MEASURING OUTPUT POTENTIAL
AND OUTPUT GAP OF ALBANIA

Altin ZEFI
Ph.D. Candidate
European University of Tirana (Albania)
azefi@uet.edu.al

Abstract: *This paper uses HP filter and production function of the Cobb-Douglas form to measure and compare output potential and output gap. We find that Albania's economy is performing near or above potential. Both the univariate and the multivariate ways result in similar results. We use a two-sided smoothing lambda of 100 for the HP filter. The results lead us to conclude that the policy interest rate of the Central bank has not been as low to stimulate economic growth as we have been led to believe. Central Banks measures of output potential of 4% seem to be higher than the recent data suggests. More studies should be performed to measure neutral interest rate to conclusively say that a lower policy interest rate should be pursued by the central bank.*

Key words: *output gap; economic potential; hp filter; Albania; Monetary Policy.*

### 1. Introduction: Potential output of Albania

Potential output is the real level of production that can be achieved by using the factors of production available in a stable inflation economy. Measuring output gap has important application in calculations future inflation and as a result the appropriate response through monetary policy. Generally, the levels of output above that of the potential are seen as inflationary pressures. In such a state the economy is using it's means of production at a higher speed that raises the costs of capital.

But when economy is performing in levels lower than that of the potential that iss a sing that monetary policy may be too tight and should become more accommodative to bolster the economy at potential.

There are no studies for measuring output gas mostly because of the lack of economic data for Albania. But also because output gap is an unobservable variable and as such is very difficult to measure. There are three approaches to measuring unobservable variables. First the univariate approach is the most popular. This approach relies on actual economic data and requires less information.

Second is the structural methods that use economic theory to through the production function to

Albania has had an average growth rate of 4.4% in the last 18 years, between 2000 and 1017. Although growth rate has been quite volatile with a high of 8.3% in 2001 and a low of 1% in 2013. During the 2009 and 2015, the years during the financial crises and the aftermath of that crises the growth rate had a 2.2%.
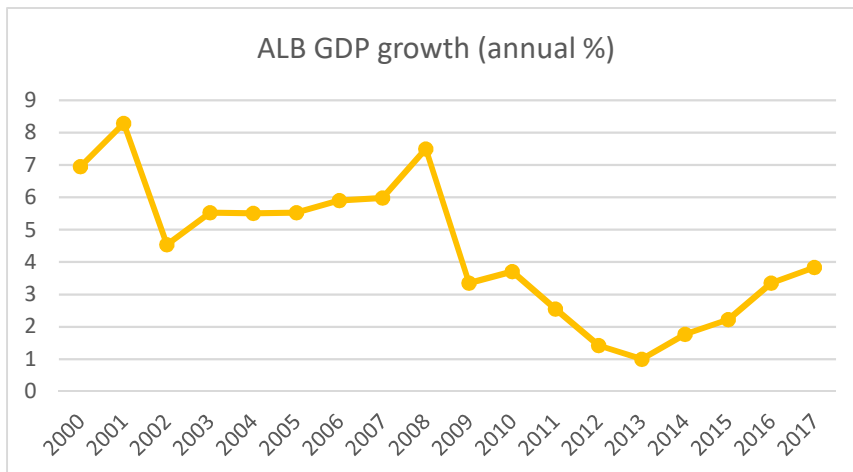
**Fig.1.** Albania GDP growth (annual % from previous year)
Source*: World Bank Data*

In 1991 Albania passed from centrally planned economy to a market economy. This explains the sharp downturns and up turns in the first decade marked by high corruption and civil unrest, as the one in 1997. Economic model, one based on consumption, helped with the instability.

Measuring output potential and deviation from it is paramount for monetary policy and fiscal policy. Potential output helps us understand how the economy is growing and the divergence of actual output from potential output. Cyclical factors or the fluctuations of potential output may affect actual growth of GDP.

GDP potential and GDP gap are important data on conducting monetary policy. After the policy makers know the economic potential, they can derive from that the neutral rate of interest, or the natural rate of interest. Yellen (Yellen, 2015) defines natural rate as the interest rate that will not expanse nor contract the monetary policy when the economy is functioning at or near potential. Natural interest rate fluctuates in the same direction with the economic potential. When we observe a decline in the potential economic growth, we observe that the same things happen to the natural interest rate.

