

POTENTIAL OUTPUT IN THE CZECH REPUBLIC: A PRODUCTION FUNCTION APPROACH*

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Abstract:

This paper deals with the Czech economy supply side performance from the macroeconomic point of view. In order to evaluate the supply side behaviour we calculate the potential output dynamic path and contribution of its particular determinants using the production function method. The results show that the potential output growth was rather slow around 2 per cent. This implies that e. g. even 3 per cent growth can cause macroeconomic imbalances. Increase of the non-accelerating-inflation-rate of unemployment (NAIRU), weak growth of the capital stock and weak growth of total factor productivity appear to be the reasons for the constrained ability of the Czech economy to grow steadily and converge to EU level.

Keywords: potential output, production function, NAIRU, capital stock, total factor productivity

JEL Classification: O47, E23

1. Introduction

The analysis of the supply side allows to detect the sources of long-run economic growth and possible restrictive factors that limit the growth. The basic starting point to evaluate the functioning of supply side is the macroeconomic one. From this point of view the relevant variables are the potential output and its determinants.

Knowledge of the potential output and position of the economy in business cycle is crucial for decisions of all agents in economy. However, the main question of the potential output is connected with the ability of the economy to grow steadily at the level sufficient for convergence towards developed economics. Does really the Czech economy converge? To put it differently, does potential output grow more rapidly than one of the EU or can we identify limiting factors for the potential output growth on the contrary?

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However, the main interest is not connected merely with the level of the potential output *per se* but also with its past dynamic path. Using the production function approach to calculate the potential output we are able to distinguish different potential output growth determinants. Their identification could indicate whether the particular parts of the economy work quite well or if there are any constraints due to the existence of any unfavourable behaviour of a particular market. The knowledge of the potential output dynamic path and the contributions of its main determinants enable then to analyse their relative influence on the potential growth. Consequently, we can also analyse possible restrictions of the potential output growth in the future depending on the actual development of its particular determinants.

One of the potential output determinants is the so-called potential employment that is calculated using the labour force and the equilibrium unemployment. Here the dynamic path of the equilibrium unemployment brings us the information about the functioning of the labour market in the economy. For example, the growing equilibrium unemployment can assess the worsening of the labour market behaviour and decrease through this way the perspective economic development, *i.e.* higher potential output growth. Next to it also labour productivity development influences the potential growth.

Other relevant variable is the capital stock. Its changes bring information about the attractiveness of the economy for investment, its efficiency and the ability of the economy to reallocate the resources smoothly. Although the investment is an important factor of the potential output growth its real impact cannot be taken into account separately from the capital productivity growth and the capital depreciation rate. The high growth of the capital stock in the situation of negative growth of its productivity can indicate the slowdown of the potential output growth, as the investment is not productive enough. Also jumps in the capital depreciation rate can signalize the ineffectiveness of past investment that might not be used for their original purpose.

Therefore, not only factor inputs (labour and capital) but also their productivity are crucial for potential output development, which is summarized in the total factor productivity. The low level of the total factor productivity should reflect not only the low level of technical and technological innovations but also a poor aptitude of the economy to allocate the scarce resources into the productive application. The total factor productivity also reflects the investment to human capital. So the low level of the total factor productivity could have the decisive impact on the potential output growth.

All of these possibly arising questions are going to be considered in the following chapters. First, we briefly discuss the equilibrium unemployment estimation in section 2. In section 3 we calculate the potential output dynamic path. Then we analyse particular contributions of different factors to the potential output growth and in section 4 we show hypothetical potential output scenarios depending on the assumption for development of individual factors. Finally, section 5 concludes.

2. The Equilibrium Rate of Unemployment

In this section we discuss the estimation of the equilibrium rate of unemployment that corresponds to a long-term steady state of the whole economy. However, as the *equilibrium* rate of unemployment is determined by the microeconomic structure of labour market its computation is not easy. Therefore we approximate the *equilibrium* rate of unemployment by close concept, *i.e.* by the non-accelerating-inflation-rate of unemployment (NAIRU). NAIRU is the rate of unemployment at which inflation remains constant. Turner *et al.* (2001) shows that the NAIRU converges to *equilibrium* rate of unemployment after being adjusted to all supply and policy influences. Advan-

tage of the NAIRU is that compared to *equilibrium* rate of unemployment it is relatively straightforward to identify empirically. Nevertheless, we do not estimate the NAIRU in this paper. Instead we use and discuss the results of Hurník and Navrátil (2005).

