

# ESTIMATES OF THE POTENTIAL GROWTH RATE OF THE SPANISH ECONOMY

The authors of this article are Mario Izquierdo and Javier Jareño of the Directorate General Economics, Statistics and Research.

### **Introduction**

The potential growth of an economy is a key variable in economic analysis and economic policy decision-making, since it is the basic benchmark for assessing the cyclical position of the economy and for conducting a diagnosis of the macroeconomic policy stance. Potential output is defined as that level of production at which the economy can produce using available factors of production and existing technology without generating inflationary pressure. It can therefore be considered to describe how the supply side of an economy is working. Deviations of the observed production levels from the potential output tend to be related to the cyclical state of the economy, which in turn is influenced by demand conditions. This article updates the potential output estimates for the Spanish economy following the methodological changes to the National Accounts in 2005 – mainly concerning the change to base year 2000 – and to the Labour Force Survey (EPA) in the first quarter of the same year.

A basic problem faced in analysis of potential output is that it is an unobservable variable, and estimates of it are subject to a relatively high degree of uncertainty. This article uses a methodology based on the estimation of a production function which is also used by various international institutions such as the OECD and the European Commission (EC). The main advantage of this technique is that it is based on a theoretical approach not found in other purely statistical methodologies which limit themselves to smoothing the original GDP series. The use of a methodology based on a production function also makes it possible to analyse the contribution of the various factors of production to economic growth. That said, its main drawback is that it requires highly diverse information and an appreciable number of simplifying assumptions, which, as mentioned above, means that estimates of potential output are subject to high uncertainty. From this standpoint, to obtain a more complete picture of the potential growth of an economy, it is preferable to analyse the results using averages for sufficiently long time periods and, if possible, to have a range of estimates obtained from the use of different procedures.

The article is organised as follows: Section 2 describes succinctly the methodology used, Section 3 analyses the results obtained in terms of both potential growth and cyclical position, and Section 4 contains some brief final considerations.

### **Brief review of the methodology used**

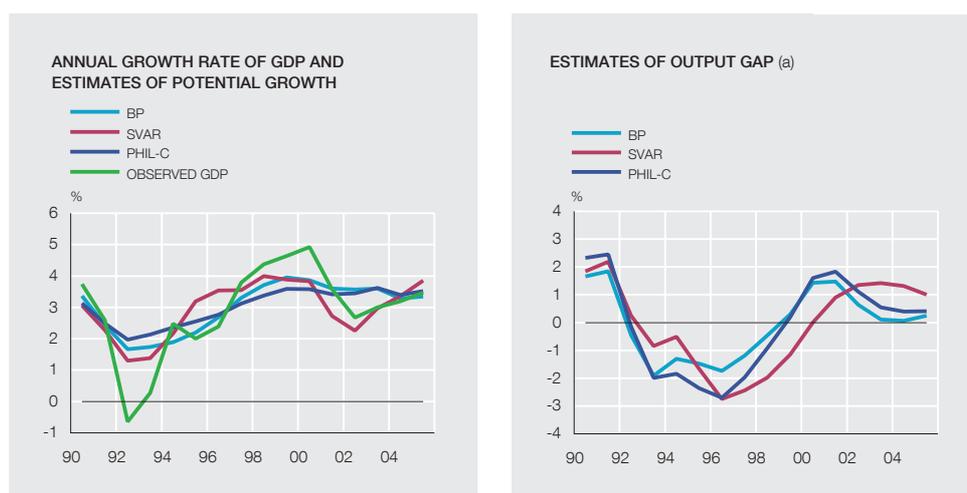
Methodology based on a production function needs to specify a particular form for this function and evaluate the factors of production at their potential values. In the case of the estimates presented in this article, the details of the methodology used can be consulted in Estrada et al. (2004) and the basic form is that of a Cobb-Douglas production function, as follows:

$$Y = AL^\alpha k^{1-\alpha} \text{TFP} \quad [1]$$

where Y denotes GDP, L employment, K the stock of capital, A is a scaling factor and TFP is total factor productivity. We estimate the potential output of the market economy and the potential output of the non-market economy is assumed to be always equal to its observed value, given the difficulty in defining a potential value for the production of this sector. The components of the production function are obtained as explained below<sup>1</sup>.