Albania's economic growth declined, as seen on figure 1 while monetary policy has been expansionary with lowest historic REPO rate of 1% (REPO rate being Bank of Albania policy interest rate), but at the same time inflation has maintained at levels lower than target. This means that monetary policy has not been as expansionary as policy makers at the Central Bank believe. Had the economic potential been like the rates of around 7% we would have seen much higher level of inflation than the 2 % average.
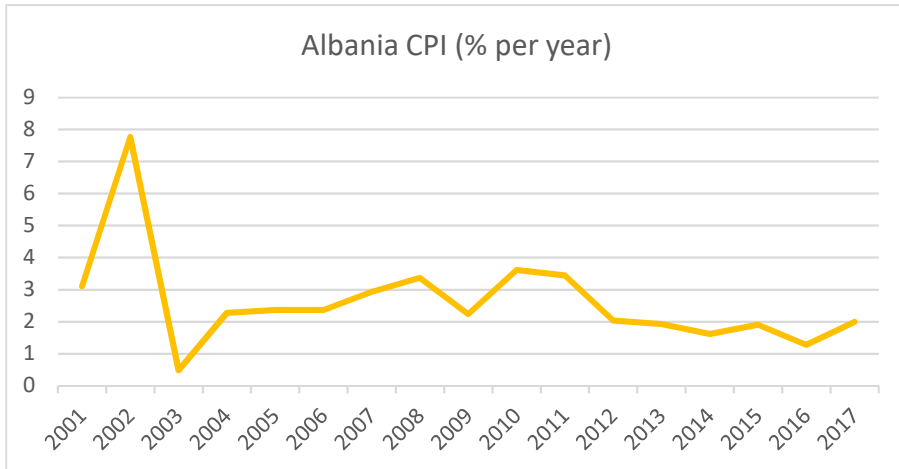
Fig. 2. Albania CPI % per year
Source: World Bank

Speaking on "The future and the economic challenges of the banking sector" Central bank governor Mr. Sejko answered the question on the progress of economic development. Mr. Sejko states that Albania economy grew at near potential of 4%. He bases his optimism for the positive future development on 2 indicators. Firstly Mr. Sejko bases his positive outlook on the past developments. Economic growth had it's lowest point in 2013, 1% and since then growth has picked up and remained positive, as seen in figure 3.
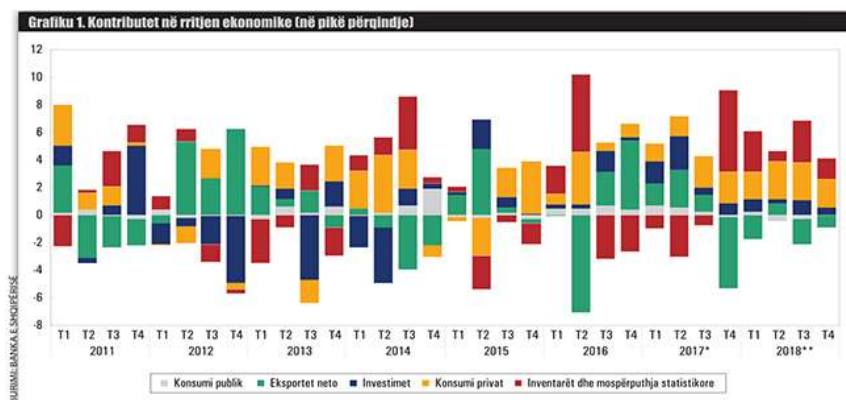
Fig.3. Contributors of sectors in economic growth – Albania
Source: Bank of Albania

Secondly Mr. Sejko sees the supportive elements of our economy working in favor of growth. Elements like monetary policy, improvement in economic development of our largest trading partners, Greece and Italy and improvements in

the balance sheet of families, private sector, banking sector and public sectors, will contribute to a sustained growth near potential.

Question is if 4% is actually the economic potential of Albania. This anchor needs to be supported on statistical data.

Before we go on to update measures of economic potential and output gap, we want to treat the methods that measure these indicators.

