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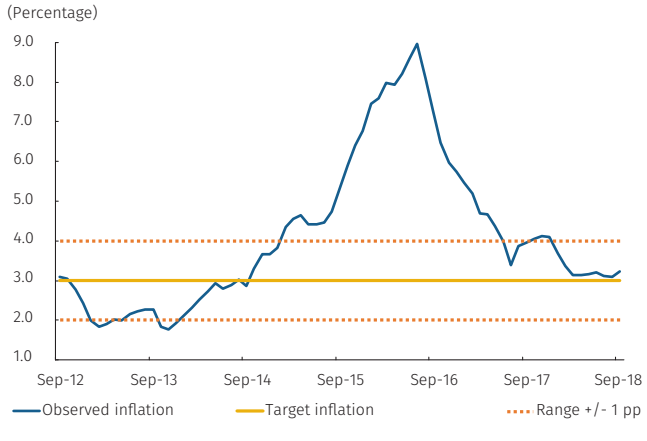
Inflation Developments and Monetary Policy Decisions

In the third quarter of 2018, inflation rose less than expected by analysts and the Central Bank's technical staff, remaining close to the 3.0% target. Inflation expectations to one and more years increased slightly, ranging between 3.3% and 3.5%. Economic growth in the third quarter is expected to be similar to that recorded in the first half of the year (2.6%), with a greater spare capacity than in 2017.

Graph A
Consumer Price Index



Sources: DANE and *Banco de la República*.

In September, the annual variation in the consumer price index (CPI) and the average of core inflation indicators stood at 3.23% and 3.28%, respectively, relatively similar figures to those recorded in June (3.20% and 3.33%) (Graph A). Food and regulated goods and services were the groups that pushed inflation upwards, while tradable and non-tradable inflation excluding food and regulated items had a better performance than the average. Inflation expectations increased slightly, remaining somewhat above the target. Analysts' expectations point toward a 3.3% inflation rate in December 2018 and in 2019. Those extracted from public debt bonds to two, three, and five years stand around 3.5%.

The performance of inflation and inflation expectations in the third quarter took place in a context of negative output gap, with a somewhat more dynamic domestic demand than the one recorded in the first half of the year. The indicators of retail sales, vehicle licenses, consumption credit, and imports of consumer goods suggest that household spending would have continued to recover. On the other hand, imports of machinery and equipment in constant pesos would have accelerated slightly.

With the above, the Central Bank's technical staff estimates that economic growth in the third quarter (seasonally and calendar adjusted) would be around 2.6%. This estimate assumes that the

growth in public consumption would continue to moderate. Also, that investment in civil works will fall less than in the first half of the year, with a similar performance (also negative) for buildings. Net exports would have subtracted to growth, with a greater expansion in imports than exports. The dynamics of absorption would have taken place in an environment of recovery of the terms of trade and with a current account deficit that would have widened in US dollars and as a share of GDP. The latter suggests that the correction of the external imbalance would have been slower than had been forecast.

As for credit, in September, total indebtedness (portfolio in domestic and foreign currency, bonds, and external direct credit) continued to decelerate, with a real annual growth rate of 2.5% for total credit, and -0.6% for commercial credit. The dynamics of household debt has stabilized around 6.0%. Real interest rates—policy, commercial, mortgage, and consumer credit (except credit cards)—stand at levels below the averages of the past ten years.

For the remainder of the year, the new figures and forecasts of economic activity of the country's trading partners suggest that external demand will continue to increase, but at a somewhat slower rate than forecast one quarter ago. The futures market at a six and twelve-month horizon suggests that the price of oil will decrease, but would remain at levels still higher than those registered a year ago. Should this materialize, the terms of trade and the dynamics expected from the country's trading partners could boost external revenues.

Several factors could put pressure on the exchange rate in the coming months. The Fed will continue to increase its interest rates, and high volatility around the globe could increase the risk premia in emerging countries. A higher-than-expected reversal in international oil prices is not ruled out, and our current account deficit remains above 3.0% of GDP.

With all of the above, the technical staff of the Central Bank revised the growth forecast for this and the following year slightly downward. According to the new estimates, in 2018 and 2019, the increase in output would be 2.6% (before: 2.7%), and 3.5% (before: 3.7%), respectively. These forecasts assume that private consumption and investment will continue to recover, albeit with a slower dynamics than the one observed, on average, since 2005. The calculations also suggest that the excess of installed capacity would reduce in 2019.

The monetary policy actions taken so far and the excess of installed capacity should contribute to the convergence of inflation to 3.0%. However, there are risks that could slow this process

down. The devaluation of the exchange rate could be larger than expected, with a high impact on the level of prices of tradable goods; regulatory changes could generate high increases in the prices of public utilities and regulated goods in the first half of 2019; finally, a greater impact on prices due to climatic variations is not ruled out.

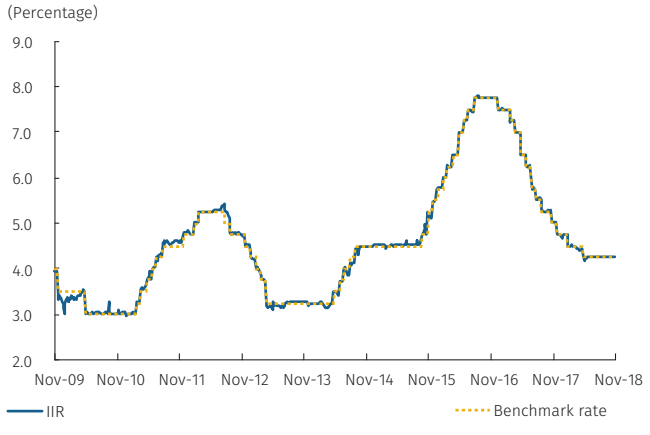
Based on this information, in its meetings in September and October, the Board of Directors considered the following factors in its decision:

- The weakness in economic activity and uncertainty regarding its pace of recovery.
- Observed inflation and its expected convergence to the 3.0% target.
- The effects from the changing international financial conditions on the Colombian economy.

In this environment, assessing the situation of the economy and the risk balance, the Board deemed appropriate to maintain the policy interest rate at 4.25% (Graph B).

The Board will continue to carefully monitor the behavior of inflation and the forecasts for economic activity and inflation in the country, as well as the international context. Finally, the Board reiterates that monetary policy will depend on the new information available.

Graph B
Banco de la República's Benchmark Interest Rate and the Interbank Interest Rate (IIR)
(2009-2018)[a/]



a/ The figures correspond to working days. The last figure is for 8 November 2018.
Sources: Office of the Financial Superintendent of Colombia (*Superintendencia Financiera de Colombia*) and *Banco de la República.*

Juan José Echavarría
Governor

01

External Context and Balance of Payments

In this report, the expectation is that Colombia's trading partners will continue to grow during 2018 and 2019 at levels similar to those observed in 2017.

There have been no major changes in Colombia's risk premia, but the peso has faced pressure to depreciate.

The forecast for the current account deficit in 2018, as a proportion of GDP, points to a figure similar to that observed in 2017, which would imply a higher level in dollars.

1.1 External Context

In recent months, the external context has been characterized by an increase in financial tensions in emerging markets, with important repercussions for some countries in the region that are perceived as being more vulnerable. Consequently, capital flows to these economies have diminished and this, in turn, has impacted their currencies to varying degrees. The origin of this situation is related, in part, to expectations of interest rate hikes in the advanced economies, especially in the United States, where positive growth in recent months has increased the likelihood of inflationary pressures.

In the case of Colombia, these events have been mirrored in moderate depreciation of the exchange rate; however, there has been no major increase in the country's risk premia. The foregoing occurred in conjunction with oil price increases, which have helped to improve the country's terms of trade and national revenue.

With respect to external demand, the baseline forecast scenario outlined in this section assumes a somewhat smaller increase than what was projected in

Monetary policy in advanced economies is expected to continue to normalize, with moderate effects on the cost of financing for Colombia.

the last edition of this *Report*, with a risk balance that has tipped to the downside. The information that is available shows the country's trading partners will continue to see economic growth during 2018 and 2019 at levels similar to those observed in 2017, which still would represent a recovery compared to what was witnessed in 2015 and 2016. As for oil, higher prices are anticipated once again for 2018; they would decline towards 2019 due to an expected increase in world supply. Moreover, monetary policy in the advance economies is expected to continue to normalize, which would have moderate effects on the cost of financing for Colombia.

1.1.1 Real Activity, Inflation and Monetary Policy

According to the latest information at hand, the United States economy continues on a solid growth path. At the statistical cut-off for this *Report,* it was known that annualized third-quarter growth in real gross domestic product (GDP) in that country was 3.5% (a. q.). This figure represents a slowdown with respect to the growth observed in the second quarter (4.2% a. q.), even though it was more than what the market expected. The good results in terms of growth have been accompanied by a strong job market and greater household confidence and income, which favored consumption. Coupled with the fiscal stimulus associated with the tax reduction and the increase in federal spending, this is pushing output above its potential, raising the likelihood that inflationary pressures will emerge.

The good performance of domestic demand in the United States has offset the recent poor performance in the external sector, which contributed negatively to growth during the third quarter.[1] The foregoing is associated with the adoption of new restrictions on trade by the United States and its trading partners.

The US economy continues on a solid growth path.

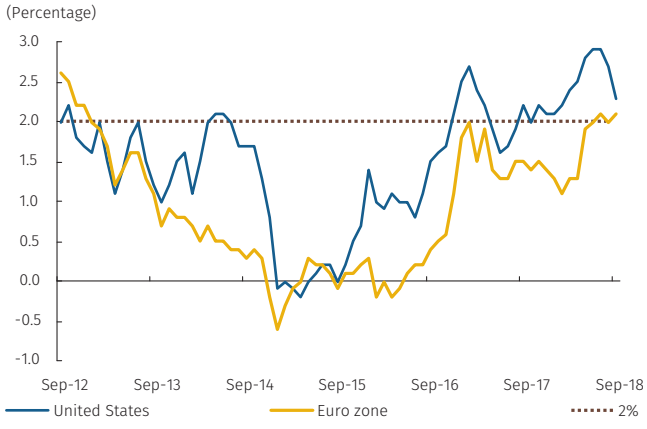
In the euro area, GDP growth during the first half of the year was slightly less than what was observed in 2017. Specifically, the expansion in the second quarter came to 0.4% with respect to the previous period and 2.2% compared with the same quarter the year before. This represents a slight slowdown,[2] which would be explained by weakening consumption and weaker momentum in the external sector. The latter, in part, also was affected by increased uncertainty about trade relations with the United States. The figures that are available for the third quarter indicate economic activity would remain weak.

1 According to the data published by the Bureau of Economic Analysis (BEA), net exports for the third quarter contributed negatively by -1.78%, after having contributed 1.22% in the second quarter of 2018.

2 First-quarter growth in the euro zone was 2.4% with respect to the same period in 2017.

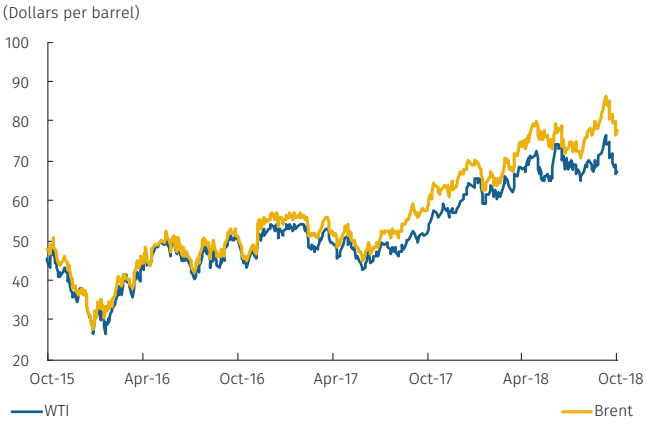
By September, the relatively elevated momentum in economic growth in the more developed countries had yet to translate into clear-cut inflationary pressures. The United States is a case in point, where headline inflation declined throughout the quarter, despite the rise in fuel prices and wage costs. In particular, the annual change in prices was 2.3% in September, which is less than the 2.9% registered in June 2018. For its part, inflation in the euro area registered a slight annual increase from 2.0% in June to 2.1% in September (Graph 1.1). The values for core inflation in these economies by September showed no major changes with respect to the previous quarter, being 2.2% and 0.9%, respectively. However, if the current trend in economic growth in the advanced economies continues and high commodity prices persist, the coming months are expected to see more obvious pressure on inflation.

