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1. Introduction

It is often mentioned that Lebanon suffers from a productivity gap or an underutilization of resources or, better still, an output gap¹. Though this is no doubt true, no estimate of the output gap was ever undertaken. That is what we will try to do in this short note; and we will do it by estimating the potential output for Lebanon and then comparing it with the actual output to measure the resulting output gap. In addition, the discussion concerning the output gap leads to the question of what constitutes the unemployment rate that is consistent with potential output and how we can arrive at it. We will also try to answer this question. So the order of the short note will be as follows: section 2 will estimate potential GDP and the output gap; section 3 will identify the unemployment rate corresponding to potential GDP and how to reach it; and section 4 will conclude.

2. Potential GDP and the Output Gap

Potential GDP is usually defined as the output that the economy can generate when it is fully employed and its resources are completely utilized. It is also the output that is consistent with long-run, steady growth. Potential output can be determined by the basic growth identity:

$$(1) \quad \hat{Y} = \hat{L} + \left(\frac{\hat{Y}}{L}\right)$$

* Bolbol: Chief Economist, BLOM Bank; Mouradian: Head of Investors Relation, BLOMINVEST Bank. The views expressed by the authors are not necessarily those of the institutions where they work.

¹ See IMF Country Report (Various Years).

where \widehat{Y} is the potential growth rate of GDP; \widehat{L} is the growth rate of labor L ; and $\widehat{\left(\frac{Y}{L}\right)}$ is the potential growth rate of labor productivity (Y/L). Put simply, producing *more* output is obtained by employing *more* labor and by generating *more* desired output from labor. A reasonable estimate for annual \widehat{L} is 2.5%². More interesting is the calculation of $\widehat{\left(\frac{Y}{L}\right)}$: a desirable or potential growth of labor productivity puts it at an annual rate of 3%. This rate can be appreciated if we expand its expression -- using the standard growth accounting identities - - into the following:

$$(2) \quad \widehat{\left(\frac{Y}{L}\right)} = \overline{TFP} + \beta \widehat{\left(\frac{K}{L}\right)}$$

which states the standard notion that $\widehat{\left(\frac{Y}{L}\right)}$ is determined by the sum of the growth in total factor productivity TFP (i.e. the *quality* of capital including technology, education, and institutions) and the growth in the capital-labor ratio (i.e. the *quantity* of capital relative to labor) weighted by the share of capital in output β – in other words, labor productivity improves when labor works with more and better capital. A desirable annual rate for \overline{TFP} is 1.2%, equivalent to the average for developing economies³. It is also *twice* the rate that Lebanon had between 1993 and 2017, which points to the imperative for Lebanon to improve its potential in technological development and institutional governance⁴. A feasible annual rate for $\beta \widehat{\left(\frac{K}{L}\right)}$ is 1.8%, obtained with an average investment to GDP ratio of 25% and β of 0.6⁵. This gives us an annual potential growth rate for labor productivity of 3% (1.2%+1.8%).

So adding up the growth rate of labor and the potential growth rate of labor productivity, as in equation (1), we arrive at the potential growth rate of output at 5.5% (2.5%+3%). As important,

² See Rabalino and Sayyed (2012). This is less than 3% which is the average for the Arab countries because of Lebanon's lower population growth rate at 1.8% (compared to an Arab one of 2.8%) and lower dependency ratio at 46% (compared to an Arab one of 58%). Interesting to note that during the 2011-2017 period, Lebanon experienced a growth rate of labor in excess of 4% due to the influx of Syrian refugees -- most likely an exceptional case that is not going to be permanent.

³ See Bosworth and Collins (2008).

⁴ See Bolbol (2017)

⁵ The investment ratio is the average for the Arab countries, and the capital share is due to the relatively higher capital income in the Lebanese economy; see Abu-Carn and Abu-Bader (2007) and Bolbol (2017) for how to arrive at these calculations and the reasons behind them.

5.5% represents the best that Lebanon can grow at in a steady way if it were to fully employ its resources and utilize its technological capabilities⁶; and as such it reflects the potential growth rate of *real* output. Incidentally, the rate of 5.5%, perhaps unsurprisingly, is *above* the actual growth rate of real output that prevailed in postwar Lebanon from 1993 to 2017 at 4.5%, and clearly shows the presence of considerable *unemployment* in the country.

What about the output gap? To calculate the output gap, we need first to find potential GDP for 2017. To do that, we have to identify, from a long-term perspective, a prior year when output was at its potential and then extend its value at the potential growth rate to arrive at current (2017) potential GDP. We have chosen the year 1971, a year when Lebanon was in its heyday and in all likelihood the Lebanese economy was operating at full capacity. One additional consideration is needed. The potential growth rate at 5.5% is for real GDP, so we need to convert it to nominal GDP by adding to it the rate for the GDP deflator (a good measure of the inflation rate). We will have more to say about this in the next section, but suffice it to say now that we are going to set the GDP deflator rate at 3%, which also happens to be the rate prevailing in 1971⁷.