2. Methodologies for measuring economic potential and output gap

In this section we would like to review the literature methodologies for measuring potential output and output gap. Bersch and Sinclair (Bersch and Sinclair, 2011) divide the methods of measuring these indicators in two main categories:

2.1. Univariate Output Gap Measures
   A.   Linear Trend

According to the this method output gap is measure as the deviation of output from a simple linear trend.
   B.   Hodrick and Prescot (HP) Filter

This is the most commonly used tool to measure output gap. HP decomposes economic growth, Yt in two parts: growth part (Y^{*}_t), which is akin to output potential, and cyclical part, G_t, which is the output gap.

 Yt = Yt * + Gt

HP filter is a two-sided smoothing method. This means that it minimizes fluctuations on bot the cycle and the trend growth. As is stated in Bersch &Sinclari (2011) lambda determines the extent to which variability in the trend as compared to the cycle is allowed for; higher lambda make the cycle and trend smoother. For quarterly data, the standard value for lambda is 1600 and has been calibrated for U.S. GDP data. As seen by the discussions in Canova, 1998, developing countries need to have smaller lambdas because of the higher fluctuations in trend. Bersch & Sinclair (2011) use different lambdas of 8, 40, and 1600 to see how sensitive the measured output gap is.

Univariate methods, although easy to use require long series of data of actual output. Also, as is supported by Kota, (Kota, 2007) statistical methods can't explain structural changes in the economy and these changes are commonplace in developing economies like Albania's.

2.2. Multivariate methods

The univariate methods depend on a time series that requires long series of data and doesn't take into account other economic information.

An alternative to univariate methods, like the HP filter treated above, is the production function approach. This approach uses capital stock, labor force and technological changes to supply information on potential output. According to this

method, potential output is measured as a supply side and gives the potential level of the economy if all production factors are fully utilized.

As Havik et.al (2014) and Kota (2007) state this approach focuses on the supply potential of an economy and is linked more directly to the economic theory but the disadvantage is that it requires assumptions on the functional form of the production technology. Havik et.al. (2014) put the connection of the production method in a figure as below:
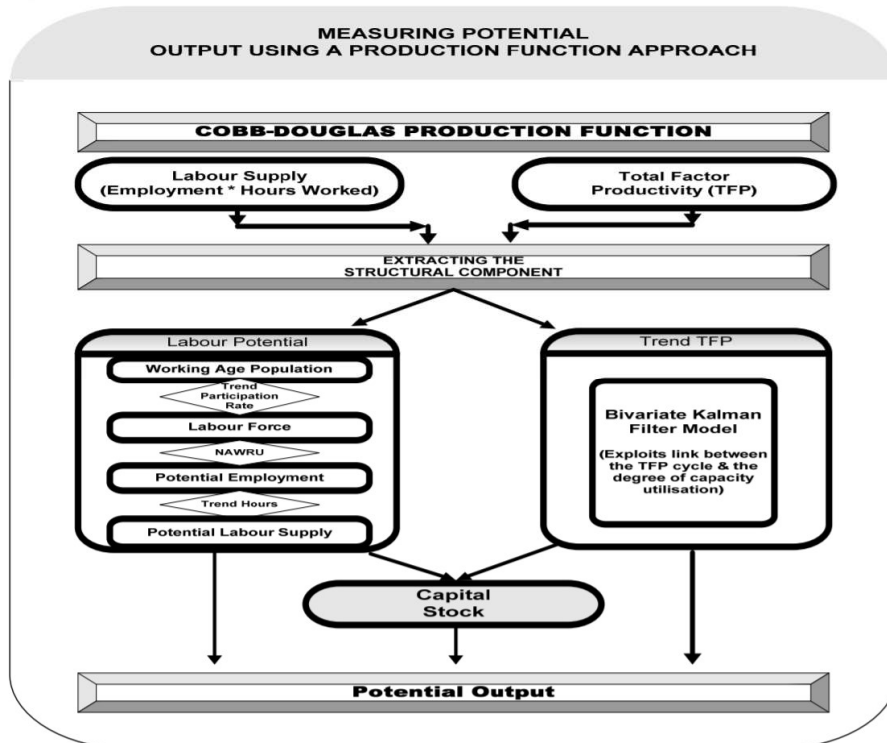
Fig. 4. Measuring potential output using Cobb-Douglas production function
Source: Havik et.al (2014)

Cobb Douglass is a simple functional form that uses data on employment and labor force, capital stock and elasticity of production factors. The mathematical form is given below:

$$Y = TFP \cdot L^{\alpha} \cdot K^{1-\alpha} \tag{1}$$

Where Y is the GDP and I given as a combination of factor inputs: labor (L), capital stock (K) and TFP is the total factor productivity. The output elasticities of labor and capital are represented by and respectively.

