Lebanese Lost GDP during the Crisis: A Counterfactual Analysis

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1. Introduction

That Lebanon has remained for more than three years doing practically nothing to remedy its economic crisis – which is one of the worst three economic crises that hit the world economy in the last 150 years – is simply mind boggling, if not tragic. The inaction has meant needless but painful losses of output and income and steep rises in unemployment. The current note will provide some preliminary estimates of these losses, and will present a standard methodology to get the economy on an optimal growth path once a structural reform program is applied. We will begin first with estimating potential output (in a slightly technical way), then we will calculate the output gap arising from the crisis, and finish with a brief discussion of the catch up process to regain lost output. Lastly, we will conclude.

2. Potential GDP

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 (^ stands for growth rate):

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

where $\hat{Y}$ is the potential growth rate of GDP; $\hat{L}$ 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 output from existing labor. A reasonable estimate for annual $\hat{L}$ is 2%1. More interesting is the calculation of $\widehat{\left(\frac{Y}{L}\right)}$, the potential growth of labor productivity, which we will put at an annual rate of 3%. This rate and its value can be understood if we expand its expression -- using the standard growth accounting equations -- into the following:

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

[1] See Rabalino and Sayyed (2012).

which states 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 $\frac{K}{L}$ (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 $\widehat{TFP}$ is 1.3%, close to the average for developing economies2. It is also twice the rate that Lebanon had obtained in the post-war period, which naturally points to the need for Lebanon to improve its potential in technological development and institutional governance3. A feasible annual rate for β $\widehat{\left(\frac{K}{L}\right)}$ is 1.7%: derived from an average investment to GDP ratio of 24% and a β of 0.64. This gives us an annual potential growth rate for labor productivity of 3%, which is the sum of 1.3%+1.7%.

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% (2%+3%)5 – and, as such, it reflects naturally the potential growth rate of real output. Incidentally, the rate of 5%, perhaps unsurprisingly, is above the average actual growth rate of real output that prevailed in postwar Lebanon at 4.2%, and clearly shows the presence of notable underperformance in the Lebanese economy even before the current crisis. One additional adjustment is still needed: to convert the real growth rate to a nominal growth rate by identifying the GDP deflator growth rate (a good measure of inflation). A very reasonable GDP deflator rate is 3%. This puts then the resulting potential growth rate of nominal GDP at 8% (5% + 3%).

There are two very interesting points that can be additionally made. First, if Lebanon underperformed even prior to the crisis period, what was the output gap in 2019? To calculate the output gap, we need first to find potential GDP for 2019. And 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 the 2019 potential GDP. We have chosen the year 2010, a year when Lebanon was at its zenith in the post-war period and in all likelihood the economy was operating at close to full capacity and at potential GDP, given that: nominal GDP growth was close to 8%, unemployment was at

[2] See Bosworth and Collins (2008).
[3] See Bolbol (2017)
[4] The investment ratio is the average for the MENA countries, and the capital share is due to the relatively higher capital income in the Lebanese economy. The rate also depends on an incremental capital-output ratio of 5, which measures the amount in dollar terms of additional capital needed to produce an additional dollar of output; see Abu-Carn and Abu-Bader (2007) and Bolbol (2017) for how to arrive at these calculations and the reasons behind them.
[5] 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 $\widehat{TFP}$. 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$\widehat{TFP}$.

around 6%, and nominal GDP stood at $38.44 billion. Hence, nominal potential GDP in 2019 can be extended forward from 2010 and calculated as (for a coverage period of 9 years, from 2010 to 2019):

(3) GDP2019 = 38.44 (1+0.08)9 = 80.11

As a result, potential GDP in nominal terms in 2019 should have been $80.11billion whereas, however, the corresponding actual GDP was $51.95 billion6. The difference is the output gap, which is equal to $28.16 billion, or 35.15% of the potential. This significant gap is indicative that Lebanon's crisis was brewing earlier than 2019, perhaps at around 2016.