A very important question to be concerned at any point of time is whether the NAIRU remains stable in time or whether it rises or declines from time to time. Facing this question Hurník and Navrátil (2005) use the time-varying NAIRU methodology, following for example, Gordon (1997) or Greenslade *et al.* (2003). This methodology uses Gaussian maximum likelihood methods described, for example, by Hamilton (1994), which is usually used for estimating unobservable variables. Its advantage is that it allows estimating simultaneously the NAIRU and the relationship between inflation and the deviation of the actual unemployment from the NAIRU (the so-called Phillips curve).

The recognition of the NAIRU movements is important as an information source of changes of the labour market structure from macroeconomic point of view. Increase of the NAIRU could signalize the less effective behaviour of the labour market and *vice versa* and movements in the NAIRU can suggest a possible restriction for growth of the potential product stemming from the labour market (see e.g. Gordon, 1997; Elmeskov, 1993; Richardson *et al.*, 2000; Turner *et al.*, 2001; Blanchard, 1999). Similarly NAIRU can provide some indication for labour-market policy.

The model for estimating NAIRU takes the form (1) (see Hurník and Navrátil, 2005, for more in-depth description and discussion of the model form and its prerequisites). In equation (1) p_t^{core} , p_t^{imp} , u_t , u_t^* , z_t denotes the quarterly annualised inflation, quarterly annualised inflation of import prices, actual unemployment rate, time varying NAIRU and real effective exchange rate, respectively:

$$p_t^{core} = \alpha_1 \cdot E_t p_{t+1}^{core} + \alpha_2 \cdot p_{t-1}^{core} + (1 - \alpha_1 - \alpha_2) \cdot p_t^{imp} + \beta \cdot (u_{t-1} - u_{t-1}^*) + \gamma \cdot z_{t-1} + e_t \quad (1)$$

Inflation is represented by the core inflation that excludes the main source of the supply shocks, *i.e.* regulated and energy price movements from the headline inflation. In line with Driver *et al.* (2003), Hurník and Navrátil (2005) extend the analysis by incorporating the forward-looking element of inflation expectations into the equation (1). In order to reflect external influences on prices, first having in mind an “indirect” channel *via* real economic activity, Hurník and Navrátil (2005) add in to the model the real exchange rate gap, *i.e.* the deviations of the real exchange rate from its “equilibrium” value.¹⁾ In addition to that channel, there is also a “direct” price channel, as prices of imported goods influence directly the aggregate price index. To capture this effect, the model is extended by import prices inflation. The model form (1) represents the Phillips curve in accordance with the new Keynesian paradigm and can be derived from the microfoundations.²⁾

The use of Gaussian maximum likelihood methods for estimating NAIRU combines inflation equation (1) with equation (2) that describes the explicit path of NAIRU:

$$\begin{aligned} u_t^* &= u_{t-1}^* + \varepsilon_t \\ e_t &\sim N(0, \sigma_e^2); \varepsilon_t \sim N(0, \sigma_\varepsilon^2) \\ \text{cov}(e_j, \varepsilon_k) &= 0 \end{aligned} \quad (2)$$

1) The *equilibrium* real effective exchange rate is simply calculated using the Hodrick-Prescott filter.

2) For the derivation of the new Keynesian Phillips curve see, e.g. Fuhrer and Moore (1995); Christiano, Eichenbaum and Evans (2001); Galí and Gertler (1999) or Calvo (1983).

The error term ε_t in the state equation (2) is expected to be a white noise with standard deviation δ_ε . If $\delta_\varepsilon = 0$, then the NAIRU is constrained to be constant and the estimation is quite simple. But if $\delta_\varepsilon \neq 0$, then the NAIRU is changing over time and estimation is more complicated. Specification (2) implies that NAIRU follows a random walk and changes in NAIRU are driven by δ_ε . The disturbance vectors e_t [see the equation (1)] and ε_t are assumed to be uncorrelated with each other in all time periods.

Table 1 presents the results of estimating the model. The data sample covers the period 1994:Q1 – 2004:Q4. As a measure of unemployment Hurník and Navrátil (2005) use the ILO definition measure of unemployment from the Czech Labour Force Surveys.

