on real – rather than monetary factors – such as labour market efficiency, competition and monopolies, barriers or incentives to engage in certain occupations” (Friedman, 1997).

The natural rate hypothesis – or the anticipation adjusted Phillips curve, as it is sometimes called in the economic literature – is now widely accepted among economists, although not unanimously: some economists still cling to the initial model of the Phillips curve; other macroeconomists acknowledge the difference between the short-run and the long-run Phillips curve, but continue to consider the latter negative; finally, some researchers substitute the stable relationship between the acceleration of inflation and the unemployment rate by a relationship between the inflation rate and the unemployment rate. A major

part of research is focused upon the exploration of various aspects of this second stage – such as the dynamics of the process, expectations formation or the proper type of economic policy.

And even though the second stage is far from being fully explored, the functioning of the economy has triggered the shift to a new stage. During recent years, the rising rates of inflation have been accompanied by higher – and not lower – unemployment, particularly regarding long periods of time. A simple econometric regression is sufficient to demonstrate the fact that, for these periods, the Phillips curve is positive, and not vertical. The third stage is centered upon the theoretical integration and explanation of this phenomenon. In Friedman's opinion, such an undertaking requires the integration of political variables into economic research as endogenous variables, determined by economic events. And whereas the second stage bears the mark of two major theoretical achievements – those of George Stigler and Gary Becker – the third is likely to be influenced by the application of economic analysis to political behaviour, pioneered by James Buchanan, Gordon Tullock as well as Stigler and Becker.

Friedman also suggested a possible explanation for the phenomenon of stagflation: just as the natural rate hypothesis explains the existence of a negative short-run Phillips curve as a temporary phenomenon which tends to vanish as agents adjust their anticipations to the new economic realities, a positive long-run Phillips curve may also occur as a transition phenomenon which will vanish as agents adjust both their anticipations and their institutional and political arrangements to the new reality. In other words, there is no question about the existence and validity of the NAIRU: the positive Phillips curve observed is determined by a series of economic distortions that can be eliminated through appropriate economic policies.

Moreover, we are now aware that the natural rate has increased in the US due to two major reasons: firstly, women, teenagers and part-time workers represent a growing fraction of the total labour force – due to their higher mobility regarding both market entrance/exit conditions and changing their workplace, these groups have higher unemployment rates; secondly, unemployment benefits and other forms of assistance are larger in volume, are granted for longer periods and are available to more categories of workers. Recently unemployed workers are thus confronted with less pressure to find a new job; in addition, they have the tendency to wait longer and to be more selective in choosing a new job.

The *natural rate* supporters argue in favour of its theoretical and practical utility, based on strong arguments. First of all, these economists claim that NAIRU is a very useful analytical device for understanding the mechanism and

causes of inflation; moreover, at the empirical level, NAIRU represents the basis for inflation forecasting. In the event that the unemployment rate is below its natural level, then the inflation rate rises, and vice versa. From a theoretical point of view, NAIRU captures the way the economy behaves outside equilibrium. Thus, when the unemployment rate is below the NAIRU, the real wages expected by the employees are above those that firms are willing to pay at the current or anticipated price level. This inconsistency is resolved through an inflationary wage-price spiral, in which workers do not get the real wages they expect and firms do no get the prices they desire. As a result, inflation will be above the anticipated level and this will translate into an inflation rate increase, in the attempt to correct the imbalance. Equilibrium – defined as a stable inflation rate which is equal to its anticipated level – will only be restored when the unemployment rate rises to its natural level. In other words, the natural rate hypothesis imagines the inflation rate changes as a labour market phenomenon; moreover, the magnitude of this phenomenon can be estimated by means of an indicator which reveals the amplitude of labour market imbalances: the unemployment rate.