Second, 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 full employment that is associated with stable and low inflation. However, for an economy with unemployment but on its path to full employment, like a would-be reformed Lebanese economy, the actual growth rate of real GDP will exceed the potential growth rate of real GDP of 5% so as to absorb not only the new entrants to the labor force L^ but also the backlog of the unemployed. Moreover, at such a growth rate, inflation could 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 growth.

As important, it is also established through Okun's Law that the additional growth at stable inflation is at an annual real rate of 2.5%, which in turn will reduce the unemployment rate by 1%7. Hence, on the road to full employment, we expect the economy to grow in real terms by 7.5% (5% + 2.5%) and in nominal terms by 10.5% (5% + 2.5% + 3%). This is actually doable so the economy can "catch up" and recuperate the lost output from not growing at the potential rate earlier. Note also that once full employment is reached, nominal GDP growth would resume at the rate of 8% (5% real and 3% GDP deflator) and the actual and potential growth rates would converge and be equal.

Lastly, to keep track of growth rates, we can summarize the various rates as follows:
Potential real growth rate: 5%; Potential "catch up" real growth rate: 7.5%
Potential nominal growth rate: 8%; Potential "catch up" nominal growth rate: 10.5%

3. Output Loss

Lebanon's crisis is, of course, still raging and its trailblazing pace – at least initially – has left output or GDP in pretty bad shape. The table below shows the extent of the damage:

	2019	2020	2021	2022
Nominal GDP Billion $	51.96	31.71	23.13	21.32
Real GDP Growth	-7.2	-21.4	-7	-5.4

[6] **All GDP figures for the 2019 to 2022 period are taken from World Bank Data Site.**
[7] See Bolbol and Mouradian (2018)

%				
GDP Deflator Growth %	4.1	66.3	139.5	114.8
Average Exchange Rate LBP/$	1,554	3,688	11,755	26,713

In retrospect, the crisis necessitated quick and sound action, and any normal, rational economy would have undertaken it. In this sense, had the political establishment embarked on a structural reform program with the IMF in the fall of 2019, and if the reform was successfully implemented, then the economy would have started recovering -- and perhaps recovering strongly -- by the beginning of 2020. In terms of our analysis above, the economy' s growth path would have moved towards full employment and, as important, would have grown at the nominal "catch up" rate of 10.5%. Assuming growth has been steady, the counterfactual GDP at this rate for the years 2020, 2021, and 2022, along with actual GDP for these years and the resulting output loss, would be given by the table below:

Billion $	2020	2021	2022
Potential GDP (Growth at 10.5%)	57.40	63.42	70.08
Actual GDP	31.71	23.13	21.32
GDP or Output Loss	25.69	40.29	48.76

Naturally, the lost output is tremendous at a total of $114.74 billion for the three years and at an average of $38.25 billion per year. The lost output is almost equal to twice the GDP in 2018 which stood at $55.3 billion. And in terms of per-capita income or GDP, instead of it being $12,741 in 2022 it turned out to be $3,8768!

Of course, growing at the real rate of 7.5% (or the nominal rate of 10.5%) is the ideal scenario. This is because it assumes the complete success of the reform program and the absence of shocks. In actual terms, IMF reform programs are usually subject to setbacks; and in the case of Lebanon it was additionally subject to three shocks: COVID 19, the Port of Beirut explosion, and higher commodity prices due to the Russia-Ukraine war. As a result, if we assume instead the Lebanese economy could have grown at the average of the MENA Emerging and Middle-Income countries (a comparable country grouping), we get a more realistic scenario9. These economies grew at the average nominal rate of 6.8% between 2020 and 2022, and applying this rate – which shaves off close to 4% of growth -- to the reforming Lebanese economy, but taking into account the reservations mentioned above, we get:

[8] This assumes a total Lebanese population of 5.5 million in 2022; see UN Population Data Set.
[9] MENA Emerging and Middle-Income countries grew by 0.6% in 2020, 12.2% in 2021, and 7.7% in 2022.