Graph 1.1
Annual Headline Inflation Indicators for the United States and the Euro Zone
(Annual change)



Source: Bloomberg.

Graph 1.2
International Oil Prices (Brent and WTI)



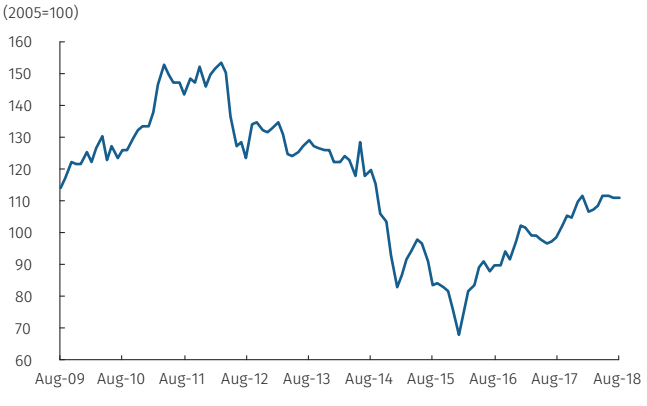
Source: Bloomberg.

1.1.2 Commodity Prices

As for the prices of Colombia's export commodities, the persistence of the price of oil at relatively high levels is an important aspect. The Brent reference has averaged USD 72.69 per barrel (Graph 1.2) so far this year, up to the third quarter. This is higher than the average observed for 2017 (USD 54.79 per barrel) and exceeds the forecast in the previous *Inflation Report*. The increase during recent months has been linked, mainly, to declines in world supply, due to the drop in Venezuela's production and the reduction in Iran's oil exports because of the sanctions imposed by the United States, which have affected Iranian oil output, even though they would not take effect until November 2018.

As a result, Colombia's terms of trade continue to demonstrate an improvement with respect to what was observed last year, even though they are still below pre-2014 levels (Graph 1.3). On the other hand, the prices of imported goods have risen slightly, in tune with international inflation.

Graph 1.3
Terms of Trade Index
(Foreign trade methodology)

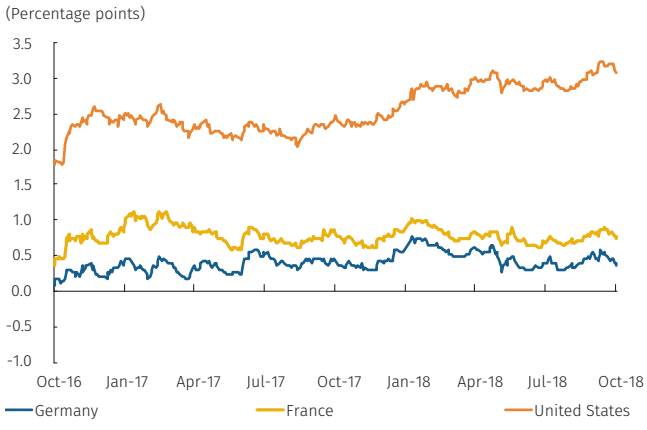


Source: *Banco de la República.*

1.1.3 Financial Markets

In recent quarters, the central banks of the major advanced economies have continued with plans to normalize their respective monetary policies, as anticipated. The United States is a case in point, where the Federal Reserve (Fed) ruled three interest rate hikes of 25 basis points (bp) each at its meetings in March, June and September. These increases were transmitted, in advance, to long-term US treasuries, particularly the ten-year bonds. Their yields have increased significantly so far this year, posting at levels above 3.0% (Graph 1.4).

Graph 1.4
Interest Rates on the 10-Year Sovereign Bonds of Several Advanced Economies

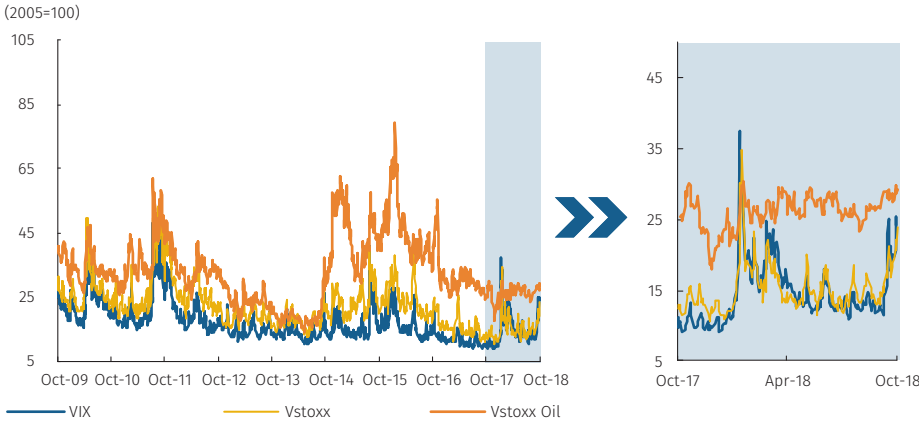


Source: Bloomberg.

Bond performance has been associated with expectations of faster increases in the Fed's policy rate and greater risk aversion, which has increased the demand for what are regarded as safer assets. This tendency would be reinforced by the build-up in trade tensions between the United States and China, by greater political uncertainty in Europe due to Italy's fiscal situation, and by the prospect of weaker global growth. All of this meant a correction in the prices of some assets and an increase in the stress on international financial markets, which was reflected in more volatility during recent weeks (Graph 1.5).

On the other hand, the last few months have seen a sudden increase in the perception of sovereign risk to several emerging economies, with important effects on some countries in the region that are regarded as the most vulnerable. This occurred in the midst of tighter financial conditions and, as a result, capital flows to these economies have declined, which has affected their currencies to different degrees.

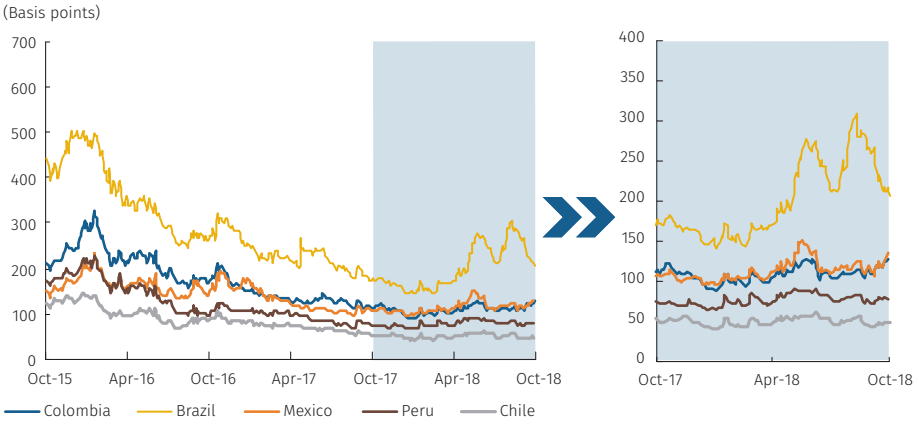
Graph 1.5
Financial Volatility Indexes



Source: Bloomberg.

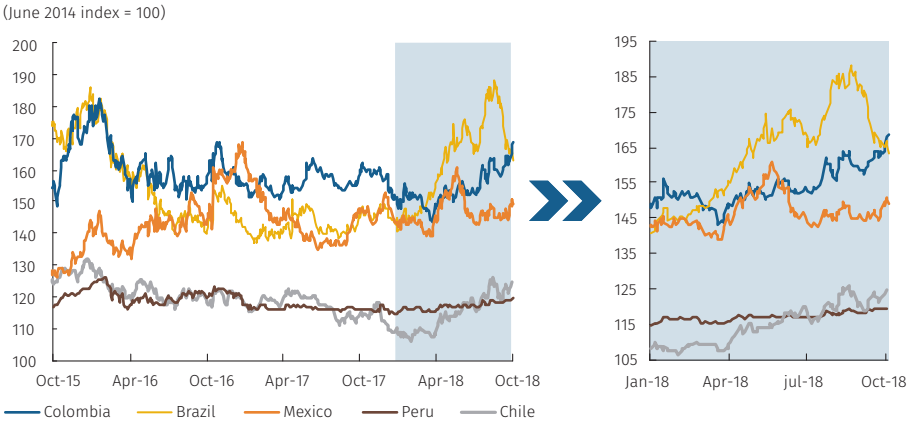
In the most vulnerable economies in Latin America, such as Argentina and Brazil, the effect of the foregoing also meant higher country risk premia and currency depreciation. As for the other countries, risk premia did not increase significantly and their currencies experienced moderate depreciation. In recent weeks, however, Brazil's currency recovered significantly, while the Argentine peso has been relatively stable, thanks to the efforts of the government, which managed to contain its depreciation (Graph 1.6 and Graph 1.7).

Graph 1.6
Five-year Credit Default Swaps (CDS) for Several Latin American Countries



Source: Bloomberg.

Graph 1.7
Exchange Rate Index for Several Latin American Countries

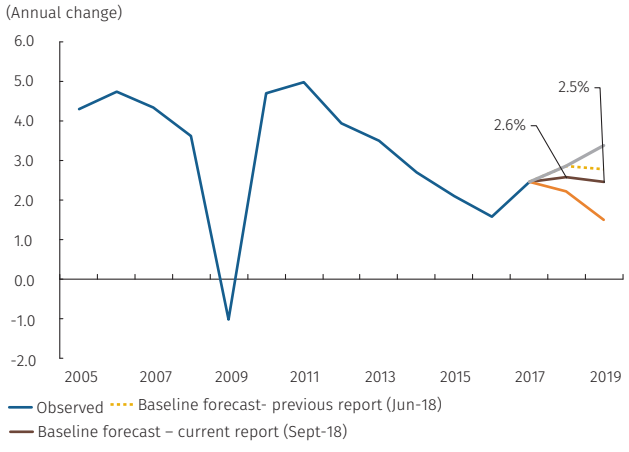


Source: Bloomberg.

1.1.4 Forecasts by the Technical Staff of *Banco de la República*

Taking into account the data at hand, the economic growth forecast for Colombia's trading partners in 2018 and 2019 was revised downwards compared to what was outlined in the June edition of this *Report*.

Graph 1.8
Average Growth of Colombia's Trading Partners, Excluding Venezuela (Non-traditional trade weighted)



Source: Calculations and projections by *Banco de la República.*

According to the baseline forecast scenario, consumption and investment would continue to be the driving force of growth in the advanced economies. By 2019, the forecast points to a gradual slowdown in these economies towards growth rates closer to their potential levels, in keeping with some monetary policies that will tend to be less expansive.

In the emerging markets, growth in output is expected to be more moderate as a result of growing trade tensions involving China and the heightened perception of risk in some economies. Nevertheless, the prospects vary among countries, because higher prices for commodities, particularly oil, will benefit the countries that export them.

Accordingly, the forecast for Colombia's trading partners (excluding Venezuela) is 2.6% annual economic growth (non-traditional trade weighted) in 2018 and 2.5% in 2019 [3](Graph 1.8). These figures are similar to those observed for 2017 (2.5%) and significantly higher than the ones posted for 2015 and 2016 (1.9% on average). The following were the revisions of the individual forecasts in the baseline scenario with respect to the previous report (Table 1.1).

- In terms of the United States, the economic growth forecast for 2018 and 2019 was revised upwards, because the data have surpassed expectations and the indicators suggest economic activity in that country remains on a solid growth path, driven by added government spending. However, less expansion continues to be anticipated for 2019, as long as the effects of tax reduction dissipate, and inflation and the Fed's policy rate continue to rise.
- With respect to the euro area, the economic growth forecast was revised downwards for 2018 and 2019, since the observed data have been weaker than expected. Added to this is the less than favorable situation in Italy due to the political uncertainty surrounding the fiscal deficit target in the years ahead. Therefore, the economy in the euro area during the remainder of the year is expected to maintain growth at a rate similar to the one observed in the first half of 2018, supported by domestic demand that would continue to expand at a good pace amid credit terms that are still favorable, given what continues to be a very loose monetary policy stance on the part of the European Central Bank (ECB).

3 This forecast represents a downward revision with respect to what was presented in the June report, which anticipated 2.9% growth in 2018 for Colombia's trading partners (excluding Venezuela) and 2.8% in 2019.