Table 1
Results for NAIRU Estimation

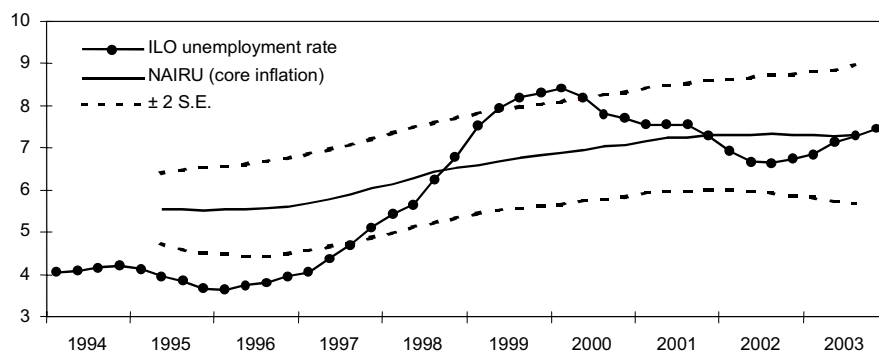
α_1	α_2	β	γ	S.E.
0.486 (4.090)	0.460 (4.344)	-0.629 (-4.451)	0.162 (1.140)	1.782

Note: Coefficients and t -statistic are in brackets.

Figure 1 shows estimation of the time-varying NAIRU with plus/minus two standard error's band to catch uncertainty and the actual unemployment rate. After a period of stability during 1995 – 1996, the Czech NAIRU started increasing, from 5.5 % in 1996 to approximately 7.5 % in 2003.

Besides to Hurník and Navrátil (2005) results there were published another estimates of the NAIRU for the Czech Republic, which we can compare conditionally on using different methodology and data sets. Vašíček and Fukač (2000), as well as Fukač (2003) or Hájek and Bezděk (2001), use registered unemployment. Their results suggest increases in the NAIRU from 3 – 4.5 % in 1996 to 8.5 – 9 % in 2000. Bezděk, Dybczak and Krejdl (2003) adopt the ILO definition of unemployment and show that the NAIRU moved from 4 % in 1994 to 7.5 % in 2002. All estimates at our disposal robustly show the NAIRU growing since 1996.

Figure 1
Unemployment Rate and NAIRU (in %)



Source: Czech Statistical Office and own computation.

In general, the reasons for increasing NAIRU arise from the situation on the labour market. In particular, we should mention labour market regulations, activity of trade unions, increasing minimum wage, the level of social benefits, and the share of labour in GDP. In fact, the critical period in which we observe the rise in the NAIRU starts during the last quarter 1996 and ends in the first quarter 1999. Since then the NAIRU remains roughly stable.

We can argue that the structure of the labour market had changed substantially in the second half of the 1990s, when the new system of social benefits was introduced, together with the new Labour Act. Besides, at the same time, regular minimum wage increases were adopted. All this supports the idea about worsening labour market's performance due to institutional reasons, which is expressed by rising NAIRU. The development in NAIRU thus imply that labour market constraints the potential output growth.

3. Potential Output

The preceding analysis proves that the development of the NAIRU could be the limiting factor. Using the production function approach we will be able to identify also the contribution of others factors, *i.e.* the capital stock growth, total factor productivity and the labour force development. We will also simulate possible impacts of changes of these factors (e.g. because of structural policies) on the growth of potential product.

During the transition the Czech economy experienced several different periods. The first period up to 1997 was affected by high growth of infrastructure investment of which productivity could have been rather slow. Moreover, many investment projects were never used for their initial purpose, as they occurred to be non-realistic. Consequently the real values of investment were to be reassessed to lower level. That effect must have appeared as an increase of the capital amortization in the economy. These both effects could contribute to possible slowdown of the potential output growth during that period. The second period, from the year 1998 up to now, can be characterized as a period of high inflow of the foreign direct investment (FDI). We can expect that the FDI have led to productive part of the economy so they should be conducive in respect to potential output growth. The question is whether this factor could overweight the other possible limits as is, for example, indicated by the growing NAIRU.

There are two papers at our disposal estimating the potential output growth in the Czech Republic. Hájek and Bezděk (2000) estimated that the potential output grew by 1.5 % during 1993 – 1999. However, they use for determining time-varying NAIRU the pure statistical filter (Hodrick-Prescott filter). Next to it Flek *et al.* (2001) using the exponential trend estimated the potential output growth close to 1 % during 1992 – 1999.

