

ESTIMATION OF ANDORRA'S POTENTIAL OUTPUT¹

Andorra's growth potential is estimated to be low, though in line with the region. This could be explained by low levels of investment, both private and public, as well as multiple structural vulnerabilities that may be limiting the country's growth potential. Boosting growth in the medium term calls for a multi-pronged approach aiming at diversifying the economy, increasing investment, and building human capital.

A. Introduction

1. Estimates of potential output are critical for macroeconomic surveillance and policymaking. In economic terms, potential output is defined as the maximum level of output that can be achieved without creating inflationary pressures (Okun, 1962). In practice, it is normally associated with trend output, which is estimated using a wide range of statistical approaches that vary in their degree of precision and data requirements. By providing a benchmark against which to assess the economy's position in the business cycle, estimates of potential output provide guidance on the appropriate policy mix. They are key to assess the stance of fiscal policy and to determine the returns on public investment, which would then inform policy decisions. Estimates of potential output are also a fundamental input into economic forecasting, acting as the long-run anchor for economic growth. Understanding the drivers of potential output—capital, labor and TFP—can shed light on the policies needed to raise it.

2. Data limitations are a key challenge in estimating Andorra's potential output. In general, the estimation of potential output relies on statistical and theoretical hypotheses that make the results very sensitive to the model specification, the method of estimation and the time horizon. In the case of Andorra, data limitations pose an additional challenge due to the small sample and the lack of data on the GDP level at quarterly frequency and the capital stock. The COVID-19 pandemic imposes additional difficulties because it produces a break in the series.

3. Several methodologies are considered to identify an adequate measure of potential output for Andorra. The premise for this exercise is to use all the available information, overcoming data limitations. Potential output is estimated using standard univariate approaches as well as a multivariate filter that incorporates empirical relationships between actual and potential GDP, unemployment, and inflation. Implementing the production function approach is not possible in the case of Andorra due to the lack of statistics on the stock of physical capital.

4. Potential growth is estimated to be low, possibly due to lackluster investment and structural vulnerabilities. Potential growth in Andorra is estimated at 1.5 percent, in line with the euro area's medium-term growth. The country faces multiple structural challenges that have curbed growth potential, such as difficult geographic accessibility, a limited stock of affordable housing and a small internal market. The economy is concentrated in a few sectors, notably tourism and banking,

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and hence is vulnerable to shocks specific to those sectors. In addition, activity is highly correlated with developments in neighboring countries, particularly Spain. Raising potential output in Andorra requires a wide set of structural reforms aiming at diversifying the economy and building both physical and human capital.

B. Data and Methodology

5. Standard univariate filters are used as the starting point to estimate potential output for Andorra. The measure of potential output considered in this case is the Hodrick-Prescott (HP) filtered trend. The trend obtained with the HP filter (Hodrick and Prescott, 1997) minimizes a loss function that increases in the distance between trend and actual GDP and in the curvature of the trend function. This method is simple and very convenient for countries with limited data availability, since it only requires the time series of real GDP. In the case of Andorra, such series is available at annual frequency for the period 2000–2021. The estimation also requires projections for the period 2022–27, which are obtained from the April 2022 World Economic Outlook. Unfortunately, its relative simplicity also brings limitations. First, the estimates are based purely on statistical methods, which do not incorporate any economic structure, and thus are not necessarily in line with the economic concept of potential output. Second, the HP filter suffers from an ‘end-of-sample problem’, with estimates at the end of the sample subject to considerable revision when the sample is extended with new data releases.

6. Results from univariate techniques are complemented with estimates from a multivariate filter. This approach, based on Balgrave et al. (2015), adds economic structure to potential output estimates by conditioning them on two basic theoretical relationships: the Phillip’s curve that links cyclical unemployment to inflation, and the Okun’s law that links cyclical unemployment to the output gap. By incorporating information on inflation and unemployment to pin down potential output, this filter yields estimates that are more consistent with Okun’s concept of potential output. Furthermore, it is relatively easy to implement, requiring data on just three observable variables: real GDP level, CPI inflation, and the unemployment rate. All variables are incorporated to the model at annual frequency.

7. The production function approach cannot be implemented for Andorra due to the lack of capital-stock data. The production function approach involves computing the potential levels of the factor inputs (capital and labor) and the trend total factor productivity (TFP), which are then combined with a two-factor production function (generally Cobb-Douglas) to calculate potential output. This approach is useful because it allows for a more detailed examination of the drivers of potential growth. However, it requires capital-stock data, which in the case of Andorra is not available.