Table 1.1
Growth Forecasts for Colombia's Trading Partners

Growth forecasts for Colombia's trading partners	2017	Forecasts for 2018			Forecasts for 2019		
		Scenario			Scenario		
		Minimum forecast	Baseline forecast	Maximum forecast	Minimum forecast	Baseline forecast	Maximum forecast
Main partners							
United States[a/]	2.3	2.7	2.9	3.1	1.4	2.5	3.6
Euro zone	2.5	1.8	2.0	2.2	0.8	1.8	2.6
Venezuela[b/]	-14.0	-17.0	-14.0	-11.0	-8.0	-5.0	-2.0
Ecuador	2.4	0.2	1.4	2.4	0.0	1.1	3.0
China[c/]	6.9	6.4	6.6	6.8	5.4	6.2	6.8
Other partners							
Brazil	1.0	1.0	1.3	1.6	1.2	2.3	3.4
Peru	2.5	3.6	4.0	4.2	2.2	3.9	4.4
Mexico	2.1	1.9	2.2	2.5	1.0	2.3	3.5
Chile	1.5	3.6	3.9	4.2	2.4	3.4	4.4
Total trading partners (non-traditional trade-weighted)	2.5	2.2	2.6	2.9	1.5	2.5	3.4
Total socios comerciales (ponderado por no tradicionales)	2.0	1.7	2.1	2.5	1.2	2.3	3.3

a/ The third-quarter figure for GDP growth in the United States was published on October 26. This information was part of the set of data used by the Board of Directors of *Banco de la República* for its decision on October 26. However, the forecasts presented herein do not incorporate this new information.
b/ The 2017 figure for Venezuela is an estimate.
c / The third-quarter figure for China's GDP growth was published on October 26. It was part of the set of data used by the Board of Directors of *Banco de la República* for its decision on October 26. However, the forecasts presented herein do not incorporate this new information.
Source: Bloomberg and Latin Focus (observed data); *Banco de la República* (projections and calculations).

- In Latin America, the economic growth forecast for Chile and Peru in 2018 and 2019 was revised upward, partly because of the good data observed for the first half of the year. Additionally, in the case of Chile, the economy would be boosted by domestic demand that is favored by an expansionist monetary policy and an improvement in job market conditions. In the case of Peru, the impulse to the economy is expected to continue, supported by a buoyant domestic demand and higher commodity prices, although a slight deceleration is expected in 2019 with respect to 2018.
- In this *Report*, the forecast for growth in Brazil, Ecuador and Venezuela was reduced. In the first case, this was because the information at hand suggests economic activity in that country remains weak, with deterioration in confidence and an increase in inflation that has weighed on consumption, in the midst of less favorable international financial conditions. As for Ecuador, the forecast was lowered because oil production has been reduced, despite better prices. The austerity measures intended to reduce the large government debt are also a factor. Finally, as for Venezuela, the downward revision in that country's forecast reflects the dramatic drop in economic activity, including the decline in oil production, despite improved prices for this commodity.

The baseline forecast scenario described herein contemplates some increase in inflation in the advanced economies towards 2019. It should be noted that, for this year, the positive growth observed and anticipated in the United States and other advanced economies, above their potential, has increased the likelihood that inflationary pressures will emerge. Added to this is would be the persistence of high commodity prices, especially for oil.

For 2018, the central scenario contemplates an additional increase in the Fed's policy rate. Three more hikes are expected during 2019.

In this environment, another increase in the Fed's policy interest rate is expected before the end of 2018, which would be added to the three previous hikes decided at the meetings in March, June and September. So, by the end of 2018, this rate would be between 2.25% and 2.50%. Added to this would be the balance sheet reduction program, which would continue to be carried out according to what was announced. As for 2019, three additional hikes the Fed's policy rate are anticipated, which would place it in a range of 3.0% to 3.25% by the end of the year. As such, the Fed's rate hikes would be somewhat ahead of what was forecast in the June edition of this *Report*. In the case of the ECB, no increases in its policy rate are anticipated for the remainder of 2018, and the reduction in its asset purchase program is expected to continue, as announced.

The baseline forecast scenario assumes the gradual normalization of monetary policy in the advanced economies is having a moderate impact on risk perception and on the cost of financing for economies like the one in Colombia, which has managed its external debt prudently in recent years. Accordingly, in this scenario, the assumption is that Colombia's risk premium will rise gradually and should be at levels towards the end of 2019 that are close to its historical average (measured with credit default swaps).

The baseline scenario does not contemplate negative effects on economic growth resulting from new restrictions on international trade imposed by the United States and its business partners, especially China.

As for raw materials, the forecast for oil in 2018 (Table 1.2) was raised in this *Report*, since the price has stayed above USD 75 in recent months. For that reason, the price per barrel is expected to average USD 74.5 (Brent reference) in 2018 and USD 73 in 2019. As in the June report, this implies a drop in observed prices during what remains 2018 and in all of 2019. The factors that would contribute to this decline are: 1) an increase in supply in response to high prices, particularly in the United States; 2) a gradual erosion of the agreements reached by the Organization of Petroleum Exporting Countries (OPEC), and 3) a slowdown in the global demand for crude.

In this Report, the price per barrel is expected to average USD 74.5 (Brent reference) in 2018, and USD 73 in 2019.

The baseline scenario for the external context faces mainly downside risks, among which the following merit consideration:

Table 1.2
Benchmark Price Forecasts for Colombia's Commodity Exports

	2017	Forecasts for 2018			Forecasts for 2019		
		Scenario			Scenario		
		Minimum forecast	Baseline forecast	Maximum forecast	Minimum forecast	Baseline forecast	Maximum forecast
Brent crude (dollars per barrel)	54.79	72	74.5	76	65	73	81
Coal (dollars per ton)	70.32	82	84	87	61	76	86
Colombian coffee (*ex dock*) (dollars per pound)	1.52	1.33	1.36	1.39	1.2	1.4	1.6
Gold[a/] (dollars per troy ounce)	1,258	1,320	1,280	1,240	1,500	1,280	1,100

a/ This is assumed to be a haven value, because the price of gold increases when there is more uncertainty (a pessimistic scenario).
Sources: Bloomberg; calculations by *Banco de la República*.

- *An increase in the cost of external financing*: larger and / or faster hikes in the Fed's reference rate could raise the cost of financing for emerging market economies and particularly for Colombia, beyond what is contemplated in the baseline scenario.
- *More contagion of the financial stress faced by several emerging economies*: this would be reflected in higher risk premia for Colombia than those contemplated in the baseline scenario.
- *A negative impact on global growth due to the adoption of new protectionist measures by the United States and its trading partners*: an increase in these measures could have a significant negative effect on international trade, on supply chains, and on global economic growth.[4]
- *Faster cooling of the Chinese economy*: the high levels of leveraging in the Chinese economy pose a risk to that country's growth. Added to this would be a possible drop in the real estate sector and commercial tensions with the United States. For Colombia, the main effect of less growth in China could be its impact on prices for raw materials, especially oil.
- *More accentuated and persistent political risks*: The risks in Europe have increased recently, due to Brexit and the conflict surrounding the Italian government's fiscal deficit target, among other factors.

4 According to the estimates developed using the International Monetary Fund's (IMF) Global Integrated Monetary and Fiscal Model (GIMF), the impact on global growth in 2019 and 2020 resulting from the new restrictions announced on trade and the possible retaliation those restrictions could spark would be -0.20% and -0.23%, respectively, with most of costs being borne by China (2019: -1.2% and 2020: -0.9%) and the United States (2019: -0.2% and 2020: -0.27%). The adoption of additional measures for the automotive market, with retaliation, would have an impact in 2019 and 2020 of -0.25% and -0.35% on global growth, -0.61% and -0.69 % in the United States and -1% and -0.9% in China.

Between January and June 2018, the current account in the country's balance of payments registered a deficit of USD 5,991 million (3.6% of GDP), which is similar in US dollars to that of a year ago.

On the optimistic side, a favorable context for Colombia could be a higher oil price than the one anticipated in the baseline scenario. This could happen if the factors that have pushed the price upwards in recent months persist, such as lower production in Venezuela and Iran and the reluctance of some oil-producing countries outside OPEC (such as Russia) to increase the supply, so as to keep prices high.

1.2 Balance of Payments

1.2.1 Results for the First Half of 2018

Between January and June 2018, the current account in the country's balance of payments registered a deficit of USD 5,991 million (m), similar in dollars to that of a year ago, when it was USD 6,004 m. However, as a proportion of GDP, this came to 3.6%, and meant a reduction of 0.4 percentage points (pp) as opposed to the 4.0% observed in the first half of 2017.

Compared to what occurred in the first half of 2017, the current account deficit in 2018 declined by only USD 13 m. The outstanding aspects in that respect included less of a trade deficit in goods and services, which fell by USD 1,195 m, and an increase in current transfers, which were up by USD 386 m. As a result, it was possible to offset the increase of USD 1,568 m in net outlays for factor income.

The current account results for the first half of 2018 show the external deficit was explained by an increase of 14.3% in revenue, which exceeds the 11.8% rise in expenditure. It is important to point out that the increase in revenue originated largely with an improvement of the country's terms of trade, due to higher export prices.

The decline in the trade deficit for goods occurred thanks to USD 2,981m in export growth (16%), which largely offset the rise in imports (USD 1,862m, 8.5%). The increase in external sales occurred in an environment of higher prices for major commodities, especially oil and coal. Moreover, sales of industrial products were better than a year ago (+16.3%), consistent with the added economic growth experienced by our major trading partners. The rise in imports, on the other hand, was explained by generalized growth in several items, particularly input and capital goods for industry.

The improvement in the country's terms of trade helped to reduce the trade deficit and to correct the external balance in the current account as a share of GDP.

The service account deficit declined during the first half of the year compared to the same period in 2017, having fallen by USD 76 m. On the export side, the highlights include the increase in revenue from travel, as well as from sales of other services. The factors that stand out with respect to imports are the added outlays associated with transportation services, travel expenses, and financial services and insurance.

Net outlays for factor income rose by 1.568 m during the course of 2018 up to June. This is attributed, on the one hand, to increased profits for firms with foreign investment in the country's oil and mining sector and, on the other, to higher interest payments associated with loans and foreign debt securities.

The decline in the trade deficit is explained by an increase in exports that more than offset the rise in imports.

Net current transfers were up by 12.7% annually, thanks largely to the rise in worker remittances. With respect to this last item, the most important increases were in remittances sent from the United States, Spain and some Latin American countries.

As for external financing, USD 5,550 m in net capital flows were registered during the first half of 2018, similar to those of a year ago, when they came to USD 5,480 m. During this period, net direct investment came to USD 4,278m, having risen by 40% due to added inflows of foreign direct investment (FDI) as well as less of an outflow of Colombian investment abroad. The FDI received during this period breaks down as follows, according to economic activity: mining and oil (42.5%), financial and business services (15.8%), the manufacturing industry (11.8%), commerce and hotels (11.6%), transport and communications (11%), and other sectors (7.3%).

In terms of foreign portfolio investment, the country registered USD 293m in net payments for liabilities, while constituting, at the same time, USD 1,992m in financial assets abroad. The funds that were received originated with TES purchases by foreign investors, which made it possible to offset, in part, the amortization payments on long-term debt securities and the exit of foreigners from the stock market.

As for other capital flows, the country registered USD 3,557 m in net inflows during the first half of the year, mainly due to loans contracted with commercial banks and multilateral entities abroad. During the period under analysis, international reserves for balance of payments transactions increased by USD 286m, due to the net return on the portfolio. By June 2018, the balance of Colombia's net international reserves came to USD 47,491m; for September, this figure was USD 47,512 m.

1.2.2 Forecasts

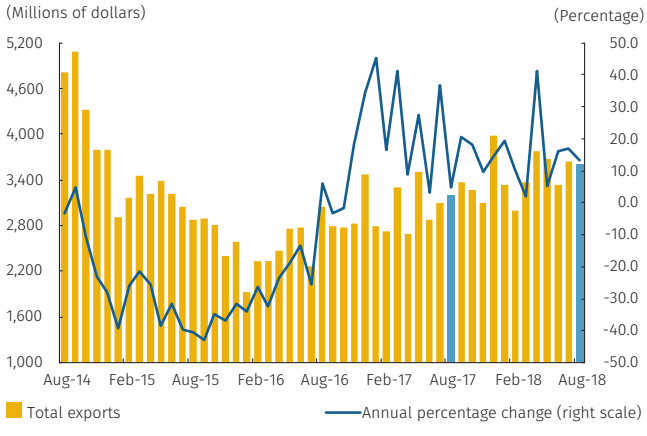
1.2.2.1 Estimate for the Third Quarter of 2018

During the first half of 2018, the financial account showed net capital inflows similar to those registered the year before.