3.1 Production Function

Following Giorno *et al.* (1995) we assume the standard neoclassical two factor Cobb-Douglas production function with Harrod neutral technology equation (3a),³⁾ where Y , L , K , and A are output, employment, capital stock, and the level of techno-

³⁾ Because of availability of data we cannot remove government sector and estimate potential output only for business sector.

logy, respectively. This specification is a special case of constant-elasticity-of-substitution production function (CES) with elasticity of substitution equal to 1 (see e.g. Barro and Sala-i-Martin, 1995; Romer, 2001):

$$Y_t = (A_t \cdot L_t)^\alpha \cdot K_t^\beta \quad (3a)$$

There are some usual assumptions about this production function specification used in the empirical literature (see e.g. Barro, Sala-i-Martin 1995, Giorno *et al.* 1995, Scacciavillani and Swagel 1995). First, the positive and diminishing marginal products with respect to each input (L , K) are assumed. This restricts the α and β to the values between 0 and 1. Second, constant returns to scale are assumed. This implies that $\beta = 1 - \alpha$. This assumption can be problematic in respect to reality (see e.g. Barro, 1998) and rather increasing returns could be assumed. The use of increasing returns for the whole economy reflects the existence of specific research and development sector in the economy that operates under strongly increasing returns whereas the rest of the economy operates under constant returns. The research and development sector represents part of the economy that is able to produce the positive spillovers for the rest economy (see Romer, 1990 or Grossman and Helpman, 1991.).

However, we were not able to obtain any significant results to validate the existence of such a specific sector in the Czech economy. So at this stage of research we hold former assumption, *i.e.* the constant returns. Let us bear in mind that the use of constant returns *per se* brings the possible restriction for the economy steady growth.

Third assumption is about markets, where the perfect competition is assumed: in such a case the parameter α corresponds to the share of labour in value added.⁴⁾ We do not constraint α to be constant overtime because we assume the Czech economy is on the path to steady state and thus α is changing over time asymptotically to the steady state value. In this sense we follow Thörnqvist (1936) and α is a moving average over two years.

The level of technology A , *i.e.* total factor productivity, summarizes factors' productivity and cannot be measured directly. We can estimate the so-called gross total factor productivity using the above assumptions and rewriting equation (3a). The level of gross total factor productivity is given by equation (4) and catches whole total productivity regardless if this level is sustainable in the long-term.

$$A_t = \left[\frac{Y_t}{L_t^\alpha \cdot K_t^{1-\alpha}} \right]^{\frac{1}{\alpha}} \quad (4)$$

To calculate the potential output it is further assumed that the gross total factor productivity is comprised of two parts: deterministic productivity, *i.e.* the total factor productivity (A), which should corresponds to the equilibrium productivity, and a stochastic component, which corresponds to the business cycle. We approximate the total factor productivity by gross total factor productivity trend.

Potential output is calculated by combining the measure of the total factor productivity, actual capital stock and the estimate of the potential employment (L'). Potential employment is a level of employment without any additional inflation pressu-

4) If the factor markets are competitive, then the marginal product of each input equals its factor price, so $\partial Y / \partial L = w$ and $\partial Y / \partial K = R$, where w and R are wage rate and rental rate of capital, respectively.

res. The potential employment is thus calculated as equation (5), where L is the labour force.

$$L^* = L \cdot (1 - \text{NAIRU}) \quad (5)$$

If we rewrite equation (3a) to equilibrium levels (total factor productivity and potential employment), we get the equation (3b) catching the potential output determinants:

$$Y_t^* = (A_t^* \cdot L_t^*)^\alpha \cdot K_t^\beta \quad (3b)$$

However, it should be mentioned that this approach assumes simplistic production technology and estimates are sensitive to NAIRU estimation and smoothing techniques for detrending the gross total factor productivity.