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1. The labour elasticity of output ( $\alpha$ ) has been assigned the average value of the weight of employed persons' compensation in the nominal value added.



SOURCE: Banco de España

a. Output gap estimated as the percentage by which observed GDP deviates from potential output.

The potential value of the stock of capital is assumed, as customary in this methodology, to be equal to its observed value, given its high inertia. The capital stock of the total market economy was calculated by aggregating the estimated sectoral capital stocks and adding to the result the stock of residential capital. It is worth noting that the stock of public-sector capital does not form part of the total capital stock in this estimate, although its inclusion would not substantially change the results obtained.

Potential employment is estimated by applying an equilibrium unemployment rate (or NAIRU) to a measure of the potential labour force of the economy<sup>2</sup>. Three procedures were used to estimate the NAIRU, namely a band-pass filter (BP), a structural VAR model (SVAR) and a Philips curve<sup>3</sup>; this was done so as to have various alternative measures of the potential employment of the Spanish economy. These measures, estimated using the EPA, are adjusted to express them in terms of the market economy employment estimated in the National Accounts in terms of hours worked.

Finally, total factor productivity (TFP) is evaluated in potential terms from the original series, smoothed to eliminate transitory fluctuations. The original series is in turn estimated as a residual of the production function described in [1] evaluated at the observed values, i.e. as that part of GDP growth not explained by the growth of labour and capital. This way of estimating TFP means that its behaviour may be influenced by the measurement and estimation errors made during the estimation process.

**Results**

ESTIMATES OF POTENTIAL GROWTH

The left-hand panel of Chart 1 shows the estimates of potential GDP growth based on the methodology described in the preceding section, for each NAIRU measurement used, together with GDP growth since 1990. It can be seen, firstly, that the different estimates move similarly, tending to smooth the observed GDP behaviour, although in certain periods there are discrepancies between them. For example, the estimate obtained with the NAIRU based on a

2. This potential labour force is calculated by applying to the working-age population, drawn from the EPA, a potential participation rate estimated from a regression which relates the observed participation rate to the unemployment rate for the purpose of eliminating cyclical fluctuations in the observed participation rate. 3. For a description of the different methodologies and the results obtained, see Izquierdo and Regil (2006).

	Average 1991-2000	Average 2001-2005	2000	2001	2002	2003	2004	2005
BP NAIRU	2,7	3,5	3,9	3,6	3,6	3,6	3,3	3,3
SVAR NAIRU	2,9	3,0	3,8	2,7	2,3	3,0	3,3	3,9
PHIL-C NAIRU	2,8	3,5	3,6	3,4	3,4	3,6	3,4	3,5
EXTERNAL ESTIMATES (a)								
OECD	(b)	3,5	3,9	3,4	3,4	3,6	3,3	3,3
European Commission	(b)	3,8	(b)	3,6	3,8	3,9	3,9	3,8

SOURCES: European Commission, OECD and Banco de España.

- a. Implied potential growth estimated from published observed growth and output gap data.  
b. Data not available.

SVAR model is for lower potential growth from 2000, although it shows a sharp acceleration in the later stages of the sample period, reaching a rate of 3.9% in 2005. Indeed, this estimate exhibits a variability that is four times that of the potential output estimate based on Philips-curve NAIRU. If we focus on the most recent period, the three available estimates indicate that GDP growth in 2005 and in the first three quarters of 2006 is very close to the potential growth of the Spanish economy.