The third-quarter 2018 figures for the external balance suggest its adjustment had come to a halt. Based on the information that is available, this *Report* forecasts a current account deficit for the third quarter of 2018 that is similar to what was observed in the immediately preceding quarter, both in dollars and as a proportion to GDP. This

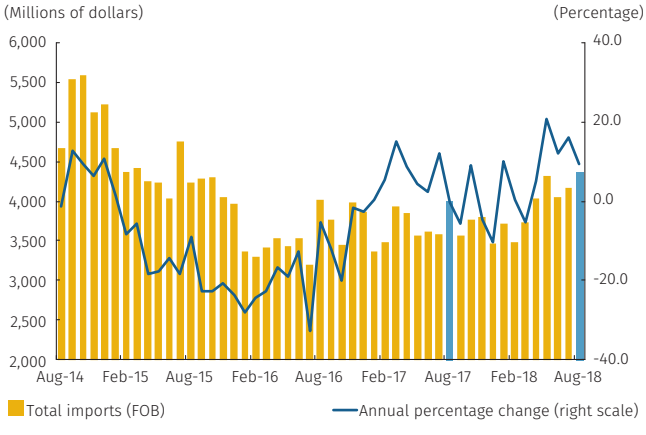
would have been close to 3.8% in terms of GDP. With regard to foreign trade in goods, the available data show total exports in dollars increased by USD 950m (15.1%) during the July-August period compared to the previous year (Graph 1.9), mainly because of an rise in the exported value of oil and its derivatives. Free on board imports (FOB)[5] were up by USD 952m during this same period (12.5% in annual terms), due to a generalized increase in the different product groups (Graph 1.10) (see the shaded section, p.25).

Graph 1.9
Total Exports - FOB
(Monthly)



Observation: The blue bars represent total exports at August 2017 and 2018.
Sources: DANE; calculations by *Banco de la República.*

Graph 1.10
Total Imports - FOB
(Monthly)



Observation: Blue bars represent total imports (FOB) at May 2017 and 2018.
Sources: DANE; calculations by *Banco de la República.*

On the other hand, the third-quarter deficit in non-factor services is expected to be somewhat less than the one registered in the same period a year ago, while the factor income deficit should increase due to higher profits for companies with FDI that operate in the mining and energy sector. Also, interest payments on loans and debt securities are expected to continue to be an important source of pressure on the current deficit, as has been the case since 2017. Moreover, an additional impact on service imports is forecast, due to expenses incurred by Colombian travelers abroad, as well as higher freight costs, due to the growth in imports and the rise in fuel prices.

5 Unlike the measurement of the balance of payments, which takes the FOB value of imports into account, the calculation of GDP based on the national accounts considers the cost, insurance and freight (CIF) of imports. CIF imports totaled USD8,928 m during the two-month period from July to August. This represents an annual increase of 12.4%.

Exports and Imports of Goods, in US dollars, during the Two-Month Period from July to August 2018

In the two-months from July to August 2018 total exports rose 15.1% in annual terms (Graph 1.9), supported by the growth in mining exports, which contributed nearly 16 pp to the total variation. In contrast, non-traditional and agricultural exports declined in annual terms by 1.1% and 2.4%, respectively.

Better international prices for mining exports continue to drive the sales in this sector.[1] A high point was the increase in crude oil exports, which rose 43.6% with respect to the same two months in 2017, contributing 12.3 pp to the variation in total exports during the period in question (Table A).

The growth in non-traditional exports came to a halt and they contracted by 1.1% with respect to the same two months last year (Graph A). This is explained, primarily, by the reduction in shipments to Venezuela, to the rest of the ALADI zone[2] and to the euro area. On the contrary, export performance improved in terms of sales to the United States (12.3%) and Ecuador (9.5%). As for exports to the United States, which is Colombia's main trading partner, the growth in non-traditional exports has been higher than in past months, having expanded 12.2% in annual terms during the period under study (Graph B).

With respect to traditional agricultural exports, external sales of flowers and bananas recovered, increasing by 7.7% and 20.4%, respectively, while coffee exports contracted 14.8% in annual terms. The total variation in exports with respect to this group of goods (-2.4%) is explained by a 4.9% drop in the price index, which was partially offset by a 2.5% rise in export volume.

As for FOB imports, the July-August period saw growth in all the groups of goods, with an annual increase of 12.5% in total imports, which is more than the rate of growth observed during the first half of the year (Graph 1.10). The biggest contribution was from the group comprised of intermediate goods (7.6 pp), propelled largely by the added momentum in imports of raw materials for industry (23.3%) and for agriculture (24.4%) (Graph C).

Within the capital asset group, which expanded 6.3% during the two-month period in question, capital goods for industry were the item that contributed the most (4.2 pp), followed by construction materials (1,4 pp) and transport equipment (1,0). Meanwhile, capital goods for agriculture posted an annual decline of 13.4%.

As for consumer goods, imports of non-durables rose 6.3%, supported by purchases of foodstuffs, pharmaceutical products and clothing. On the other hand, purchases of durable goods were up 20.3%, having recovered due largely to the increase in imports of vehicles for private transportation.

1 (1) Shaded area -The price index for mining exports rose 36.5% in July-August 2018 with respect to the same two-month period in 2917. The growth in this index during May-June was 39%.

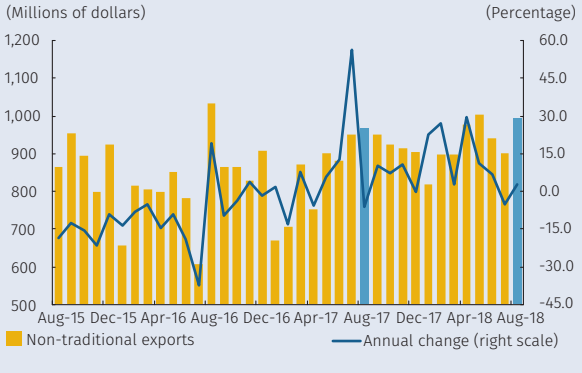
2 (2) Shaded area – The Latin American Integration Association (ALADI) without Venezuela, Ecuador, Peru and Mexico.

Table A
Exports and Imports of Goods, in US dollars, during the Two-Month Period from July to August 2018 (FOB)
(Percentage)

Group	Annual change	Items with important contributions to the annual change	
		Item	Annual change in the item
Total Exports	15.1		
Mining goods	27.5	Crude oil	43.6
		Coal, lignite and peat	4.1
All other exports[a/] (Non-traditional)	-1.1	Food and beverages	-10.4
		Automotive vehicles	-27.7
		Exports to Venezuela	-38.0
		Exports to the other ALADI countries	-8.3
		Exports to all other destinations	4.6
Agricultural goods	-2.4	Flowers	7.7
		Coffee	20.4
		Bananas	-14.8
Total imports	12.5		
Capital goods	6.3	Capital goods for industry	6.8
		Construction materials	13.8
Intermediate goods	17.0	Raw materials for industry	23.3
		Raw materials for agriculture	24.4
Consumer goods	12.5	Non-durable goods	6.3
		Durable goods	20.6

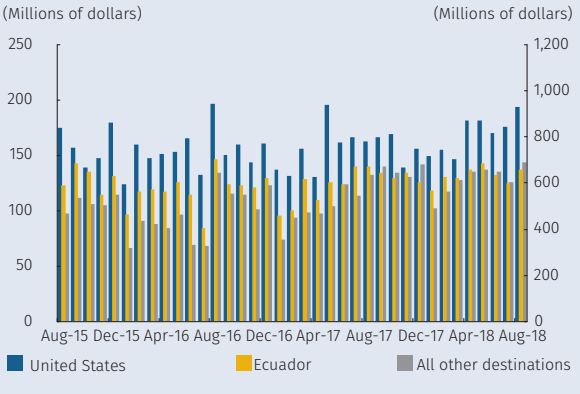
a/ This group does not include petroleum or derivatives thereof, nor does it include coal, nickel-iron, gold, coffee, bananas or flowers. It does include other mining and agricultural products. The majority are manufacturing exports.
Source: DANE; calculations by *Banco de la República*.

Graph A
Exports of Non-traditional Goods [a/] (FOB)
(Monthly)



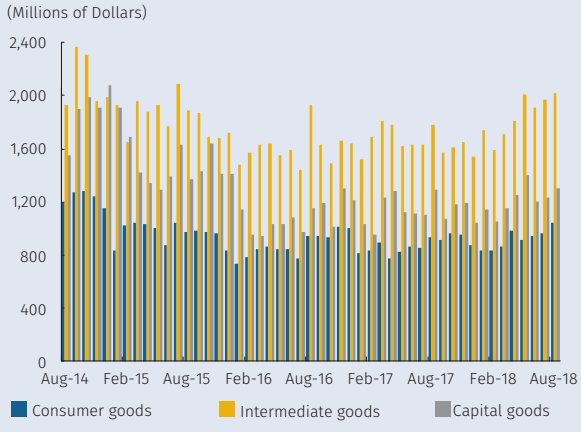
Observation: The blue bars represent non-traditional exports (FOB) pertaining to May 2017 and 2018.
a/ Excluding petroleum and derivatives thereof, coal, nickel-iron, gold, coffee, bananas and flowers. It includes other mining and agricultural products. The majority are manufacturing exports.
Source: DANE; calculations by *Banco de la República*.

Graph B
Exports of Non-traditional Goods by Destination: United States, Ecuador, Peru, Mexico, Venezuela and All Others[a/]
(FOB)



a/ Excluding petroleum and derivatives thereof, coal, nickel-iron, gold, coffee, bananas and flowers. It includes other mining and agricultural products. The majority are manufacturing exports.
Source: DANE; calculations by *Banco de la República*.

Graph C
Imports by Type of Goods (FOB)
(Monthly)



Source: DANE; calculations by *Banco de la República.*

In terms of capital flows, it is estimated that FDI during the third quarter of 2018 would have been similar to what was observed for the same period a year ago, thanks to the resources received by companies in the mining and oil sector, given the improved outlook for international prices. On the other hand, the available information on capital flows from the foreign exchange balance shows an annual drop in private-sector foreign portfolio investment resources between July and September.[6] Added to this are the resources from external loans contracted with multilateral banks, especially loans obtained by the government and other public-sector entities.

1.2.2.2 Estimate for all of 2018 and 2019

The forecast exercises done this *Report* indicate the current account deficit, in terms of GDP, would cease to adjust in 2018 and 2019, compared to what was observed in 2017. In the most likely scenario, the current deficit for 2018 would be around USD 11,650.m, which is 3.4% of GDP in a range between 3.2% and 3.6% (Table 1.3).

In the most likely scenario, the current account deficit for 2018 would be around 3.4% of GDP.

As for 2018 as a whole, the trade balance in goods is expected to continue to show a deficit, but less so than in 2017, largely because of the increase in exports of oil and industrial goods. The rise in external sales is driven mainly by better international prices for crude oil and

6 Although the capital flows registered in the foreign exchange balance do not correspond exactly to what is recorded in the balance of payments, since the former refer to the inflow and outflow of foreign currency, they do provide some idea of the trend.

Table 1.3
Balance of Payments
Annual Flows (Millions of US dollars)

	2014	2015	2016 (pr.)	2017 (pr.)	2018 (proj.)	2019 (proj.)
Current account (A+B+C)	-19,762	-18,564	-12,024	-10,591	-11,650	-11,978
Percentage of GDP	-5.2%	-6.3%	-4.2%	-3.4%	-3.4%	-3.4%
A. Goods and services	-11,863	-18,267	-12,679	-8,793	-8,018	-9,435
B. Primary income (factor income)	-12,521	-5,727	-5,225	-8,394	-11,015	-10,707
C. Secondary income (current transfers)	4,622	5,430	5,880	6,596	7,383	8,163
Financial account (A+B+C+D+E)	-19,292	-18,250	-12,275	-9,807	-11,430	-11,978
Percentage of GDP	-5.1	-6.2	-4.3	-3.1	-3.3	-3.4
A. Direct investment (ii-i)	-12,268	-7,505	-9,333	-10,324	-8,648	-9,102
i. Foreign investment in Colombia (FDI)	16,167	11,723	13,850	14,013	12,174	12,892
ii. Colombian investment abroad	3,899	4,218	4,517	3,690	3,525	3,790
B. Portfolio investment	-11,565	-9,166	-4,839	-1,414	160	-87
C. Other investment (loans, other types of lending and derivatives thereof)	104	-1,994	1,731	1,387	-3,708	-3,947
D. Reserve assets	4,437	415	165	545	767	1,158
Errors and omissions (E & O)	470	313	-252	784	221	0

(pr.) preliminary
(proj.): projected
Observation: The results presented in this table follow the recommendations outlined in the sixth edition of the Balance of Payments Manual proposed by the IMF. For additional information and changes in methodology, see http://www.banrep.gov.co/balanza-pagos .
Source: *Banco de la República.*

by the effect of the recovery in external demand for Colombian manufactured goods.

