

### Box 3

## EFFECT OF THE DROP IN TERMS OF TRADE ON INVESTMENT AND LONG-TERM SUSTAINABLE OUTPUT

Juan Sebastián Amador  
Juan Pablo Cote\*

The recent drop in the country's terms of trade had a significant impact on economic growth. This section looks at what would happen to long-term sustainable growth if that decline were to be permanent. This is particularly important when considering the Board of Directors of *Banco de la República* (BDBR) has a constitutional mandate to keep inflation low and steady, in coordination with an economic policy that is intended to stabilize output and employment at their sustainable long-term or "potential" levels.

In their simplest form, estimates of the potential level of output assume that if a change in the actual level of economic output is sustained, part of that change will be permanent. For example, if the observed GDP of an economy declines as of a particular moment, a respective reduction in potential GDP should be observed.

However, this approach does not take into account information on the structure of the economy that can be important to explaining the evolution of the country's productive capacity. Therefore, we will use a production function to model the country's productive capacity as a function of capital and labor.

The main advantage of the production function is that it takes into account changes in the structure of the economy to estimate potential output.<sup>1</sup> However, the method poses a high degree of uncertainty and its results are especially sensitive to the different assumptions being made (for example, the particular functional form used to describe the economy's system of production).

---

\* Mr. Amador is a specialized professional with the Programming and Inflation Department. Mr. Cote is a professional who also works with the same department. Their opinions imply no commitment on the part of *Banco de la República* or its Board of Directors.

1 For example, these models correctly identified an increase in production potential in the United States that was generated by the increased participation of women in the labor market during the 1960s and 1980s.

To determine the value of potential output, each of the factors included can be corrected according to their noninflationary level of use. In the case of manpower, this would involve the noninflationary level of the unemployment rate (see Box 2) and the overall labor force participation rate. In this way, the resulting estimate includes economic information on the negative relationship between inflation and unemployment, which is a desirable property from the monetary authority's point of view.

Accordingly, to have an idea of what the economy's long-term or potential growth can be at present and in the coming years, using the production function method, it is necessary to identify the anticipated trends in capital, labor, and total factor productivity.

First, the decline in terms of trade has affected capital in the production function and will continue to do so. The rate of Colombian investment; that is, the ratio of gross fixed capital formation to GDP, reached a high of 25% in 2014. This was due largely to the increase in investment in the mining and energy sector during the last decade. However, the investment rate fell and was 23% in 2016, because the sector is now less attractive than it was in the past. Thus, less productive capital could be expected to accumulate in the future.

As for the next factor, the labor force, the main determinant of its future evolution is the projected growth of the population. According to DANE, the population is expected to grow in the coming years at an annual rate of approximately 1%, after having increased by an average of 1.5% during the last thirty years. On the other hand, labor force participation is now at levels close to its historic maximum (see Graph B in the shaded section of Chapter 2). These levels are relatively high from an international perspective. Therefore, it is reasonable to assume there would be little or no increase in labor force participation in the years ahead.

Total productivity is the most problematic factor in the production function methodology, since it is not observed, but is obtained in a residual way. This causes it to be contaminated by cyclical factors that are unrelated to its true dynamics and means that uncertainty about its behavior is greater. Therefore, the different scenarios

of potential growth rest largely on assumptions about whether structural reforms that affect long-term growth in productivity in Colombia will be implemented (or not) in the coming years.

Three scenarios, in particular, are contemplated for long-term growth in productivity. The first scenario more or less sticks to the International Monetary Fund's argument about the factors that could lead to long-term growth in productivity growth.<sup>2</sup> Specifically, it is assumed productivity will increase due to the implementation of policies that include the peace process, the tax reform, the reduction in trade barriers, and the construction of so-called fourth-generation highways. In the second scenario, it is suggested that productivity will evolve in keeping with its trend in growth during the last twenty years, isolated from variations generated by the economic cycle or fluctuations in commodity prices. Finally, in the third scenario, as opposed to the first one, it is assumed productivity will not grow in the long term; that is, it will maintain its current estimated level in the years ahead.

Taking the foregoing into account, the technical staff at *Banco de la República* estimates long-term sustainable growth of the Colombian economy would be somewhere between 3% and 4% annually, but most likely in the lower half of that range.

Finally, as mentioned earlier, it is important to remember these estimates are highly uncertain and the results are sensitive to the forecasts, assumptions, and specifications being used. It should be noted, moreover, that the range presented here was constructed assuming a permanent drop in the terms of trade. If there is a significant recovery in the products exported by Colombia, the sustainable growth rate might be higher in the long term.

---

2 See, F. Roch (2017). "Colombia: Potential GDP Growth," IMF, selected issues papers, unpublished.