Given that GDP in 1971 was \$1.67 billion, and given that the resulting potential growth rate of *nominal* GDP is 8.5% (5.5% + 3%), then current potential GDP (for a coverage period of 46 years, from 1971 to 2017) is:

$$(3) \quad \text{GDP}_{2017} = 1.67 (1+0.085)^{46} = 71.19$$

As a result, *potential* GDP in nominal terms in 2017 should have been \$71.19 billion whereas the corresponding *actual* GDP was \$51.46 billion⁸. The difference is the *output gap*, which is equal to \$19.73 billion, or 27.71% of the potential.

⁶ Note that the potential growth rate of GDP is not constant: it can change with declining population growth affecting \hat{L} ; with lower savings, as population ages, affecting \hat{K} ; and with better technology and institutional governance affecting \hat{TFP} . That is widely true for developed economies, where declining labor and capital are usually compensated for by higher productivity through technical progress or TFP. In fact, one could identify each of the economic revolutions in history – whether agricultural, industrial, or digital – as corresponding to new and higher \hat{TFP} .

⁷ The GDP and deflator figures are taken or generated from Gaspard (2004) and UNCTAD (2018).

⁸ See IMF (2018).

3. Potential GDP and the Unemployment Gap

Another way of defining potential GDP is that it is the level of output commensurate with NAIRU – the Non-Accelerating Inflation Rate of Unemployment – or with *stable and low inflation*. NAIRU itself is not stable, though, tending to be positively related to participation rates; and negatively related to weak labor unions, absence of unemployment benefits, lower tax rates, and strength of international competition. Another interpretation of NAIRU is that it is the “full employment” unemployment rate, or the unemployment rate with zero cyclical unemployment and low search and structural unemployment.

For Lebanon, the factors that favor a lower NAIRU dominate (except for the increasing participation rate due to higher women’s participation at more than 25%), so we expect it to be fairly low, but how low and at what rate⁹? To find NAIRU, we are going to use Okun law, which states that for an unemployed economy a 2.5% increase in real GDP will *reduce* unemployment by roughly 1%. Given that we already know the output gap (the difference between potential and current GDP), we can then tie it to the employment gap (the difference between NAIRU and the current unemployment rate) via the Okun equation. Though there are no accurate estimates for the current unemployment rate UNEMP, we are going to put it at 15%: the average between the 10% estimate of Lebanon’s *Central Administration of Statistics* and the 11% estimate of Rabalino and Sayyed (2012) and the 24% estimate of Azhari (2014)¹⁰. Accordingly, the Okun equation is:

$$(4) \quad \text{GDP}_{\text{potential}} = \text{GDP}_{\text{actual}} \{1 + 0.025 (\text{UNEMP} - \text{NAIRU})\}$$

Before we operationalize equation (4), two very important points need to be stressed: first, for an economy with unemployment but on its path to full employment, the actual growth rate of

⁹ For instance, in Lebanon, the highest income tax rate is only at 20%, there is no unemployment insurance, and the economy is quite open.

¹⁰ This agrees with a lot of anecdotal evidence that saw all types of unemployment – cyclical, structural, and search unemployment – to have increased since 2011. So, if anything, we are erring on the side of caution.

real GDP will *exceed* the potential growth rate of real GDP of 5.5% so as to absorb the new entrants to the labor force \hat{L} and *the backlog of the unemployed*; second, at such a growth rate, inflation will be maintained at the GDP deflator rate of 3% because of the excess capacity in the economy and the tying of wage growth to productivity growth¹¹.

Given that the output gap is 27.71%, equation (4) would then indicate or *require that the real GDP growth rate rise by an additional 2.5% to 8% (5.5%+2.5%) annually so as to employ the new entrants to the labor force plus 1% of the unemployed*¹². After 11 years of steady growth at that rate, or in year 2028, the output gap would be closed (11x2.5% = 27.5%) and so would the unemployment gap, thus implying a *NAIRU of 4% (15%-11%)* – which is a very reasonable estimate for Lebanon. As a result, by 2028, actual GDP would have caught up and converged with potential GDP; and real GDP growth would then resume at the potential rate of 5.5% with full employment totally restored and maintained¹³ (see Figure (1)).