With respect to imports of goods, the estimate for annual growth in all of 2018 is 11%, continuing with the recovery observed in 2017. This is the result of the increase in economic activity forecast for this year, which should encourage imports in all sectors, in general. The added acquisition of capital goods in the mining-energy and transport sectors is also a contributing circumstance.

As for factor income, larger net outflows are anticipated in 2018, due to higher profits for foreign companies that operate in the mining and energy sector. This would be in line with the rise in export prices. The profits of companies that operate in the other sectors of the economy are expected to improve as well, consistent with the increase in growth that is forecast for the economy. Added to this would be an increase in interest payments on the external debt, due to the higher debt level and the hike in external interest rates.

The service deficit estimated for 2018 is less than in 2017. On the income side, there would be an increase due mainly to larger inflows associated with tourism, which would be consistent with the improvement in global economic growth. On the other hand, expenditures would rise owing to

By 2019, direct investment should continue to constitute the main inflow of capital into the country.

the higher cost of foreign travel for Colombians, the increase in shipping costs, and the growth in technical services for the petroleum industry, given the increased price of oil.

Finally, more net income from transfers is forecast, particularly because of the momentum observed in the world economy (see Section 1.1 in this chapter).

Regarding capital flows, direct investment during 2018 should continue to be the main item in terms of foreign capital inflows. Moreover, loans (net disbursements) contracted with multilateral lenders and foreign banks are expected to increase with respect to the net amortizations registered in 2017. As for portfolio investments, the baseline scenario for 2018 involves fewer bonds issued by the public sector and less momentum from foreign investors in the TES market.

By 2019, a slight setback in prices for Colombia's main exports is anticipated, while the momentum in external sales of industrial products is expected to make more of a contribution to the growth in exports of goods. The positive path towards import growth likely will continue, in line with the anticipated increase in economic growth. This would imply more of a trade deficit in goods compared to the forecast for 2018 (Table 1.3). In contrast, less of a deficit in non-factor services and factor income is expected, as is a positive contribution from income from remittances. Accordingly, the current account deficit forecast for 2019 in the baseline scenario comes to USD 11,978 m (3.4% of GDP) (Table 1.3).

As for financing, an increase in FDI and other investment flows is forecast for 2019, while TES purchases on the part of foreigners should continue, although at a slower pace. Additionally, the amount of bonds issued by the government and public entities is expected to decline, and portfolio outflows from by the private sector would increase.

02

Domestic Growth: Current Situation and Short-Term Outlook

Second-quarter GDP growth was similar to what it was in the first three months of the year.

The foregoing occurred in a context where the positive shock to consumption and the negative impact on investment observed in the first quarter would have dissipated more slowly than was predicted in the previous edition of this *Report*.

The third-quarter data points to an expansion in economic activity during that period, similar to the one registered in the first half of the year.

2.1 GDP Performance during the Second Quarter of 2018

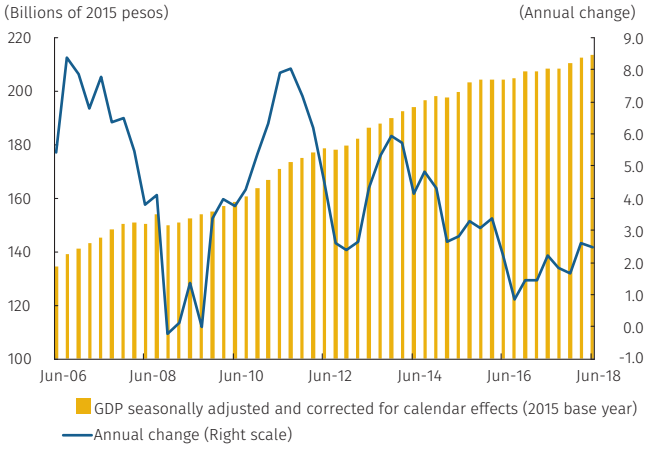
The results published by the National Bureau of Statistics (DANE) on GDP in the second quarter of the year,[7] adjusted for seasonality and calendar effects, showed 2.5% annual growth (Graph 2.1), similar to the 2.6% in the first quarter. This adjusted figure, which allows us to infer more accurately the direction in which the Colombian economy is headed, was similar to the central point of the forecast range outlined by *Banco de la República's* technical staff in the previous *Inflation Report* (between 2.0% and 3.0%, with 2.6% being the most

7 In its original series, the pace of GDP growth accelerated with respect to the records for the first three months of the year. The annual increase in the original series was 2.8% (as opposed to 2.2% in the first quarter of 2018).

likely outcome). The expansion between quarters was 0.6%, which implies a quarterly annualized rate of 2.3%

The second-quarter results show the positive shock to public consumption and the negative shock to investment in the first quarter would have dissipated and reversed, respectively, although at a slower pace than was implicit in the growth forecasts for the second quarter of 2018, as outlined in the previous *Inflation Report*. In this context, and in addition to the simultaneous dynamics of these shocks, domestic demand (measured as the combination of total consumption, plus gross capital formation) accelerated in the second quarter, thanks primarily to a recovery in private consumption and more of an accumulation of inventory. On the other hand, public consumption slowed (in line with expectations), but did continued to grow more than the main components of spending.

Graph 2.1
Gross Domestic Product
(Seasonally adjusted and corrected for calendar effects)



Source: DANE; calculations by *Banco de la República*.

Net exports contributed negatively to the increase in GDP. In this sense, even though the rate of export growth recovered, it was higher in the case of imports (Table 2.1). According to estimates by the Bank's technical staff, non-traditional exports would have increased during this period at relatively high positive rates, and would have offset the poor performance in terms of exported quantities of oil and coal. In principle, and as mentioned in Chapter 1 herein, this outcome is supported by the good performance of external demand. On the other hand, the acceleration in imports was due to more momentum in foreign purchases of capital goods (machinery and electronic equipment, mainly).

A more detailed breakdown of the performance of the different items that make up the GDP on the expenditure side shows the speed up in private consumption, which went from 2.0% to 2.6% annual growth between the first and second quarters, was driven by better performance for most of its components. On the one hand, the consumption of non-durables, semi-durables and services accelerated in a context where inflation remained stable at values close to the long-term target of 3.0%, consumer confidence rebounded compared to last year's figures, and the job market indicators showed no signs of deterioration. On the other hand, durable goods consumption grew at a slower pace, although more than what was registered for the aggregate in 2017.

Public consumption, for its part, continued to benefit from the positive shock at the beginning of the year, and registered 4.9% annual growth. This performance would have been related, largely, to the disbursement of resources to pay for the population census and the presidential elections, but also to a satisfactory degree of budget spending by regional and local government administrations.

In the second quarter, non-traditional exports in constant pesos would have grown at relatively high rates, offsetting the poor performance with respect to export volumes of oil and coal.

Table 2.1
Real Annual GDP Growth, by Type of Expenditure
(Seasonally adjusted and corrected for calendar effects, 2015 base year)

	2017				2017	2018	
	I Qtr.	II Qtr.	III Qtr.	IV Qtr.	Full year	I Qtr.	II Qtr.
End consumption expenditure	1.8	2.3	2.6	2.2	2.2	2.9	3.2
Household consumption	1.7	1.7	2.0	1.6	1.8	2.0	2.6
Non-durables	0.5	1.3	3.3	2.9	2.0	2.6	3.1
Semi-durables	-1.7	-3.5	-3.7	-0.5	-2.4	0.6	2.0
Durables	0.1	1.5	4.7	-3.2	0.7	5.2	1.8
Services	3.0	2.5	2.0	1.7	2.3	1.7	2.5
End government consumption	2.5	4.2	4.8	4.5	4.0	6.4	4.9
Gross capital formation	-2.6	-1.2	3.7	2.8	0.6	-3.2	0.5
Gross fixed capital formation	0.8	6.6	4.4	1.6	3.3	-2.6	-2.5
Housing	8.6	7.2	-0.5	-9.5	1.2	-5.4	-0.7
Other buildings and structures	2.5	1.2	0.5	-3.0	0.3	-5.6	-3.1
Machinery and equipment	-5.4	-1.6	2.0	-2.6	-2.0	1.6	0.6
Cultivated biological resources	7.9	-11.1	-5.0	7.1	-0.6	-2.1	1.1
Intellectual property products	4.6	14.7	18.7	20.7	14.6	7.2	4.4
Domestic demand (consumption + investment)	0.8	1.5	2.9	2.3	1.9	1.6	2.6
Total exports	-4.2	2.4	3.4	-4.1	-0.7	-0.3	2.6
Total imports	0.2	4.2	-0.0	-3.2	0.3	-1.4	4.8
GDP	1.4	2.2	1.8	1.6	1.8	2.6	2.5

Source: DANE; calculations by *Banco de la República.*

The results for gross capital formation (BCF) indicate a similar direction. Although this component of GDP posted annual increases near zero, they contrasted with the drop observed during the first three months of the year. However, it is important to point out that a large part of this improvement in performance was due to an added accumulation of inventory during that period, since gross fixed capital formation (GFCF) was down by 2.5% with respect to the same quarter in 2017, a figure similar to that of the first quarter (-2.6%). As for the subcomponents, investments in machinery and equipment, in biological and agricultural resources, and in intellectual property showed positive annual variations, while investment in construction (housing, buildings and civil works) suffered new setbacks. Investment in construction continued to have a tough time, as it has for more than a year.

As for the different sectors, the branches of the economy with the highest growth rates during the second quarter of the year were

professional, scientific and technical activities (7.6%), the sector dedicated to public administration and defense, education, health and social services (4.8%), and the agricultural sector (4.7%), in that order. On the contrary, there were significant declines in construction (-7.4%) and mining (-5.0%). Industry and trade saw moderate growth (Table 2.2).

The accelerated growth in the agricultural sector during the second quarter was due mainly to good performance in terms of coffee production. According to the National Federation of Coffee Growers (FNC), production was up by 13.2% during that quarter. In addition, livestock activity rose 4.9% during the same period, supported by increases in the production of cattle (4.6%) and hogs (9.5%).

Table 2.2
Real Annual GDP Growth by Branch of Economic Activity
(Seasonally adjusted and corrected for calendar effects, 2015 base year)

	2016	2017				2017	2018	
	Full year	I Qtr.	II Qtr.	III Qtr.	IV Qtr.	Full year	I Qtr.	II Qtr.
Agriculture, forestry, hunting and fishing	2.2	8.3	7.6	5.3	1.6	5.6	3.5	4.7
Mining and quarrying	-3.0	-7.6	-1.8	-4.9	-2.7	-4.3	-4.1	-5.0
Manufacturing industry	2.8	-1.0	-2.7	-1.5	-2.7	-2.0	0.5	1.7
Electricity, gas and water	-0.0	-1.0	1.0	1.6	1.7	0.8	1.2	2.4
Construction	3.0	0.8	-2.5	-4.9	-1.3	-2.0	-7.6	-7.4
Buildings	5.4	-3.3	-3.9	-9.1	-4.9	-5.3	-3.0	-7.6
Civil works	-3.2	6.6	4.9	7.8	10.6	7.5	-7.7	-5.5
Specialized construction activities	5.3	-3.6	-3.7	-6.3	-3.3	-4.2	-3.6	-9.2
Retail, repairs, restaurants and hotels	1.9	0.5	1.5	1.8	1.0	1.2	2.6	3.3
Information and communications	-0.8	-0.1	0.5	-3.0	2.5	-0.1	1.5	2.5
Financial and insurance activities	6.6	6.7	7.3	6.6	6.9	6.9	6.7	4.0
Real estate activities	3.3	3.2	2.8	2.6	2.5	2.8	2.3	2.1
Professional, scientific and technical activities	-2.3	0.6	3.6	3.6	6.2	3.5	7.1	7.6
Public administration and defense, education and health	3.6	3.9	4.8	4.0	2.7	3.8	6.9	4.8
Artistic, entertainment and recreational activities	5.5	9.1	2.7	1.0	3.0	3.9	1.6	3.1
Subtotal –value added	2.0	1.5	1.9	1.4	1.4	1.5	2.5	2.5
Taxes minus subsidies	1.2	1.0	5.0	6.0	5.4	4.3	5.7	2.6
GDP	2.0	1.4	2.2	1.8	1.6	1.8	2.6	2.5

Sources: DANE; calculations by *Banco de la República*.