8. Regardless of the method used, the COVID-19 pandemic introduced a break in Andorra’s GDP series that requires a special treatment when estimating potential output. This avoids an artificially much lower medium-term estimate of potential growth, at odds with the temporary nature of the shock and the limited scarring effects in Andorra. The pre-crisis trend is estimated to establish an anchor for medium-term potential growth and to determine how potential

output should evolve from the low in 2020. Since 2020 is our starting point for the calculation of potential output in subsequent years, it is important to pin it down well.

9. For both the univariate and the multivariate filters, the first step is to estimate the pre-crisis trend output that will provide the medium-term anchor for potential growth. This is done using actual GDP data up to 2019 and the pre-crisis projections from 2020 onwards. Since Andorra was not included in the World Economic Outlook database until 2021, the pre-crisis projections used in the analysis are those produced by the Andorran authorities for the 2020 budget approved in 2019. Once the pre-crisis trend output is estimated, the next step is to determine the impact of the COVID-19 pandemic in 2020. Assumptions are made regarding the role of supply factors—which are those that would ultimately affect potential output—in driving the GDP contraction observed in 2020. The negative shock in 2020:Q2 is attributed 50 percent to supply factors (e.g., contraction of the labor force due to a deterioration in the health situation) and 50 percent to demand factors, while the recovery in the second half of 2020 is fully attributed to demand factors. So, when considering the entire year, only a small part of the GDP decline in 2020 is translated into lower potential output. Finally, potential growth is assumed to converge gradually to the pre-crisis estimate from 2021 onwards, since limited scarring effects are expected in Andorra.

C. Results

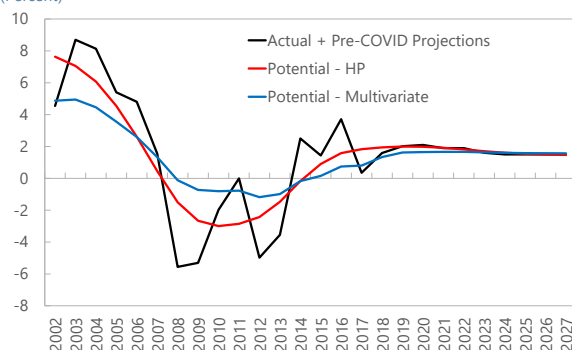
Pre-Covid Trends

10. By the end of 2019, right before the COVID-19 outbreak, Andorra's output gap was almost closed, and the economy was growing at its potential rate, albeit low. While there are differences in magnitudes, all filters depict the same three-phase pattern. The first phase, preceding the Great Financial Crisis (GFC), was characterized by high potential growth, which averaged between 3.7 and 5.2 percent in 2001–07, depending on the filter used. The second phase, covering the GFC and the European sovereign debt crisis, featured a lower potential growth, at a rate that ranged between -2.0 and -0.3 percent on average in 2008–14. Finally, the third phase, from 2015 to 2019, displays positive potential growth during the recovery, though lower than in the first phase. Regarding the output gap, it was positive during the first phase, negative in the second phase, and was nearly closed by the end of the third phase. This implies that it took Andorra 10 years from the through of GFC to close the output gap, reflecting significant scarring associated with the negative impact of the crisis on supply factors, particularly labor. Inflation developments were consistent with the evolution of the output gap.

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Pre-COVID Potential Output Growth

(Percent)

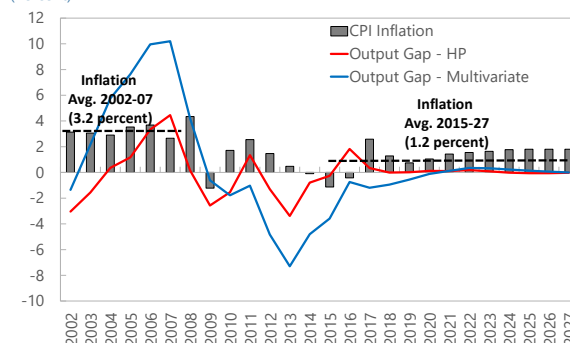


Sources: Haver Analytics and IMF staff calculations.

...and the output gap was almost closed.