According to *Joseph Stiglitz*, in assessing the theoretical and practical utility of the natural rate, economic analysis resorts to three major criteria: first of all, economists need to determine whether the deviation of the unemployment rate from its natural level provides a realistic and coherent method for forecasting inflation rate variations (Stiglitz, 1997). But since this empirical question is not sufficient to sustain the NAIRU hypothesis, there emerges a second criterion: the prospect of finding a theoretical explanation for the variation of the NAIRU over time. This criterion is of primary practical importance, because in correcting and anticipating economic dysfunctions, public authorities need to fully understand the variables involved in forecasting. And since economists are yet a long way from such an understanding, a third criterion comes forward: the possibility of using the NAIRU as a framework for formulating and evaluating economic policy. In analyzing this criterion, we must not overlook the fact that both the exact level and the variation of the NAIRU are still surrounded by uncertainty. Consequently, first of all we need to assess whether the natural rate hypothesis is pertinent and consistent enough to provide an answer to the issue of ensuring economic growth in an uncertain environment, while maintaining stable prices.

The empirical success of the Phillips curve

In what regards the first criterion, the empirical data seems to support the assumption that unemployment is an accurate indicator of the variations in the

inflation rate. Starting from the ’60s, for the American economy, the empirical data point out that inflation rose whenever unemployment fell below 5%, and decreased whenever unemployment exceeded 7%. Apart from identifying a feasible empirical regularity, the data suggest a possible estimation of the NAIRU, between 5-7%, after 1960. To the extent that we accept empirical evidence as a satisfactory argument, these results confirm the fact that unemployment has predictive powers in what regards the inflation rate variations. However, this negative relationship cannot by itself prove the utility of the NAIRU and requires further quantitative estimations of the variations in the two variables. In this respect, the empirical tests undertaken by the Council of Economic Advisors in the US revealed that maintaining the unemployment rate one percentage point below the NAIRU leads to a 0.3-0.6% rise in the inflation rate, which is significant enough for the formulation of economic policy. Moreover, the tests showed that at least 20% of the inflation rate variations are attributable to the level and variations of the unemployment rate. These relationships are extremely relevant for practical purposes: they point out that the inflation mechanism and economic policy measures are much more complex than a mere direct relationship between the NAIRU and the inflation rate.

Changes in the natural rate of unemployment

The second criterion for evaluating the utility of the NAIRU aims to account for its variation across time, to possibly forecast this variation, and even to formulate policies that can influence the NAIRU. When Friedman first introduced the natural rate concept, he presented it as an invariable constant; however, three decades later there seems to be an apparent consensus among macroeconomists: to the extent that there exists such a natural rate, then this rate definitely changes over time.

This assumption is firmly supported by the data available for the US economy in the `90s: in the beginning of this interval, the estimates of the NAIRU most commonly varied between 6.0-6.2%. Had this level remained constant, then the average unemployment rate for 1994-1996 – of 5.6%, below the NAIRU –, should have determined a rise in inflation. This implication was contradicted by the available data, which revealed an inflation decrease from 2.9% to 2.6% during the above mentioned period. For the NAIRU supporters, the explanation lies in the econometric research findings: the natural rate must have fallen. Thus the CEA research points out that the natural rate has decreased by 1.5% as compared to its peak in the early ’80s. Still, the uncertainty of these estimations – in what regards both the accuracy of the model and the standard errors – is rather high.

The subsequent economic literature has identified three major causes for this decline in the NAIRU: the demographic changes in the labour force structure, better synchronization between productivity growth and employees' wage expectations and, finally, a general rise in competitiveness both on the goods and the labour market.

Demographic changes in the labour force structure

The first underlying factor – demographic changes – is the easiest to account for and, at the same time, is strongly rooted in empirical evidence. The basic assumption is that each demographic group has its own natural rate of unemployment – which does not change over time, but remains constant. Moreover, this rate is higher for the young than for the middle-aged, and is also higher for women than for men. From such a perspective, the NAIRU variations are due to alterations in the share of each labour group within the labour force; however, we must take into account that the natural rate is influenced by all the factors that affect the structure and the volume of the labour force. If we accept the assumption that demographic changes affect the natural rate in a similar fashion as they affect the real unemployment rate, then approximately one third of the 1.5% decrease in the natural rate can be accounted for by these changes. The most important demographic development in recent years is the aging of the "baby boomers" generation – so that the US is enjoying a more mature labour force, in which the groups with lower unemployment rates are prevalent.