Mining, for its part, weakened even more in the second quarter of the year, given the limited growth in oil production during that period (0.7%) and the sharp drop in the output of coal (-5.9%). It is important to note that the mining sector has experienced setbacks since 2016, as a result of less investment in long-term projects in the sector. This, in turn, is a consequence of the plunge in international prices for mining products in mid-2014.

The manufacturing industry accelerated slightly in the second quarter.

In contrast, the manufacturing industry accelerated somewhat during the second quarter of 2018, having grown 1.7%. Industry, without oil refining, rose 1.1%. The highlights include the positive performance of chemical product manufacturing (5.4%), meat processing and preservation (6.2%) and beverages (5.4%). Yet, despite this good outcome, a survey by the National Association of Colombian Business Owners (ANDI) shows its members still perceive demand (both domestic and external) as the main problem facing industry, followed by the cost of raw materials. Both these phenomena would have reduced the positive impact accumulated depreciation was expected to have on industrial activity.

The services-related sectors contributed positively to economic growth during the April-June period and are still the most dynamic component of GDP on the supply side. In particular, professional, scientific and technical activities, which account for 7.3% of GDP, continued to grow at an important pace (7.6%). The branch involving public administration and defense, education and health also increased, although at a more moderate rate than during the previous quarter (4.8%). Part of, this momentum could be attributed to electoral activities and those related to the population census, which took place in the second quarter. On the other hand, growth in the financial and insurance sector was more moderate, but continued at a relatively high rate (4.0%).

Finally, as mentioned, poor performance in the construction sector persisted throughout the second quarter, with sharp cutbacks in building construction (-7.6%) and civil works (-5.5%). In the first case, according to the figures from the DANE Building Census on square meters of work in progress, the reductions occurred in both the residential (-9.1%) and non-residential (-9.4%) segments. Setbacks in the construction of several freeways that are part of the so-called fourth generation (4G) road projects continued to contribute to the poor performance in the non-residential segment. Among other factors, this was due to delays in financial closure for a number of these initiatives. As a result, the subsector comprised of specialized activities for construction also declined sharply (-9.2%).

Construction continued to perform poorly during the second quarter, with reductions in buildings and civil works.

Job Market Performance in the Third Quarter of 2018

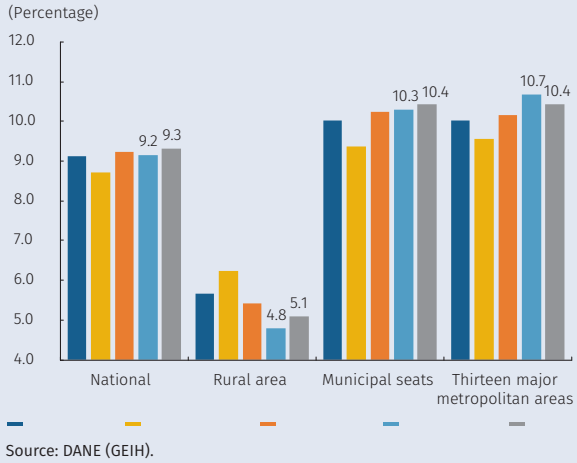
According to the information up to August 2018, the unemployment rate (UR) increased slightly with respect to the national total and declined in the thirteen major metropolitan areas, compared to what was observed for the same period in 2017 (Graph A). However, a look at the seasonally-adjusted series (moving quarter) shows no evidence of deterioration with respect to these same rates in the second quarter of 2018: the national UR averaged 9.5% between July and August, remaining unchanged compared to the average for the second quarter of 2018, while the UR for the thirteen major metropolitan areas was 10.4%, between July and August, which is less than the figure observed between April and June (10.6%) (Graph B).

The decline in the UR in the thirteen areas was accompanied by stability in labor supply and demand, evidencing a change in the downward trend observed in both series over the last two years. The average urban occupation rate (OR) was the same at it was last quarter (59.7%), but higher than the rate in the first quarter of 2018 (59.2%), while the overall participation rate (OPR) declined less compared to the previous quarter (having gone from 66.8% to 66.6%), but stayed at higher levels than those witnessed in the first quarter of the year (66.3%) (Graph C).

As for the number of occupied persons, the seasonally-adjusted figures in recent months signal few changes compared to the second quarter. In terms of the national level and the thirteen major metropolitan areas, the average number of occupied persons between July and August increased by 0.1% in both domains. This is with respect to the average for the second quarter of the year. A look at the annual variations during the moving quarter ended in August shows an increase of 0.4% in the national total and 0.3% in the thirteen areas (Graph D, panels A and B). The positive change in the national total was explained mainly by slight improvements in urban employment and the good momentum in employment in the service sectors, manufacturing and commerce. In contrast, agriculture, construction and real estate activities were the branches of the economy that subtracted from job creation in the last quarter.

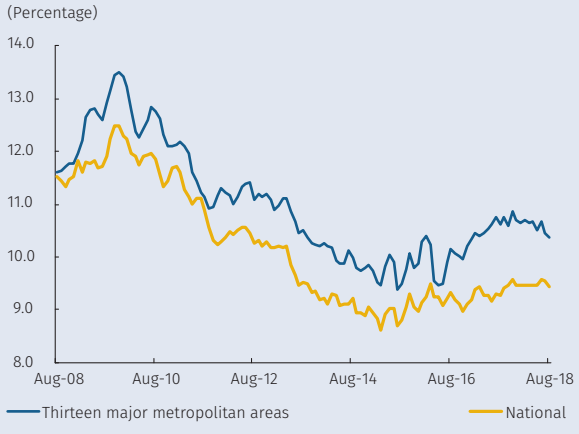
In the urban area, the added momentum in the demand for labor was explained by the performance of non-salaried employment, without this having implied at setback in salaried employment. During the quarter ended in August, the number of occupied non-salaried workers rose by 0.5% annually, while the variation in salaried workers was 0.2% (Graph E). For its part, formal employment[1] began to register positive annual changes during

Graph A
Unemployment Rate
(June-July-August moving quarter)



Source: DANE (GEIH).

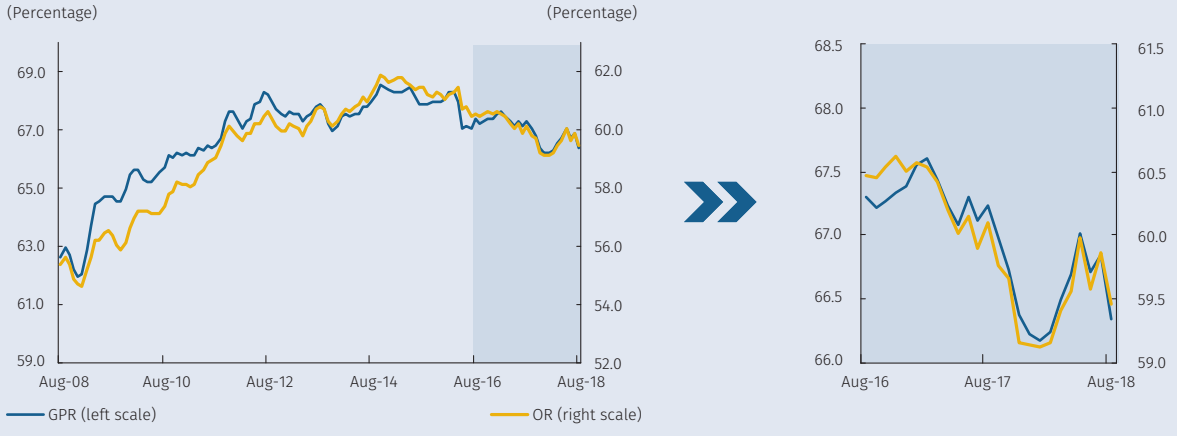
Graph B
Unemployment Rate
(Seasonally adjusted moving quarter)



Source: DANE (GEIH).

1 (1) Shaded area - According to the definition used by DANE, which is based on resolutions adopted by the United Nations International Labor Organization (ILO), employers and workers in companies with up to five workers, unpaid family workers, unpaid workers in other household companies or businesses, domestic workers, day laborers or unskilled farm workers, and independent laborers who work in establishments of up to five people, with the exception of independent professionals, are regarded as informal workers (DANE, 2009).

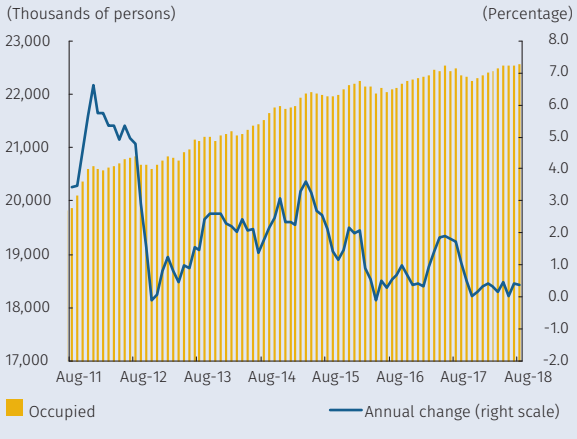
Graph C
Global Participation Rate and the Occupation Rate
(Thirteen major metropolitan areas, seasonally adjusted)



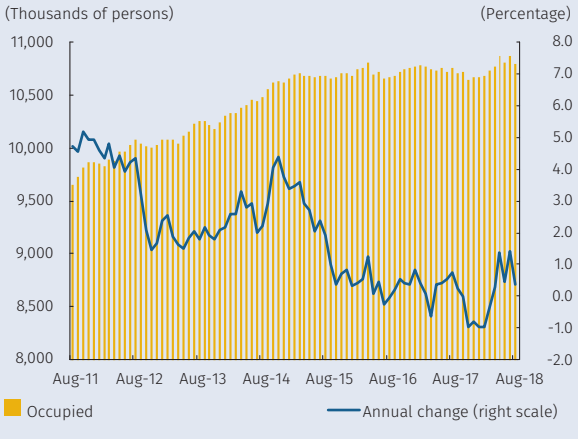
Source: DANE (GEIH).

Graph D
Number of Occupied Persons
(Seasonally adjusted and annual change)

A. National total



B. Thirteen major metropolitan areas

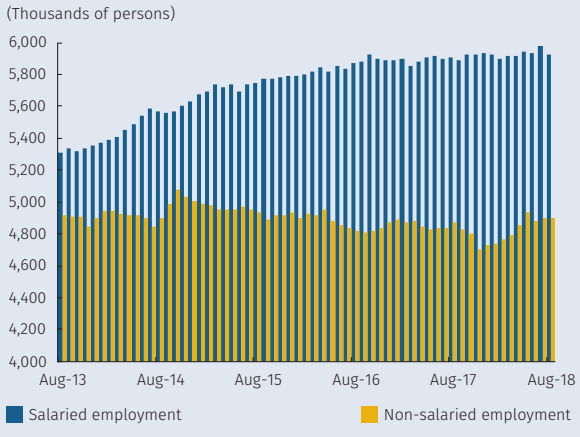


Source: DANE (GEIH); calculations by *Banco de la República.*

this quarter, after having posted negative adjustments since midway through last year(Graph F). Accordingly, the rate of informal employment registered a quarterly reduction in the thirteen major metropolitan areas.

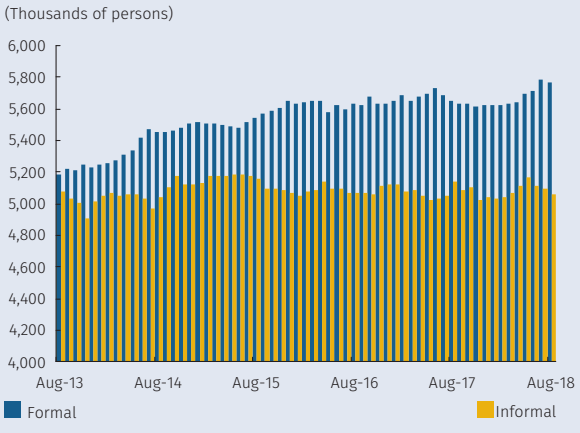
This being the case, the urban job market has shown early signs of recovery that helped to keep the national indicators stable. Stability was observed in the quarterly averages for the OPR and the OR in the thirteen areas, together with an increase in the number of non-salaried employees, without this having involved deterioration in better-quality employment. The next few months could see moderate reductions in the UR, given the prospects for a recovery in economic activity; however, no major improvement in the job market is expected.