3. Data

We use yearly data available for Albania's GDP from 1981 – 2017. To measure the output potential we use the HP filter. Other methods have been used with similar results thus we rely on this filter to measure the potential output and the output gap.

We us the lambda of 100, in accordance with Kota (2007), Bersch & Sinclair(2011).
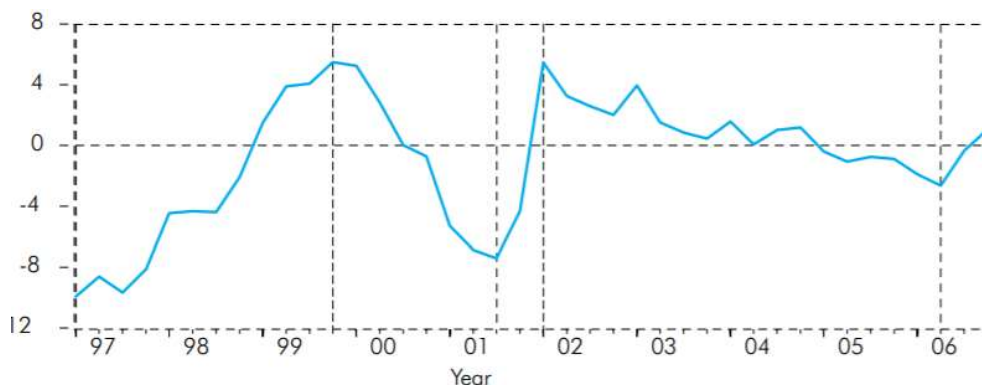
HP Filter results:
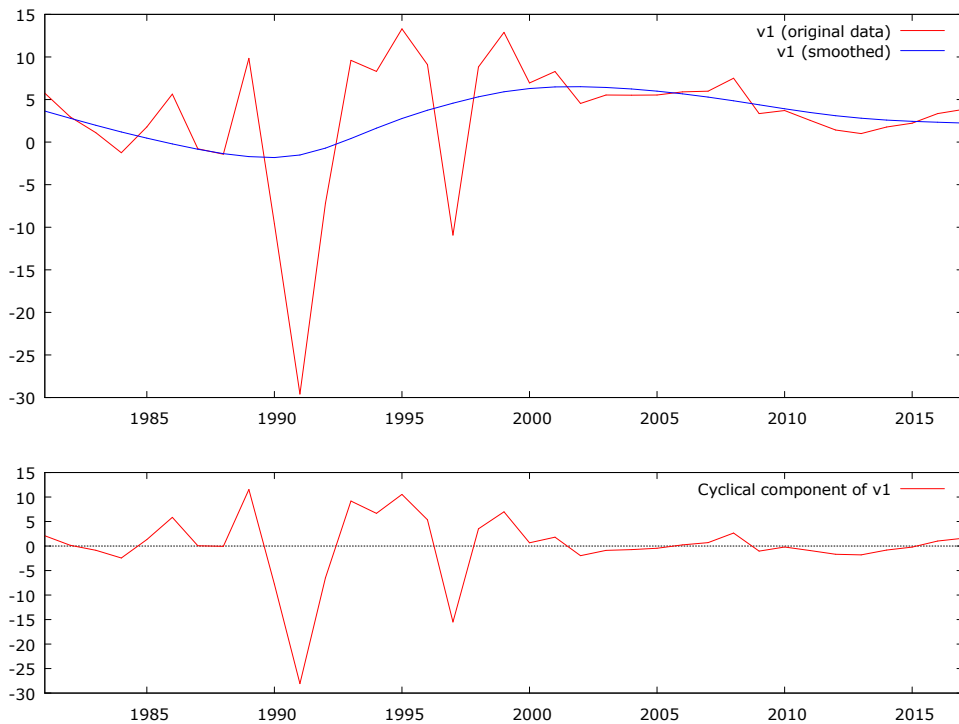
Fig. 5. Albania output actual and potential 1981 – 2017
Source: Bank of Albania and the author's calculations

Output gap measured by production function

More studies should be done in the future to see if results produced by the production function with the Cobb-Douglas function result in different results. Our results through Hodrick-Prescot method produce very similar results to the Cobb-Douglas production function.