Pre-COVID Output Gap and Inflation

(Percent)



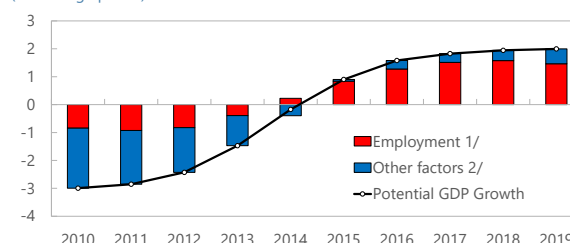
Sources: Haver Analytics and IMF staff calculations.

11. A relatively lower potential growth in the third phase (2015–19), compared to the pre-GFC rates, could be reflecting lingering effects from the GFC and the sovereign debt crisis. The contraction of potential output in 2011–14 was driven by a decline of employment and, to a larger extent, by a decline of other factors, including total factor productivity (TFP) and physical capital. In the recovery phase of 2015–19, the rebound of potential output was largely supported by a strong employment growth, with a very modest contribution by other factors. This implies that the crises in 2008–14 may have resulted in a lower accumulation of physical capital (i.e., lower investment) in subsequent years and/or in a decline of TFP.

The recovery from the 2008–14 crises was largely supported by a recovery of employment, with a very modest contribution from physical capital and TFP.

Potential GDP Growth Accounting

(Percentage points)



Sources: Haver Analytics and IMF staff calculations.

1/ The calculation of the contribution of employment to potential GDP growth assumes a labor share of 70 percent.

2/ 'Other factors' is computed as a residual and corresponds to the contribution of both physical capital and total factor productivity to potential GDP growth. Such contributions cannot be disentangled due to data constraints.

Impact of the Covid-19 Pandemic

12. The COVID-19 shock had a relatively small, negative impact on potential output in 2020. While actual output declined by 11.2 percent in 2020, potential output is estimated to have declined only by nearly 1.5 percent. The supply-side component of the COVID-19 pandemic is assumed to explain only half of the output contraction in 2020:Q2; the rest of the impact in 2020:Q2, and through the rest of the year, is attributed to demand factors. The larger decline of actual relative to potential GDP created a negative output gap in 2020, which is expected to close in 2024 as the economy recovers.

Potential Growth in the Medium Term

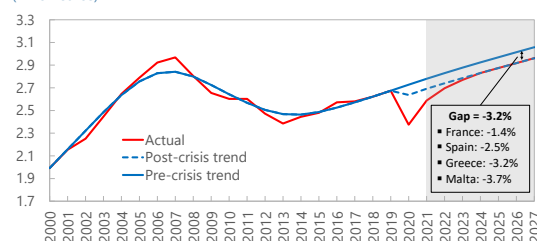
13. Prior to the COVID-19 crisis, potential growth in the medium term was estimated at 1.5 percent. Furthermore, output gap was expected to remain close to zero and inflation stabilized at around 1.8 percent. The estimates from the univariate and multivariate filters are very similar. While a potential growth rate of about 1.5 percent is assessed to be low, both in absolute terms and relative to historical levels in Andorra, it is in line with medium-term growth in the euro area (see [Euro Area 2021 Article IV Staff Report](#)).

14. While potential growth is projected to reach the pre-crisis estimate in the medium term, the COVID-19 pandemic caused a permanent income loss. After a short phase of relatively more rapid recovery, and due to limited scarring effects, potential growth should converge to 1.5 percent in the medium term. However, the level of output is expected to remain at a permanently lower level. Such permanent income loss, estimated at 3.2 percent, could be attributed to the missed 2020/21 winter season and the sharp contraction in investment, which recovered only partially with the construction boom and large inflows of foreign direct investment. Other tourism-dependent economies (e.g., Greece) are also expected to suffer significant income losses due to missed tourism seasons.

The permanent income loss caused by the pandemic is projected to be larger than in neighboring countries.

Real GDP: Gap Relative to Pre-Crisis Trend

(Billion euros)



Sources: Govern d'Andorra Statistics Department and IMF staff calculations.