Billion $	2020	2021	2022
Potential GDP (Growth at 6.8%)	55.48	59.25	63.28
Actual GDP	31.71	23.13	21.32
GDP or Output Loss	23.77	36.12	41.96

As we can see, the results from the economy not following this more realistic scenario is a smaller output loss but it is still fairly significant: total loss of $101.85 billion and an average loss of $33.95 billion per year.

4. Catch Up

Now that 2019 had passed with no remedial action to the economy, can the year 2023 be any better? Assuming it can, and a successful IMF-led reform program gets underway, how can the economy catch up? To answer this question, we need to find potential GDP in 2022 and then calculate the output gap that needs to be caught up starting in 2023. This is done as follows:

(4) $GDP2022 = 38.44\ (1+0.08)12 = 100.91$

Given that actual GDP in 2022 was $21.32 billion, whereas potential GDP is $100.91 billion, then the output gap that needs to be recaptured through growth-cum-reform is $93.44 billion, or 78.87% of the potential. And given that it is the additional annual rate of 2.5% (out of the nominal growth rate of 10.5%) that drives the catch up, then catch up will take (78.87%/2.5% =) 31 years to be completed!.

Two important observations are in order. First, obviously, it is quite a lengthy process to close the gap. But remember, it is a very large gap to start with, and the final aim is to put the economy at its ideal growth path with stable inflation. Of course, as usually happens, the economy can grow faster than 10.5% annually, and in the process close the gap sooner, but that would be at the expense of inflation rising higher than 3% -- and often way higher -- ala a typical downward-sloping Philips curve. Second, and more important, in light of Okun' s law, the additional 2.5% catch up growth will reduce unemployment by 1% each year. Over the entire 31-year period, other things being constant, unemployment should fall by 31%. And if we assume, as argued above, that a reasonable NAIRU is about 6% (the rate prevailing in 2010), then we can say that the unemployment rate in Lebanon in 2022 must have been 37% (31% + 6%) – which is close to what almost all reputable sources indicate10. And as just was argued, if the additional growth is above 2.5%, then unemployment will fall by more than 1% annually, and NAIRU would be reached much sooner as a result.

In sum, adhering to an optimal catch up nominal growth rate of 10.5% is not easy and it requires perfect calibration of fiscal and monetary and exchange rate polices. If that is the

[10] See World Bank (2022).

case, the discussion above shows the analytical framework by which the growth process need to be understood once a credible reform program is agreed upon and implemented.

One last point is worth mentioning. It is well established that Lebanon's exchange rate was overvalued during the pre-crisis years, so that tends to overestimate actual GDP prior to the crisis and the potential GDP extended forward from 2010. The problem of exchange rate misalignment (i.e. undervaluation) does not arise, however, during the crisis because the GDP estimates by the World Bank (2022; footnote 38) adjust for that. So given the probable overvaluation of potential GDP, we expect the output gap to be slightly overstated, but perhaps by no more than 7%.

5. Conclusion

Staying with 'business as usual" throughout the economic crisis in 2020, 2021, and 2022 has lost Lebanon, in terms of nominal USD value, almost twice the GDP recorded in 2018 and two thirds of its per-capita income. In pure economic terms, the lack of action might be justified by the high opportunity cost of reforms, in the sense that though reforms produce gains, these gains have to be compared against the losses incurred due to the dislocations caused by reforms. But the thing is, these losses, especially as the crisis endures, are nil, or in other words the opportunity cost of reform is zero, if not even negative! So the answer for the dearth of reforms must lie in political economy, as reforms will most likely upset the interests of the ruling political elite and the interests of the "presumed resistance" movement, perhaps quite badly. Another important reason is that the Lebanese economic reforms are actually very complex and hard, so the authorities are simply "kicking the can down the road". Unfortunately, as such, there seems to be no end in sight to the mounting economic losses. YA HARAM!

6. References

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