3.2 Data

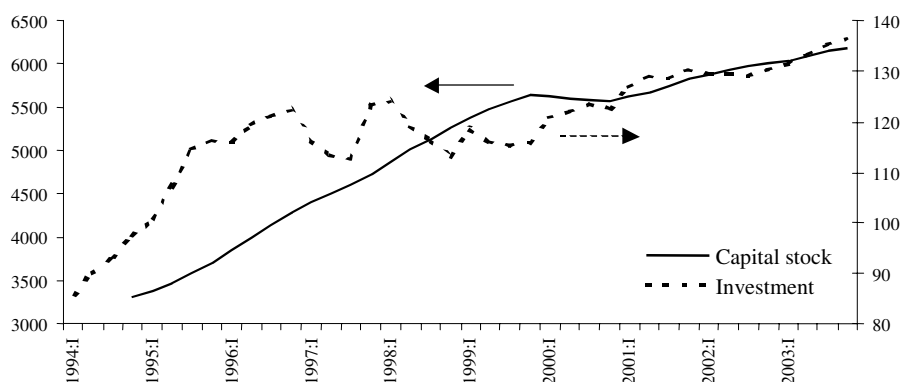
We utilize seasonally adjusted⁵⁾ quarterly GDP (Y) and gross fixed capital formation series (I) at constant prices and GDP (P^Y) and gross fixed capital formation's deflator (P^I) for period 1994 to 2003. As a measure of capital we use the total stock of fixed assets data at the book value (it means the current prices, K^{NOM}). Series is available in yearly frequency (end-of-year values) from 1994 to 2001. We applied some statistical methods to obtain the quarterly time series at constant prices. Firstly, we computed the “residuals”, *i.e.* nominal depreciation of the capital stock (Δ^{NOM}) from the modified capital law of motion equation (6).⁶⁾ This nominal depreciation catches the equipments, which are disabled from production process:

$$K_{t+1}^{NOM} = K_t^{NOM} + P_{t+1}^I \cdot I_{t+1} + \Delta_{t+1}^{NOM} \quad (6)$$

Then we used gross fixed capital formation deflator to get real depreciation of the capital. Subsequently we interpolate it in quarters. For 2002:Q1 – 2003:Q4 we used the standard calibration from empirical literature (see *e.g.* Barro, Sala-i-Mar-

Figure 2

Investment and Capital Stock (constant prices, CZK bill., seasonally adjusted)



Source: Czech Statistical Office and own computation.

5) GDP and gross fixed capital formation series are seasonally adjusted using the Census X12.

6) It is not exactly depreciation of capital stock, because it in addition to the fixed capital consumption embodies also the nominal holdings gains and losses and other changes in the volume of fixed assets.

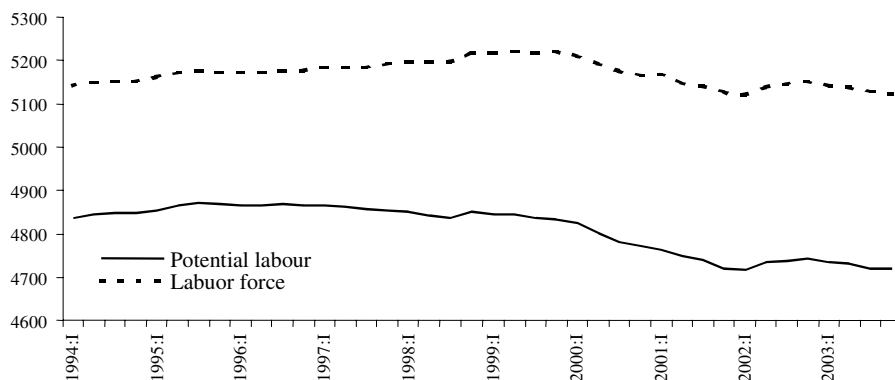
tin, 1995) and set the capital depreciation rate at 6 % of the capital stock.⁷⁾ Using equation (6), quarterly gross fixed investment and capital depreciation at constant prices we get the capital stock at constant prices (see Figure 2).

Figure 2 shows sharp growth of the capital stock till the end of 1998 and the gradual growth slowdown during 1999. The year 2000 can then even be characterized as a year of stagnation in respect to capital stock. The stagnation was caused not only by the decline of the investment activity in previous years but also by the increase of capital depreciation rate. Observing such a capital formation slowdown one could expect similar pattern also in the case of the potential output growth.

Figure 3 shows other relevant factor, e.g. the potential labour. Data for the labour force are from the Labour Force Survey. The potential labour is computed using the seasonal adjusted labour force and estimates of the NAIRU from previous chapter.

Figure 3

Labour Force and Potential Labour (mill. persons, seasonally adjusted)



Source: Czech Statistical Office and own computation.

We observe the gradual decrease of the potential labour since end of 1996 consistent with the rise of the NAIRU. Increasing NAIRU reduced the labour force, which can be effectively integrated to the production process. It means that the NAIRU movement, *i.e.* the labour market properties, has probably contributed negatively to the potential output growth.