However, as mentioned above, any given estimate of potential growth is subject to high uncertainty. For this reason, we analyse simultaneously the results obtained by different procedures for the average of various years. Thus, from 2001 to 2005 the potential growth of the Spanish economy was between 3% and 3.5%, as can be seen in Table 1. These estimates represent a potential growth rate higher than that estimated for the 1990s, for which the three procedures used yield a lower potential growth of 3%. As shown in Table 1, these estimates are broadly similar to those published by international institutions such as the OECD and the European Commission (EC), which use a similar methodology. Specifically, the OECD estimates average potential growth for the last five years of 3.5%, while the EC raises this figure to 3.8%.

Potential growth in recent years has been underpinned by a highly positive contribution from the two factors of production (labour and capital), whereas the behaviour of TFP has contributed negatively to the potential growth of the economy. As seen in Table 2, the contribution of capital to potential growth of the market economy in the period 2001-2005 with respect to the 1990s increased by 0.6 percentage points, while that of labour rose by 0.7 percentage points (according to estimates based on BP NAIRU and Philips-curve NAIRU). For its part, the contribution of TFP decreased over these two periods by 0.7 percentage points, and in fact made a negative contribution in the last five years.

Table 3 analyses in more detail the reasons why potential employment has increased so notably in the last five years, doubling its annual average growth rate in this period and reaching nearly 4% in two of the estimates reported in this article. Such a favourable employment performance in potential terms was made possible, firstly, by the higher population growth rate, which rose from an annual average of 0.7% in the 1990s to 1.7% per annum between 2001 and 2005. As is well known, this higher population growth is due to the influx of immigrants, who have gone from 1.6% of the total population in 1998 to nearly 10% in 2006, according to the latest data of the Municipal Census of Inhabitants. Secondly, potential employment was boosted by the sharp increase in the number of people entering the labour market. In the last

	Average 1991-2000	Average 2001-2005	2000	2001	2002	2003	2004	2005
POTENTIAL GDP BASED ON BP NAIRU	2,7	3,5	3,9	3,6	3,6	3,6	3,3	3,3
Potential market GVA	2,7	3,4	3,9	3,8	3,7	3,2	3,2	3,1
<i>Capital</i>	1,2	1,8	1,8	1,8	1,7	1,7	1,8	1,8
<i>Employment</i>	1,1	1,8	2,1	2,2	2,2	1,7	1,6	1,4
<i>TFP</i>	0,5	-0,2	0,0	-0,1	-0,2	-0,2	-0,2	-0,1
POTENTIAL GDP BASED ON SVAR NAIRU	2,9	3,0	3,8	2,7	2,3	3,0	3,3	3,9
Potential market GVA	3,0	2,8	3,8	2,6	2,0	2,4	3,2	3,7
<i>Capital</i>	1,2	1,8	1,8	1,8	1,7	1,7	1,8	1,8
<i>Employment</i>	1,3	1,3	2,0	1,0	0,5	0,9	1,7	2,0
<i>TFP</i>	0,5	-0,2	0,0	-0,1	-0,2	-0,2	-0,2	-0,1
POTENTIAL GDP BASED ON PHIL-C NAIRU	2,8	3,5	3,6	3,4	3,4	3,6	3,4	3,5
Potential market GVA	2,8	3,4	3,5	3,6	3,5	3,3	3,3	3,3
<i>Capital</i>	1,2	1,8	1,8	1,8	1,7	1,7	1,8	1,8
<i>Employment</i>	1,1	1,8	1,7	1,9	2,1	1,7	1,7	1,6
<i>TFP</i>	0,5	-0,2	0,0	-0,1	-0,2	-0,2	-0,2	-0,1

SOURCE: Banco de España.

five years, the potential labour force has grown between 3.1% and 3.4%, according to different estimates, thanks to the upward trend in the participation rate, which is a result of the greater labour participation rate of the foreign population and of the progressive increase in the female participation rate.

Finally, the estimated decrease in the structural component of unemployment or NAIRU has also contributed to the rise in potential output. The NAIRU is estimated to have fallen appreciably since 2000 to levels near the observed level of unemployment. This decrease in the NAIRU has meant that the observed drop in unemployment has not been accompanied by the appearance of inflationary pressure in the labour market that would have considerably inhibited job creation.