Graph E
Employment by Type of Occupation
(Thirteen major metropolitan areas, seasonally-adjusted moving quarter)



Source: DANE; calculations by *Banco de la República.*

Graph F
Employment by Formality
(Thirteen major metropolitan areas, seasonally-adjusted moving quarter)



Source: DANE (GEIH); calculations by *Banco de la República*).

2.2 GDP in the Third Quarter of 2018

Given the information that is available for the third quarter of 2018, the technical staff at *Banco de la República* expects the rate of GDP growth during that period (seasonality adjusted and corrected for calendar effects) to be similar to what it was in the first half of the year; that is, around 2.6% annually. This forecast indicates total consumption that would have slowed somewhat on the margin, primarily due to less of an increase in the public component. Private consumption, on the other hand, would have seen no significant changes in its growth rate. As for gross capital formation (BCF), performance with respect to this GDP item is expected to be mediocre. In this sense, the improved performance exhibited by investment in capital goods for industry and other sectors would not have offset entirely the difficult situation for investment in construction. In this scenario, domestic demand would have slowed slightly in the third quarter. The forecast also includes some increase in the real foreign trade accounts, more for exports than for imports. Even so, net exports would continue to contribute negatively to GDP growth.

The growth scenario described above would have emerged in a context where some of the downside risks identified in past reports have materialized. The negative shock to civil works during the first half of the year is a case in point and would not have dissipated in the third quarter, as expected. Its reversal is likely to begin during the fourth quarter and to consolidate in 2019, as explained in Chapter 4 of this *Report*. Another risk that could begin to materialize is a slower growth rate for the economies in the region, which could weaken the

The negative shock to civil works witnessed during the first half of the year would not have dispelled during the third quarter.

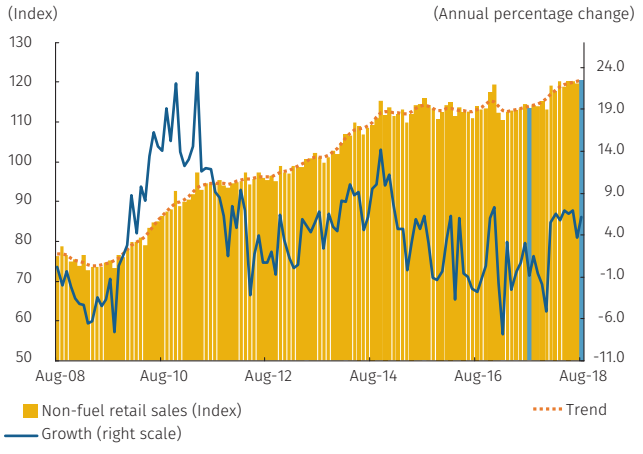
expansion in non-traditional exports. And so, the Colombian economy would have grown at a slightly slower pace during the third quarter than what was implicit in the GDP forecasts outlined in the report presented three months ago.

The results for most of the short-term indicators support the technical staff's forecast that was escribed earlier. According to figures from the DANE Monthly Retail Trade Survey (EMCM), non-fuel retail sales were up 6.1% annually by August (Graph 2.2). The aggregate of this index for the July-August period showed an increase of 4.9% compared to the same period in 2017, representing a slowdown with respect to the figure reported for the second quarter (6.8%). When vehicle sales are discounted, the rest of the aggregate rose 5.4% annually during the same month (Graph 2.3). For the two-month period in question, the expansion was 3.9% annually, which also meant a slowdown compared to the second quarter (when growth was 6.2%).

In the case of automotive retail sales, the same survey shows the vehicle sales index for August increased by 11.0% with respect to the same month in 2017 (Graph 2.4). The expansion indicated in the aggregate for that two-month period was of equal scale, slightly above the figure on record for the second quarter (10.3%). The vehicle registration series published by Fenalco suggests a similar situation. In September, these registrations were up 10.7% annually, which meant the third-quarter aggregate increased 5.6% with respect to the same period in 2017 (compared to 3.8% last quarter).

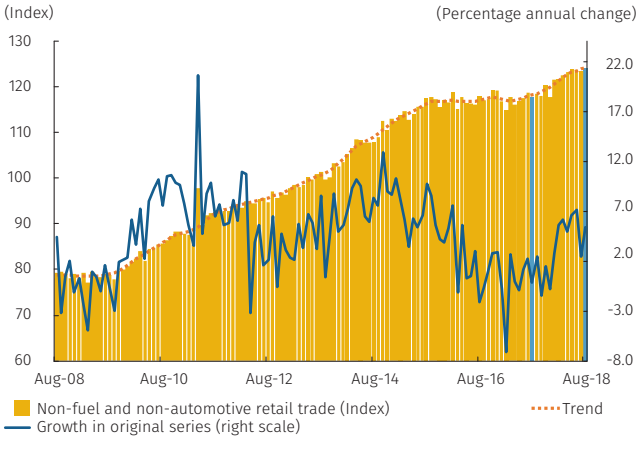
Other indicators that closely correlate with household consumption also point to modest performance by this GDP component during the third quarter of 2018. Particularly, in September, the consumer confidence index (CCI) published by Fedesarrollo declined with respect to what was observed in previous months, and entered negative terrain after five months of positive figures (Graph 2.5). The average CCI for the third quarter is lower than it was in the previous period, which could suggest growth in private consumption was less than the amount contemplated in

Graph 2.2
Monthly Retail Trade Survey
(Total Non-fuel Retail Sales, Seasonally adjusted and corrected for calendar effects)



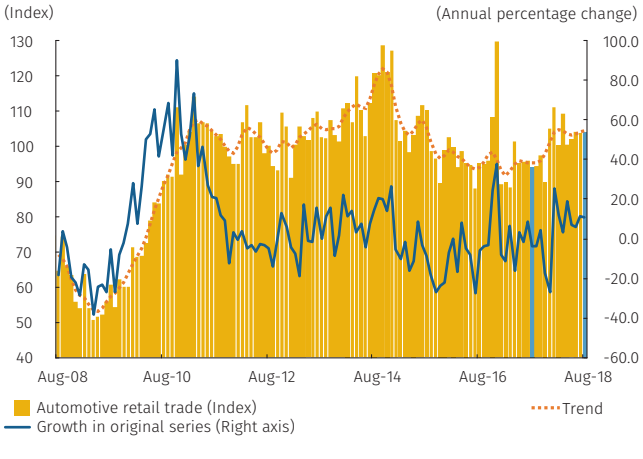
Sources: DANE; calculations by *Banco de la República.*

Graph 2.3
Monthly Retail Trade Survey
(Total non-food and non-automotive retail trade, seasonally adjusted and corrected for calendar effects)



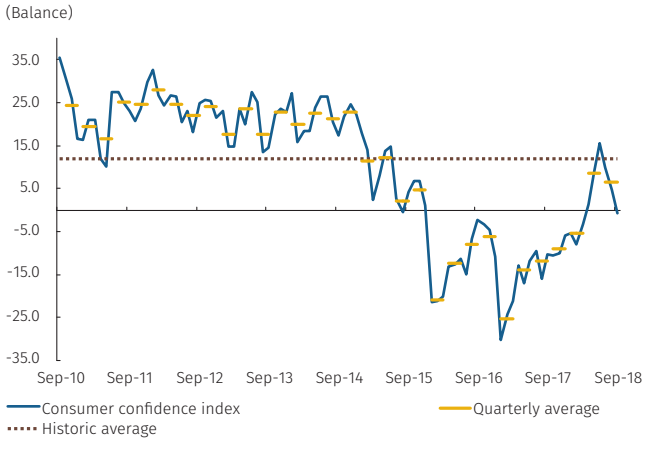
Sources: DANE; calculations by *Banco de la República.*

Graph 2.4
Monthly Retail Trade Survey
(Automotive vehicle retail sales, seasonally adjusted)



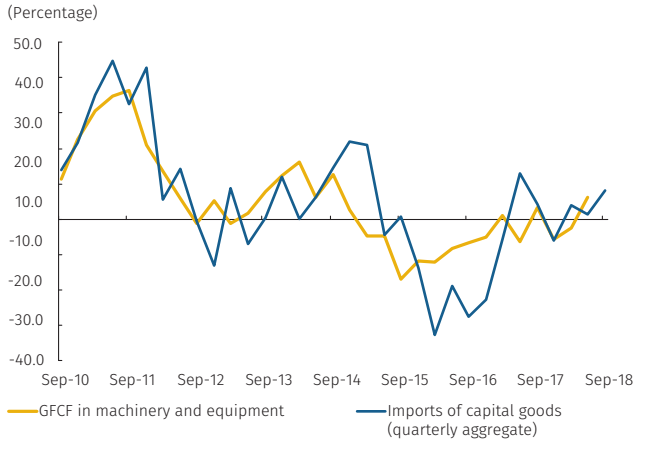
Sources: DANE; calculations by *Banco de la República.*

Graph 2.5
Consumer Confidence Index and Quarterly Average



Source: Fedesarrollo.

Graph 2.6
Imports of Capital Goods
(Real) and GFCF Excluding Construction Machinery and Equipment
(Annual change)



Sources: DANE (national and foreign trade accounts) and DIAN; calculations by *Banco de la República*.

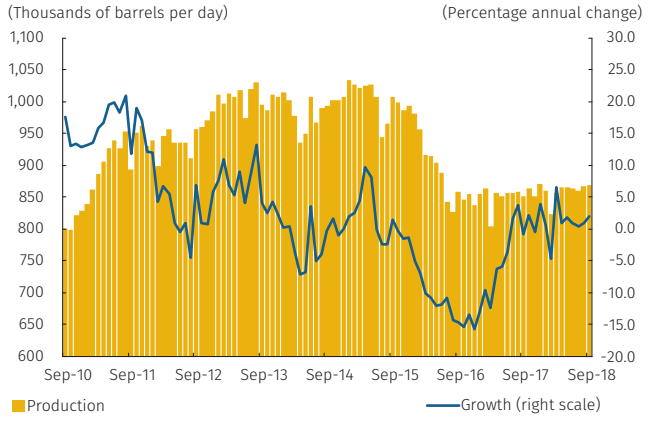
previous editions of this *Report*. The figures for the seasonally-adjusted sales balance series in *Banco de la República's* Monthly Survey of Economic Expectations (EMEE) indicate a similar state of affairs. At the cut-off in August, this indicator also implies the pace of growth of household spending would have remained at levels akin to those posted in the second quarter. Considering all of the above, the expectation is that household consumption will continue to expand at a moderate pace, like what it was in the previous quarter.

With respect to the GCF forecasts, the technical staff estimates the demand shock to investment in construction during the first half of the year will take longer than expected to reverse. In this context, the information at hand for the third quarter of 2018 suggests GCF would have grown at rates that were positive but not much different from those in the second quarter, and still a long ways from the average calculated since 2006 (6.9%). In principle, the figures on imports of capital goods, in dollars, that were published by DANE, in constant pesos, (and the foreign trade reports, according to DIAN) anticipate some acceleration in the growth of investment in machinery and equipment (Graph 2.6).

Likewise, the baseline forecast presented by the technical staff in this *Report* suggests the poor situation for GCF in construction continued during the third quarter, with a standstill in the levels of the aggregate for investment in construction of other buildings and structures. This would reflect the surplus supply in the non-residential sector and the effect delays in financial closure have had on investment in a number of infrastructure projects.