39

Fig. 6. Peaks and troughs in output gap through production function
Source: Kota, 2007

4. Potential output and output gap in Albania

According to HP filter the annual potential growth in 2017 is 2.2%. This method results in a much lower potential output then the one the Central bank of Albania seems to be operating under, 4%. Interest rate of 1%, the REPO rate may be low if we assume the 4% potential growth but is not low enough for an economy, such as Albania's where the potential output is 2.2%. If we use GDP deflator we will find that there is a much smaller real growth rate.

Similar results are achieved by measuring potential output and output gap in the study by Kota(2007) that takes in into account the period between 1996 and 2006:
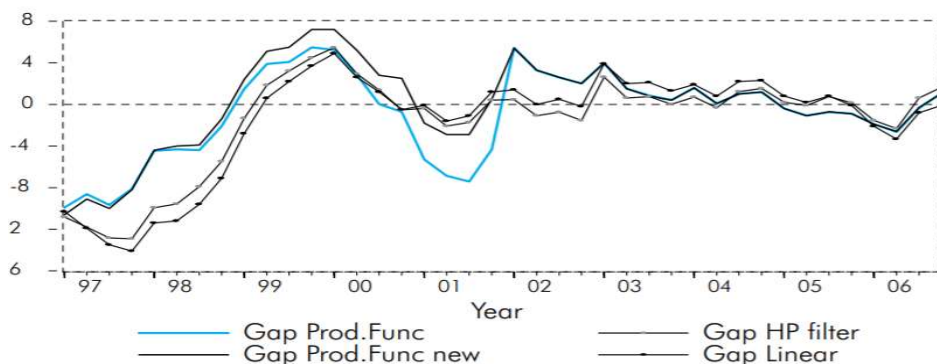
Fig.7. Output gap according to the three methods and the new production function
Source: Kota, 2007

Conclusions

In this study we decompose GDP data using HP filter. We find similar results to other methods like production function. Data show that Albania is operating at or above the output potential of about 2.2%. This information helps Central Bank policy makers better understand and respond through monetary policy. REPO rate of 1% may not be as accommodative to the economy as previously thought because potential output has fallen to historic lows. As results who the potential output is at the lowest point in 25 years. Monetary policy has not been as quick to reflect to the situation, the policy interest rate has not been as loose as we've been led to believe. Central Banks measures of output potential of 4% seem to be higher than the recent data suggests. More studies should be performed to measure neutral interest rate to conclusively say that a lower policy interest rate should be pursued by the central bank.

References:

1. Donders, J.; C. Kollau. 2002. The Cyclically Adjusted Budget Balance: The Brussels Methodology. Division of General Financial and Economic Policy of the Ministry of Finance.
2. Dupasquier, C., A. Guay; P. St-Amant. 1999. "A survey of alternative methodologies for estimating potential output and the output gap", *Journal of Macroeconomics*, 21(3).
3. Dushku Elona. 2007. "Themainmethods of temporal disaggregation", Bank of Albania.
4. Hodrick, Robert J.; Edward C. Prescott. 1997. "Postwar U.S. Business Cycles: An Empirical Investigation". *Journal of Money, Credit, and Banking*, vol. 29, no. 1, pp. 1–16.
5. Julia Bersch and Tara M. Sinclair. 2011. "Mongolia: Measuring the Output Gap" - WP/11/79.
6. Karel Havik; Kieran Mc Morrow; Fabrice Orlandi; Christophe Planas, et al. 2014. "The Production Function Methodology for Calculating Potential Growth Rates & Output Gaps".
7. Sejko, Genti. 2019. "E ardhmja dhe sfidat e ekonomisë e sistemit bankar" *Revista Monitor*.
8. Scott, A. 2000. "Stylized facts from output gap measures". Reserve Bank of New Zealand Discussion Paper DP2000/07.
9. Vasilika Kota. 2007. "Alternative methods of estimating potential output in Albania" Bank of Albania.