4. Conclusion

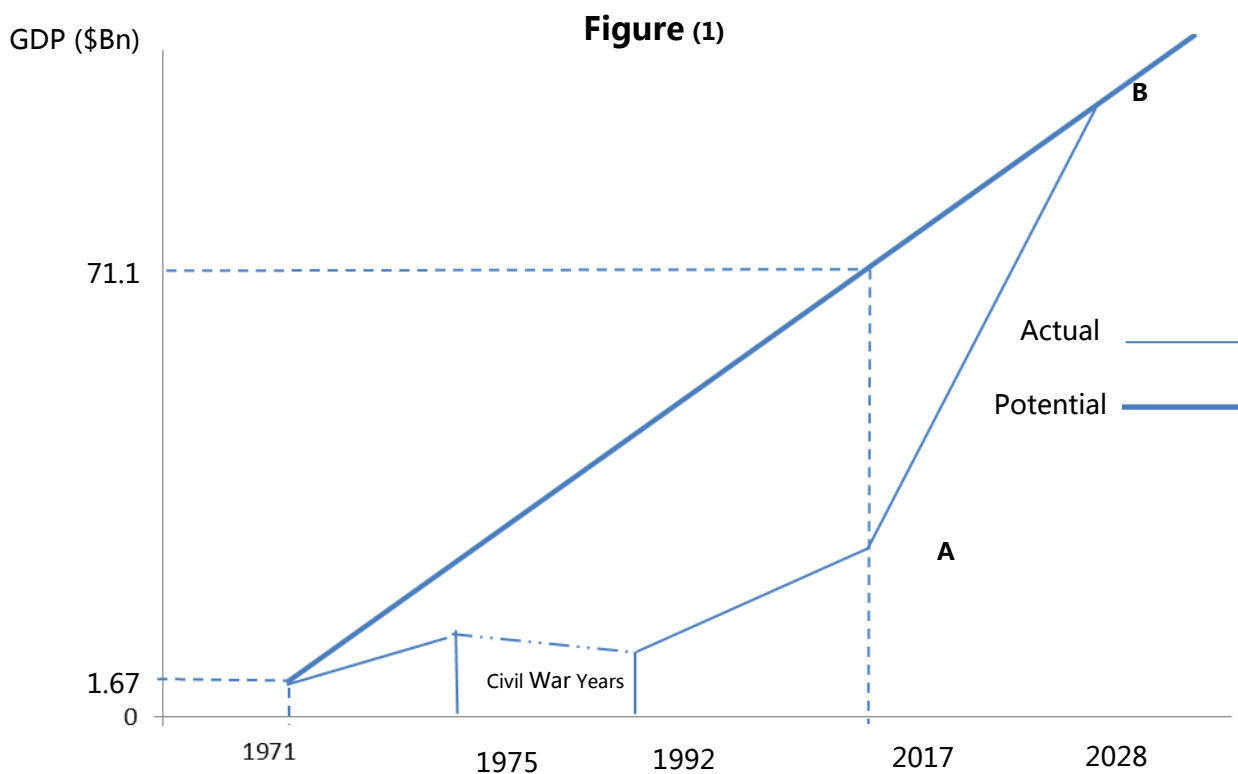
The above note is intended as a simple model, not as an exact depiction of reality. But we believe its simplicity does not make it less appealing. Its primary aim is to guide our thinking in a sound way on how to analyze full-employment growth, especially at a time when Lebanon is embarking on a new restructuring of its economy. The note's main findings are that Lebanon's output gap is close to 28%, its potential real GDP growth rate is 5.5%, and its NAIRU is 4%; but it has three caveats. First, some of the figures used are close approximations, not exact numbers based on hard data. Second, Okun law might not necessarily reflect the relationship between growth and the closure of the unemployment gap (as in the possibility of *jobless growth*); and inflation might not stay at 3% and could overshoot in the adjustment to full employment. Third, the policy and reform environment that is needed to induce the

¹¹ Incidentally, at 3%, inflation is close to the CPI rate that prevailed in Lebanon at 3.8% between 1993 and 2017; see IMF (2018).

¹² During the transition to full employment, \hat{L} would rise by 3.5% (2.5%+1%) and $\widehat{Y/L}$ would rise by 4.5% (3%+1.5%) annually because output increases faster than employment with the presence of unemployment. Both should revert to their long-run trend of 2.5% and 3% respectively once full employment is reached.

¹³ Another way of saying this is that *nominal GDP* growth would resume at the rate of 8.5% (5.5% real and 3% inflation).

requisite changes in output or aggregate supply and in aggregate demand management is not discussed.



Note that from point A (2017) to point B (2028), and with inflation given at 3%, actual GDP rises at a steeper slope, reflecting the higher real growth rate of 8%, than potential GDP which rises at a flatter slope reflecting the lower real growth rate of 5.5%. At point B, actual and potential GDP converge and grow at the same real rate of 5.5%.

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