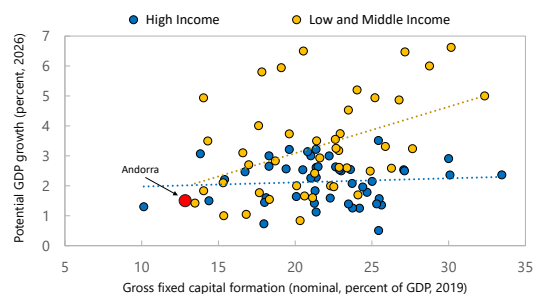
Note: In the case of Andorra, the gap relative to the pre-crisis trend corresponds to the difference between the projected real GDP and the Hodrick-Prescott pre-crisis trend, which is computed using historical data up to 2019 and the pre-crisis projections produced by the Andorran authorities. For other European countries, the gap relative to the pre-crisis trend is obtained from the staff reports of the 2021 Article IV consultation for each country.

Drivers of Potential Growth

15. Low investment could be behind Andorra's low potential growth rate. Andorra is one of the countries with the lowest investment in the sample of countries for which data on both investment and potential output is available in the World Economic Outlook database. Averaging about 13 percent of GDP, investment in Andorra is significantly lower than the average in high-income economies (21.8 percent of GDP) and euro area countries (21.0 percent of GDP). This is mostly driven by low levels of private investment. Public investment (nearly 5 percent of GDP) tends to be larger than in other countries, especially compared to high-income (3.7 percent of GDP) and euro area (3.2 percent of GDP) countries. Increasing public investment should be leveraged to induce higher private investment, including through a more favorable business environment.

Potential growth is positively associated with total and public investment. Andorra's low level of total investment—particularly private—could be behind the relatively low rate of potential growth.

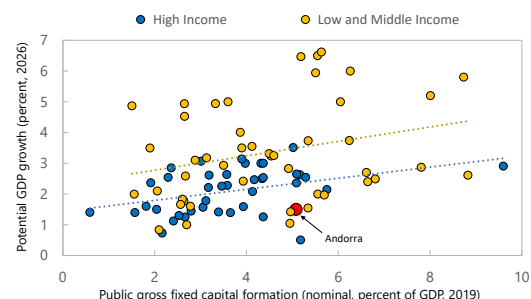
Total Investment and Potential GDP Growth



Sources: WEO Database and IMF staff calculations.

Note: The chart only shows countries for which data on both investment and potential output are available. Outliers were removed.

Public Investment and Potential GDP Growth



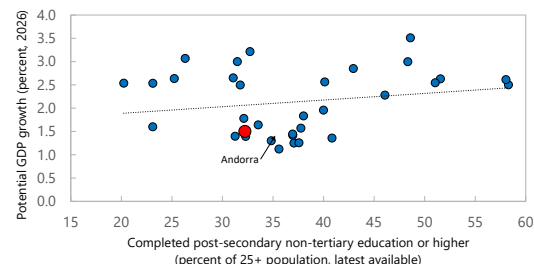
Sources: WEO Database and IMF staff calculations.

Note: The chart only shows countries for which data on both public investment and potential output are available. Outliers were removed.

16. Low potential growth in Andorra could also be explained by lower levels of human capital. Higher educational attainment is positively associated with higher potential growth amongst high-income countries. In Andorra, 32 percent of the population older than 25 has completed post-secondary non-tertiary education or higher. Such educational attainment is lower than the averages for high-income economies (36.6 percent with complete post-secondary education) and euro area countries (37.2 percent with complete post-secondary education). Policies that encourage the population to pursue vocational training and tertiary education would boost human capital and support higher potential growth. It is important to highlight that the relationship between educational attainment of the Andorran population and potential output growth may be weakened by the fact that the Andorran population represents a relatively small share of the labor force due to the large inflow of foreign seasonal workers.

Relative to other high-income economies, Andorra has lower levels of educational attainment, which might explain the low rate of potential growth.

Educational Attainment and Potential GDP Growth in High-Income Economies



Sources: UNESCO, WEO Database and IMF staff calculations.

Note: The chart only shows high-income countries (as defined by the World Bank) for which data on both educational attainment and potential output are available.

D. Policies to Boost Potential Growth

17. Raising potential growth in Andorra calls for a multi-pronged approach focused on diversifying the economy, boosting investment and building human capital. Reducing red tape and administrative rigidities and improving access to credit would support diversification and boost investment. Expanding the supply of affordable housing and easing immigration requirements will help attract the needed high-skilled workers, while training will improve human capital. Andorra's vulnerability to natural events calls for continuing building resilience to climate change, including by greening transportation and energy, and reducing dependency on imported energy. Current negotiations on an EU Association Agreement have the potential to unlock substantial benefits.

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