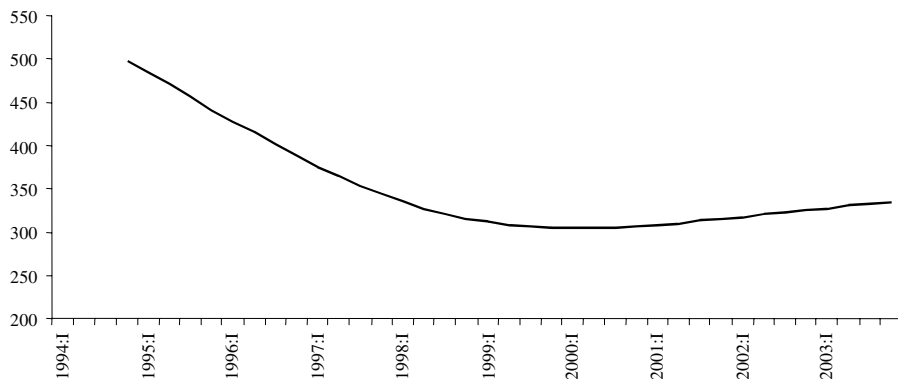
Afterwards, we calculate the gross total factor productivity using equation (4). In order to get the total factor productivity from gross total factor productivity we employ Hodrick-Prescott filter (see Figure 4).

It is evident that the total factor productivity has decreased in the level up to 2000 (our results are similar to Campos and Coricelli, 2002). It implies the negative contribution to the year-on-year potential output growth probably caused by poor allocation of sources (see Table 2). Only after 2000 the total factor productivity had positive influence on the potential output dynamics as it started to grow. Explanation can be the FDI, which has started to bring the results in the shape of new firms and also of restructuring the old ones.

Finally, the variable α is approximated by the labour share under perfect competitive factor markets, thus it is computed as equation (7), where w is the real wage.

7) Some estimates of Czech depreciation rate are in Jaroš (2002) and Lízal (1999). They indicate similar size of the depreciation in spite of large statistical revision of capital until then.

Figure 4
Total Factor Productivity (level)

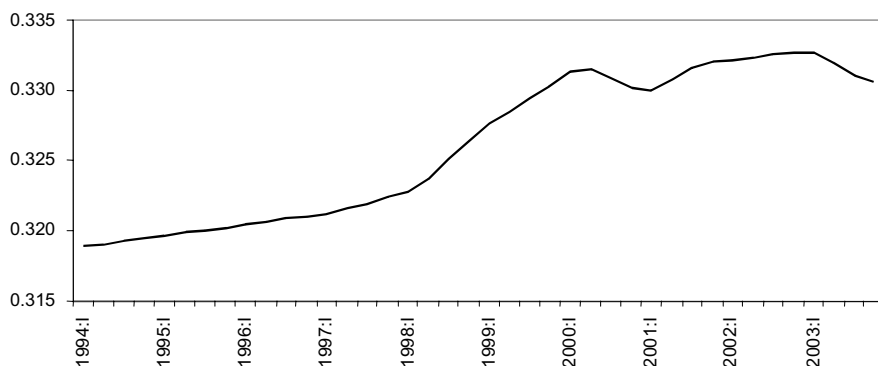


Source: Own computation.

Then we compute two-year moving average following Thörnqvist (1936) (see Figure 5).

$$\alpha = \frac{w_t \cdot L_t}{Y_t} \quad (7)$$

Figure 5
Two-year Moving Average of Labour Share (level)



Source: Own computation.

What the Figure 5 shows is gradual increase in the labour share till the beginning of 2000. Subsequently there is labour share stability. However, the labour share variability is rather small with negligible impact on the potential output growth.

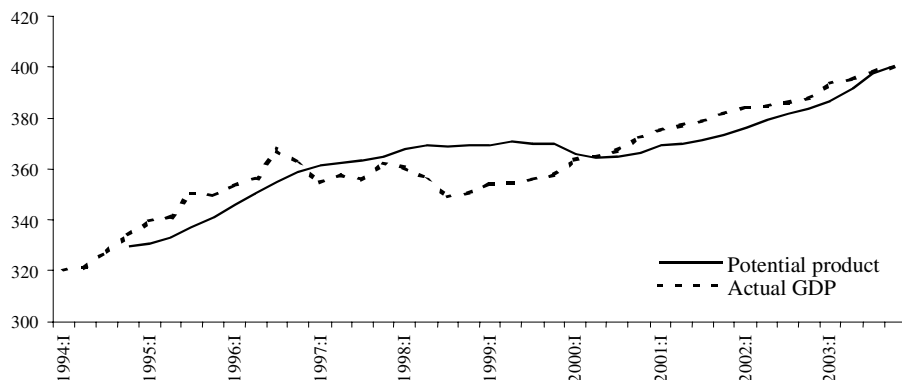
3. 3 Results

Using the equation (3), potential labour, total factor productivity, moving average of labour share and capital stock we calculate the dynamic path of the potential output. In Figure 6 there is the potential output together with the actual output deve-