#### CYCLICAL STATE OF THE ECONOMY

To characterise the cyclical state of the economy, it is useful to calculate the output gap, which is simply the difference between the observed GDP and the estimated potential GDP. This measure allows us to quantify the extent to which an economy's observed production is above or below its potential level and, therefore, whether or not inflationary pressure can be expected to appear. The output gap estimates derived from the three potential GDP estimates mentioned in the preceding section are shown in the right-hand panel of Chart 1.

In general, the available estimates coincide in pointing to a positive gap in the last five years. This suggests that, despite the improvement in potential growth in this period, the observed strong economic growth has raised the level of production above what is estimated to be its potential level. This positive gap originates from the economic recovery in the second half of the 1990s and, after peaking around 2000, has remained relatively stable in recent years, since, taking into account at all times the high uncertainty of these estimates, the observed growth has been very close to potential growth.

#### Final considerations

Estimating the potential growth of an economy is a relatively complex task, since it requires a wide variety of information and, in the final instance, the specific estimates are subject to a high degree of uncertainty. With these reservations, the results reported in this article indicate that the Spanish

	Average 1991-2000	Average 2001-2005	2000	2001	2002	2003	2004	2005
<b>BP NAIRU</b>								
Potential market economy employment	2,0	4,0	3,9	4,0	4,2	4,1	3,9	3,9
<i>Population aged 16-64</i>	0,7	1,7	1,0	1,3	1,7	1,8	1,8	1,8
<i>Potential labour force</i>	1,9	3,4	2,9	3,1	3,5	3,5	3,4	3,4
<i>NAIRU</i>	-0,1	-0,6	-0,9	-0,8	-0,7	-0,7	-0,5	-0,5
<b>SVAR NAIRU</b>								
Potential market economy employment	2,4	3,0	3,8	1,9	1,2	2,6	4,1	5,1
<i>Population aged 16-64</i>	0,7	1,7	1,0	1,3	1,7	1,8	1,8	1,8
<i>Potential labour force</i>	2,0	3,1	2,9	2,4	2,5	3,1	3,5	3,8
<i>NAIRU</i>	-0,3	0,0	-0,9	0,6	1,2	0,2	-0,7	-1,2
<b>PHIL-C NAIRU</b>								
Potential market economy employment	2,1	4,0	3,2	3,6	3,9	4,2	4,2	4,3
<i>Population aged 16-64</i>	0,7	1,7	1,0	1,3	1,7	1,8	1,8	1,8
<i>Potential labour force</i>	2,0	3,4	2,7	3,0	3,4	3,5	3,5	3,5
<i>NAIRU</i>	-0,2	-0,6	-0,5	-0,5	-0,6	-0,6	-0,7	-0,7

SOURCE: Banco de España.

economy's potential growth rate, expressed as the average for the last five years, has risen to 3.5%, nearly half a percentage point higher than the estimated potential growth in the 1990s.

This improvement in potential growth reflects the buoyancy of investment in this period and the notable growth of potential employment, which was boosted by a sharp rise in the labour supply derived from the population increase – as a result of immigration – and from the rising female participation rate. Also, the decrease in the NAIRU has been an additional factor in explaining the positive trend in potential employment. This favourable diagnosis regarding the sources of potential growth in recent years is only clouded by the poor behaviour of TFP, which may point to structural problems of the economy, although, in view of the residual nature of the estimate, its performance may also reflect accumulated errors in measurement of the various productive inputs.

Regarding the cyclical state of the Spanish economy, the results obtained indicate that the level of production in the last five years has been above what is estimated to be its potential level. This is compatible with the existence of inflationary pressure derived from the strength of demand.

As regards the coming years, the high potential growth rates have to be sustained, despite the above cautions, by more favourable behaviour of TFP. Of key importance in achieving this is the execution of structural reform policies designed to eliminate inefficiencies in general market operation and continue raising the employment rate of the economy, both by further increases in the participation rate and by additional decreases in the equilibrium unemployment rate (NAIRU).

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