Increased productivity and higher wage expectations

In what concerns the second underlying factor, neither the productivity level, nor its growth rate has an impact on the unemployment rate over the long term; this is obvious during the 20th century, when unemployment remained relatively constant, despite massive productivity growth and large fluctuations in the productivity growth rate. In the short run though, changes in the productivity growth rate can have a temporary effect in the natural rate of unemployment. The basic assumption behind this assertion is of a psychological nature: the workers' demand for higher real wages depends on their previous experience and is probably due to the fact that people get used to a certain improvement in the living standards. Thus, even when the productivity growth rate declines, workers will still demand higher real wages – based on their previous experience – which will result in higher inflation and a corresponding higher unemployment rate to preserve equilibrium. However, this increase in the natural rate is temporary, either because the productivity shock itself is temporary, or because workers will revise their wage aspirations in the event of a permanent decrease of the productivity growth rate. Anyway,

in both cases, NAIRU will return to its previous level over the longer term; this is best illustrated by the NAIRU increase during the ’70s and ’80s, in line with the fall in the productivity growth rate, followed by its decrease in the ’90s.

Increased competitiveness of the product and labour markets

The third factor – increased product and labour market productivity – is due to the continuous opening of both national and international markets, as a result of regulatory reforms and trade liberalization agreements. Even in the event that trade accounts for a relatively low share within the national product – like in the US – the existence of potential competitors in the productive sectors is enough to induce wage limitations. The institutional changes experienced on the labour market – such as reduced trade union arrangements – also have a beneficial effect on inflation. And even though quantifying the enhanced competitiveness or the institutional structure of the labour market is extremely difficult, it is reasonably to assume that they can account for the remaining 0.5% of the 1.5% decrease in the NAIRU.

Apart from these three factors, another possible underlying cause is hysteresis. The assumption that sustained high unemployment can lead to a gradual increase in the NAIRU is probably more popular in the European context. The explanation behind this reasoning is that high persistent unemployment diminishes both the working skills and the searching abilities of the unemployed. At the same time, the working labour force desires to maintain the current wages, which deters the increase in the employment rate. For the US economy, the available data does not seem to support this theory. However, if the hysteresis assumption is true, then high persistent unemployment might have surprisingly deep consequences, because its leads to an increase in the NAIRU, whereas low unemployment has a beneficial effect, in that it leads to a reduction in the NAIRU.

NAIRU – A framework for formulating and evaluating economic policy

The final criterion in evaluating the opportunity of the NAIRU refers to its utility in the formulation of economic policy, even though the precise determination of its current and future levels is surrounded by uncertainty. From a certain perspective it is difficult to imagine economic policy without the natural rate concept. Suppose there were no clear, systematic relationship between inflation and unemployment: then why don’t public authorities concentrate exclusively on reducing unemployment, while ignoring inflation? The most feasible answer lies in the authorities’ belief – or rather conviction – that modifying the level of economic activity does indeed have an impact on the inflation rate.

In deciding whether economic policies should be focused on targeting the natural rate, we must first determine the possible consequences of founding such policies on incorrect estimations of the NAIRU. In this respect, numerous researchers claim that if the unemployment rate decreases slightly, then, in turn, inflation is expected to rise only slightly. This opinion contrasts another frequent assertion – rather popular within the non-academic environments – that the NAIRU is like a chasm: only a slight decrease of the unemployment rate below its natural level is enough to generate a rapid inflationary spiral. The empirical evidence, however, seems to contradict the latter assumption: the available data show that by maintaining the unemployment rate 1 percentage point below the NAIRU for one year, inflation will only increase by 0.3-0.6%. This observation contradicts the bleak accelerationist thesis and demonstrates that the magnitude of the inflation rise does not increase even if the unemployment rate remains below the NAIRU for longer periods.