lopment. In general we observe faster potential output growth till the end of 1996 followed by the deceleration of the growth during the years 1997 – 1999. Approximately during 2000 we can even talk about the stagnation or even the decrease of the potential output. The last period beginning in 2001 is then characterized by a slow recovery of the potential output growth.

Figure 6

Gross Domestic Product and Potential Output (CZK bill.)



Source: Czech Statistical Office.

Table 2 contains the decomposition of the potential output growth that enables us to consider the contribution of the particular determinants to the potential output growth. It shows that in the years 1996 – 1997 the potential output growth was driven by the high growth of the capital stock although the contribution of the total factor productivity was negative (see the decline of the level in Figure 4). The relative stability of the NAIRU and the growth of the labour force ensure also the slightly positive contribution of the potential labour to the potential output growth. The negative contribution of the total factor productivity could signalize irrational behavi-

Table 2

Decomposition of the Potential Output Growth (in %)

	Potential product (yoy)	TFP (yoy)	Labour force (yoy)	NAIRU (level)	Labour share (level)	Capital stock (yoy)
1996	5.04	-11.83	0.05	5.90	32.07	15.03
1997	2.94	-11.81	0.22	6.30	32.18	12.19
1998	1.68	-9.63	0.32	6.80	32.45	11.20
1999	0.29	-5.31	0.32	7.30	32.89	8.89
2000	-1.29	-0.74	-0.61	7.50	32.10	1.41
2001	1.61	2.10	-0.77	7.80	33.11	2.13
2002	2.51	3.13	-1.13	7.90	33.24	4.00
2003	3.57	3.00	-0.13	7.90	33.16	2.84
1996 – 2003	2.04	-3.89	-0.22	7.18	32.65	7.21

Source: Czech Statistical Office and own computation.

our of economic subjects during that period. This coincides with the view of specific behaviour of the state owned banks, the so-called “bank socialism”, by the middle of the 1990s, when the lending did not fully follow economic factors. On the other hand, the huge increase of the capital stock was at least partially caused also due to large infrastructure investment.

During the period from 1997 to 2000 we observe slowdown in the potential output growth caused by several different factors. First, we can see the deceleration of the capital stock growth although the inflow of the FDI started at that period. It is straightforward that the FDI inflow was not able to overweigh the slump in the domestic investment activity. The reason for the capital stock deceleration is not only the decrease of new investment but also really high rate of capital depreciation. This may coincide with the argument of the necessary overrating of assets values in the balance sheets of the enterprises and banks at the end of the so-called “bank socialism” period.

As we have mentioned already, the results for the years 2002 and 2003 are not based on hard data, as the data for the capital stock are still not available. Though we should take the results as being only preliminary. Taking this into account we observe the recovery of the potential output growth from 2002 to the level of 3 %. The contribution of the total factor productivity is positive similarly like the contribution of the capital stock growth. Any conclusion about the NAIRU is ambiguous, as we cannot say whether the NAIRU has stabilized at the new higher level or will grow furthermore in the future.

Although we observe the recovery of the potential output growth the rate of growth remains still quite low. It has direct implication for the ability of the economy to grow without the emergence of imbalances in the economy. In the situation of potential output growth by 2 %, already the actual output growth by 3 % could imply the danger of the economy imbalances. Such result signalizes the constraint for the convergence and the catching up process.

4. Simulation

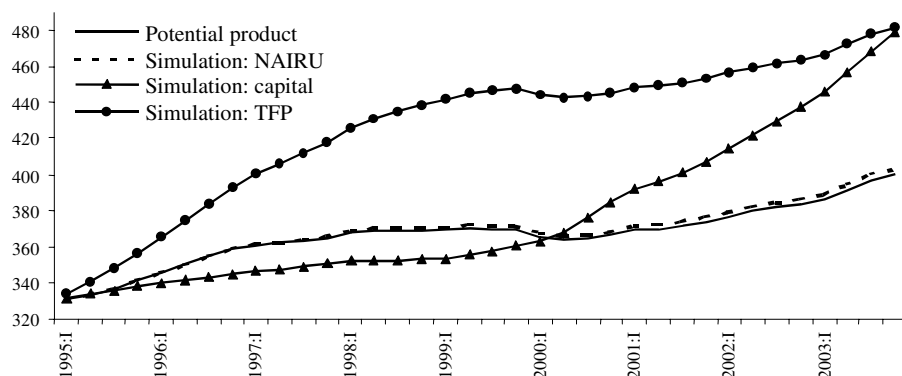
Interesting question is the relative importance of the particular determinants for the potential output growth. For example, it can answer the question which determinant is the most limiting for the potential output growth. In order to address this question we run several simulations using arbitrary assumption for development of the particular determinants. In practice we substitute the artificial values for the relevant variable instead of the observed data in the production function.

We run three simulations (NAIRU, Capital and TFP). Within the NAIRU simulation we assume the stability of the NAIRU at level of 6 %, which was the NAIRU level in 1996. This should indicate possibilities of the structural labour market policies to stimulate the potential output growth. Within the capital simulation we assume the capital stock growth has remained at 10 % level since 1999. This means high investment without any deterioration of the capital depreciation. Finally, within the total factor productivity simulation we assume the stabile growth of the total capital productivity by 1.8 %. It was the average growth of the total factor productivity in Germany between 1963 – 1999 (see Lehman Brothers, 2000). The simulation results are depicted in Figure 7.

In comparison to both other determinants, the impact of the lower NAIRU level on the potential output development seems not be so strong. The potential output at the end of 2003 is higher by 0.7 % in case NAIRU simulation. So the estimated NAIRU increase does not constrain the potential output growth dramatically, but it is worth to mention that the results are conditioned by the used methodology. In

comparison the higher level of the capital stock formation has already quite huge impact on the potential output growth since 2000. At the end of 2003 the difference is around 15 %. The observed drop out of the capital stock formation by the middle of the nineties could constraint the potential output growth quite substantially. Finally, the highest effect should have had the higher growth of the total factor productivity. The simulation implies the potential output to be higher at the end of 2003 by 20 %. The enormous impact of the total factor productivity reflects the crucial role for the ability of the economy to allocate and reallocate the scarce resources to the most productive sector. It reflects all the imperfections in the allocation of scarce resources the economy faced during the 1990s.

Figure 7
Simulations of Potential Output Level (CZK bill.)



Source: Own computation.

However, it should be noted that capital and NAIRU simulations do not assume any impact on productivity. For example, in case of NAIRU, there can be done such policies, which lead to the more skilled labour force. This would be reflected by lower unemployment but also by higher productivity of this "better" labour force. However, our simulation reflects just the decline in the unemployment. Therefore the total factor productivity growth covers all the quality of factors, e.g. in case of the labour its skills and experiences and in case of the capital its technology level.

5. Conclusion

In order to evaluate the performance of the economy supply side from the macroeconomic perspective the possible way is to use the production function approach for calculating the potential output growth. The advantage of this method is the possibility to assess the specific contribution of relevant potential output determinants as each of them contains information about the past and actual stance of the selected part of the economy.

The general result of this method is rather slow potential output growth in the past, around 2 %. In the case when similar growth will continue also in the future, this implies the possible macroeconomic imbalances as early as the actual output growth exceeds 2 %. Compared to the EU's average in the same period (2.3 %), this growth does not imply real convergence, but rather divergence.

Important results come from the analysis of determinants of the potential output growth, as they could serve as an approximation for the economy effectiveness or as an indicator for the future potential output development. So the gradual increase of the NAIRU can mean the worsening of the labour market efficiency and the decline in the capital stock formation decreasing the economy attractiveness for investment. Both mentioned factors are connected in the total factor productivity measure. The simulations showed that the low contribution of the total factor productivity measure was the main reason for the slow potential output growth. If the total factor productivity reflects the effectiveness of the economy in scarce sources allocation, then the situation is getting gradually better in this respect, in particular in comparison to the first half of the nineties. On the other hand there still exists the lag in comparison to past behaviour of more developed countries.

The actual level of potential output determinants can be also used in consideration about potential output movement in the near future. From this point of view we should conclude that there is no convincing proof for the potential output acceleration in the near future.

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