Another interesting aspect related to practical issues is whether economic policy can influence the natural rate: the empirical evidence shows that the type of monetary policy has an impact on the natural rate. Thus, countries which haven't followed an expansionist monetary policy during the recessions in the early '80s experienced higher NAIRU increases than countries that followed such a policy. This empirical observation can be regarded as a challenge to the standard theory (Ball, 1997). Other authors (Mankiw, 1999) accept this causal relationship, but believe that it works the other way round. In other words, it is the estimates and the forecasts of the natural rate that influence the monetary policy of the central bank. Thus, when the NAIRU decreases, the central bank enjoys more freedom to follow an expansionary monetary policy through measures destined to increase the money supply and decrease the interest rate. Similarly, when the NAIRU increases, the central bank is forced to stick to tighter rules to control inflation. According to this line of reasoning, countries that experienced larger NAIRU increases in the early `80s were forced to follow non-expansionary policies. This appears to be the standard approach to monetary policy in the US during recent years. To the extent that we accept the NAIRU hypothesis, Mankiw's opinion seems more pertinent, because it accounts for the utility of the concept – that of orienting authorities' monetary policy.

Despite the controversies and the uncertainty surrounding the NAIRU, there is no denying that it occupies an important place in business cycle research. At least, from an empirical point of view, the aggregate demand changes – such as those induced by economic policies – seem to affect inflation and unemployment in opposite directions, at least over the short term. This is the very assumption that lies behind the natural rate concept. On the other hand, the practical use of the concept is a much more sensitive issue: first of all, the

NAIRU is very difficult to measure, because it changes over time, and secondly, the economy experiences various types of shocks which influence inflation and unemployment in different ways.

As to the variation of the natural rate over time, there have emerged numerous explanations, among which the demographic factor seems to play a central role. However, the available data are not able to help us establish which of these explanations is correct. And even though recent research has advanced considerably, a lot of issues are extremely controversial and uncertain and need further analysis.

References

Ball, L., (1997). *Disinflation and the NAIRU*, *Reducing Inflation: Motivation and Strategy,* Christina D. Romer and David H. Romer (eds.), University of Chicago Press, Chicago

Ball, L., Mankiw, N.G., Romer, D., „The New Keynesian Economics and the Output-Inflation Trade-off", *Brookings Papers on Economic Activity*, no.I, 1988

Blanchard, O.J., „What Do We Know About Macroeconomics that Fisher and Wicksell Did Not?", *NBER Working Paper,* no.7550, febr. 2000

Blanchard, O.J., Lawrence St.F., „Hysteresis and the European Unemployment Problem", in Summers - *NBER Macroeconomics Annual*, 1986, MIT Press

Lucas, R.E. Jr, Sargent, T., (1978). *After Keynesian Macroeconomics, în After the Phillips Curve: Persistence of High Inflation and High Unemployment*, Federal Reserve Bank of Boston, Boston

Friedman, M., „The Role of Monetary Policy", *American Economic Review*, 58, 1968, pp. 307-308

Friedman, M., „Nobel Lecture: Inflation and Unemployment", *Journal of Political Eonomy*, vol. 85, no. 3, 1977

Gordon, R.J., „The Time-Varying NAIRU and its Implications for Economic Policy", *Journal of Economic Perspectives*, vol.11, nr.1, Winter 1997, pp.11-32

Gordon, R.J., (1998) „Foundations of the Goldilocks Economy: Supply Shocks and the Time-Varying NAIRU", *BPEA*, 2, 1998

Mankiw, N., G., Nordhaus W., „Comments and Discussion", *Brookings Papers on Economic Activity*, nr. 2, 1999

Mankiw, N.G., „A Quick Refresher Course in Macroeconomics", *Journal of Economic Literature*, vol. 28, December 1990

Phelps, E., „Money-Wage Dynamics and Labor Market Equilibrum", *Journal of Political Economy*, 76, 1968, pp. 678-711

Phillips, A.W., „The Relation between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom 1861-1957", *Econometrica*, 1958, pp. 283-299

Stiglitz, J.E., „Reflections on the Natural Rate Hypothesis", *Journal of Economic Perspectives*, vol.11, no. 1, winter 1997, pp. 3-10

Tarţa, M., „Noi fundamente teoretice ale politicilor economice", *Oeconomica*, Societatea Română de Economie, nr. 4, 2004