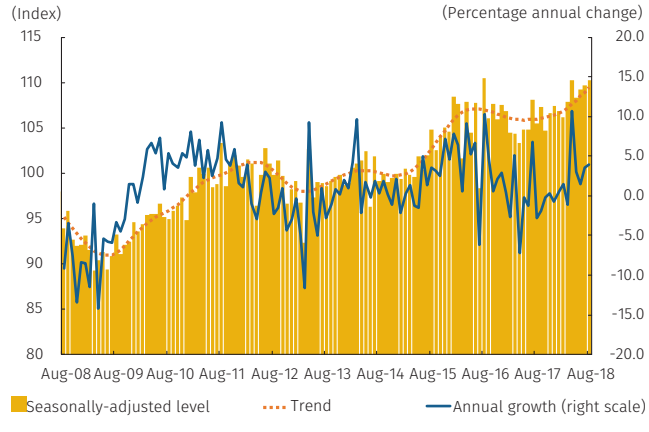
Finally, when it comes to foreign trade, real exports and imports are expected to increase, as was mentioned earlier. In the first case, better performance would be related, above all, to an improvement in exports of non-traditional goods and services. This would be consistent with the relatively good economic growth exhibited by our main trading partners. As for imports, the figures in dollars (converted to constant pesos) published by DANE and DIAN show increases with respect to the records for previous quarters. These would be related to better performance with respect to private consumption and investment other than in construction.

Graph 2.7
Oil Production
(Monthly and annual growth)



Source: Agencia Nacional de Hidrocarburos (ANH); calculations by *Banco de la República.*

Graph 2.8
Total Real Manufacturing Industry Production
(Seasonally adjusted series, trend component and annual growth)



Sources: DANE; calculations by *Banco de la República.*

As for the different branches of economic activity, the available indicators suggest performance was mixed during the third quarter of 2018. They also point to slightly more GDP growth than during the second quarter.

With respect to mining, the sector is expected to recover somewhat, mainly on the basis of coal production. It was affected by weather during the first half of the year, but some trade associations foresee a recovery in the coming months. On the other hand, average oil production during the third quarter (865 thousand barrels per day: TBD) rose 1.1% annually and was similar to what it was in the second quarter (Graph 2.7).

As for the manufacturing sector, the forecast models used by *Banco de la República*'s technical staff suggest growth was somewhat more pronounced during the third quarter than in previous months. This projection also is supported by the good growth in raw material imports. Moreover, according to the DANE Monthly Manufacturing Survey (EMM), with figures seasonally adjusted and corrected for calendar effects, production in this sector rose at a monthly rate of 0.6% in August, implying a build-up. The trend component of this series also suggests a recovery (Figure 2.8).

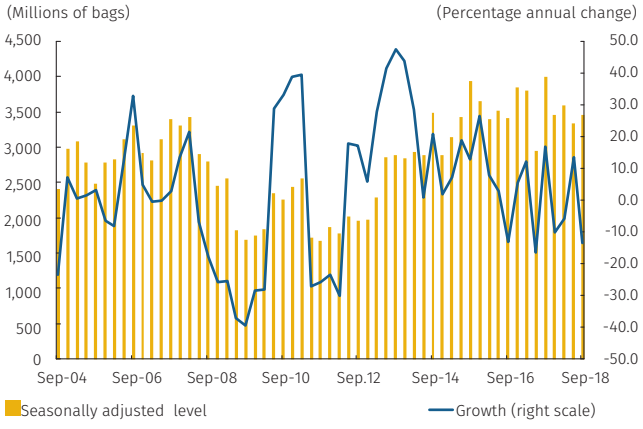
The construction sector is expected to deteriorate somewhat during the third quarter. This is because the poor performance in civil works is expected to begin to reverse slowly. However, it is important to clarify that the bulk of production in this branch if the economy would be postponed until the fourth quarter of 2018 and, above all, until 2019. On the other hand, building construction would continue to suffer tough times, as signaled by several indicators related to this activity; For example, the total number of licenses for construction and housing fell sharply in August (-10.3% and -11.6%, respectively).

With respect to the agricultural sector, the figures point to less growth than during the second quarter. As for permanent and temporary crops, the FNC says coffee production was down 13.8% annually during the third quarter (Graph 2.9). Moreover, according to the figures compiled by growers' associations, the performance of other crops (some cereals and vegetables) during the quarter has been mixed. Finally, the figures for livestock denote positive growth in this sub-sector

(4.3% annually during July-August for the slaughter of cattle and hogs), but somewhat less than in the second quarter.

Finally, in terms of the service sector, the figures on real income obtained from the DANE Monthly Survey of Services point to higher growth during the July-September period for sectors such as information and communications and artistic and entertainment activities. This is compared to the quarter before. Quarterly growth in financial and insurance services is expected to accelerate, but the basis of comparison implies that annual growth during the third quarter would be more moderate.

Graph 2.9
Coffee Production
(Quarterly and annual growth)



Sources: Federación Nacional de Cafeteros; calculations by *Banco de la República.*

Based on the results of the forecast models and taking into account all of the above, the technical staff estimates GDP growth in the third quarter of 2018, seasonally adjusted and corrected for calendar effects, would have been between 2.1% and 3.1%, with 2.6% being the most likely figure. The breadth of the forecast range is consistent with the doubt surrounding the performance of domestic and external demand, and the assumptions of the different balance of payments scenarios for that period. As in the previous edition of this *Report*, it is important to point out that the uncertainty associated with the recent change in the base year and the possible revision of the GDP growth figures mean the technical staff`s forecast is subject to a great deal of uncertainty.

03

Recent Developments in Inflation

Annual consumer inflation remained stable at around 3.2% during the third quarter, somewhat surpassing the long-term target.

Likewise, the average of the core inflation indicators has not changed significantly since last April and is still near 3.3%.

The stability of annual inflation in recent months was favored by weak demand, coupled with what is still limited pass-through to the CPI of the rise in the exchange rate.

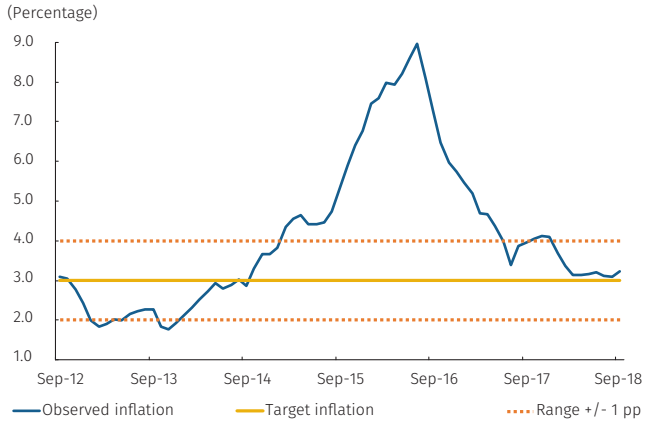
So far this year, inflationary pressures have focused on perishable foods and, to a lesser extent, on regulated items.

3.1 General Performance

In September, annual headline consumer inflation stood at 3.23%, a figure similar to the one observed the quarter before. In recent months and since March, this indicator has remained relatively stable, following the sharp drop witnessed at the beginning of the year once the effects of the upward shock disappeared, thanks to implementation of the 2017 tax reform, among other factors (Graph 3.1 and Table 3.1).

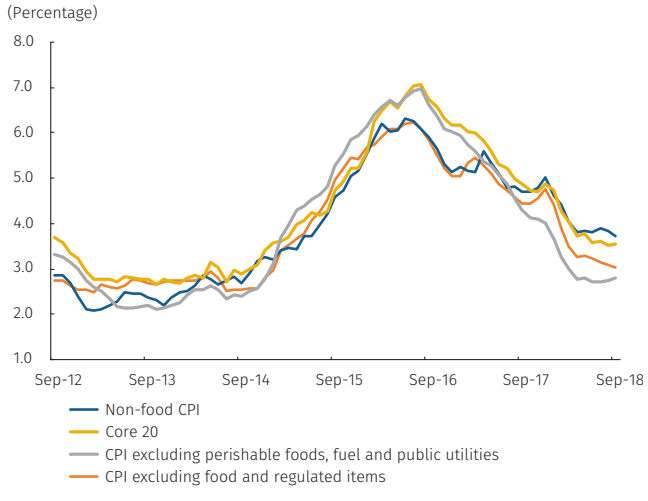
Core inflation followed a similar path, fluctuating around 3.3% since April and ending the third quarter at 3.28%. This is according to the average of the four indicators monitored by *Banco de la República*. By last month, the non-food consumer price index (CPI) was the indicator with the highest level (3.71%), while the CPI excluding staple foods, fuel and public utilities was the lowest (2.81%) (Graph 3.2 and Table 3.1).

Graph 3.1
Consumer Price Index



Sources: DANE and *Banco de la República.*

Graph 3.2
Core Inflation Indicator



Sources: DANE; calculations by *Banco de la República.*

The current weakness in demand, coupled with growth below its potential and surplus production capacity, has limited price adjustments, especially for non-tradable goods and services. Moreover, there has been very little pressure from the exchange rate, among others, because the pass through of depreciation to the CPI in recent months has been insubstantial and because the weakening of the peso between April and September was not pronounced, having reached levels that are not very different from those observed in 2017. Peso depreciation during this period would have had only a moderate effect on some items in the basket of consumer goods and services, especially on certain regulated foods and services.

In the third quarter, perishable foods and regulated goods and services began to exert upward pressure on annual consumer inflation, partly as was predicted in previous editions of this *Report*. In the case of food, this trend would have contributed to several specific supply shocks and to an unfavorable statistical base of comparison. Inflation in regulated items, on the other hand, has been driven by increases in the price of oil and by regulatory changes that explain readjustments in public utility rates. Both these phenomena are outlined in detail later.

In the last month, non-labor costs would have been the source of some upward pressure on consumer prices, as is evidenced by the behavior of the producer price index (PPI) (Graph 3.3). After a period of decline, annual inflation in the total PPI for domestic supply (produced and consumed domestically, plus imported) went from 2.45% in August to 3.77% in September. Both the imported component (affected by depreciation) and the local component (for food and mining) rose during September. The depreciation of the peso, the increase in the international price of oil and the upswing in prices for several products of agricultural origin explain this break in the trend.

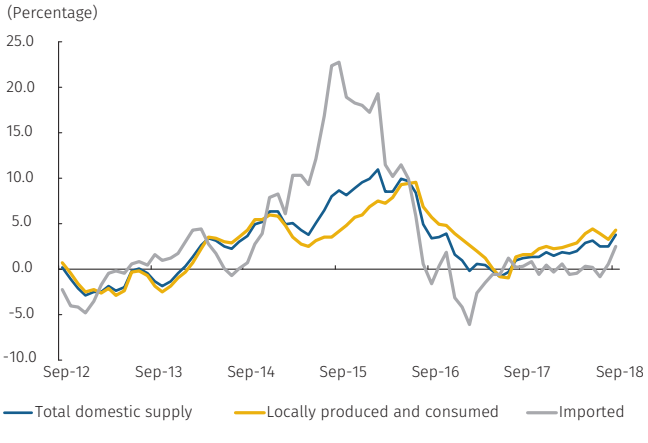
In contrast, with respect to labor costs, the information available by August showed no additional inflationary pressures. Salaries in industry (up 4.8%), in commerce (6.6%) and in construction, both housing (3.8%) and heavy construction (3.7%), remained unchanged during the last two quarters (Graph 3.4). It should be noted that recent estimates of the unemployment rate are above the non-accelerating inflation rate of unemployment (NAIRU) for 2018. This allows us to expect low inflationary pressures from

Table 3.1
Consumer Inflation Indicators
(At September 2028)

Description	Weighted	Jun-17	Sep-17	Dec-17	Jun-18	Jul-18	Aug-18	Sep-18
Total	100.00	3.99	3.97	4.09	3.20	3.12	3.10	3.23
Non-food	71.79	5.12	4.71	5.01	3.81	3.91	3.83	3.71
Tradables	26.00	4.41	3.41	3.79	1.83	1.57	1.67	1.57
Non-tradables	30.52	5.21	5.21	5.49	4.27	4.31	4.16	4.13
Regulated	15.26	6.01	5.68	5.86	5.82	6.60	6.36	6.03
Food	28.21	1.37	2.22	1.92	1.74	1.23	1.34	2.05
Perishables	3.88	-14.72	-0.32	5.84	8.47	5.30	6.10	9.51
Processed	16.26	3.29	0.84	-0.91	-0.91	-1.09	-1.18	-0.72
Eating out	8.07	7.62	6.01	5.21	3.13	3.30	3.46	3.32
Core inflation indicators								
Non-food		5.12	4.71	5.01	3.81	3.91	3.83	3.71
Core 20		5.31	4.87	4.87	3.58	3.61	3.54	3.56
CPI excluding perishable foods, fuels and public utilities		5.07	4.31	4.02	2.71	2.72	2.76	2.81
Inflation excluding food and regulated items		4.87	4.44	4.76	3.23	3.14	3.10	3.04
Average of all indicators		5.09	4.58	4.66	3.33	3.35	3.31	3.28

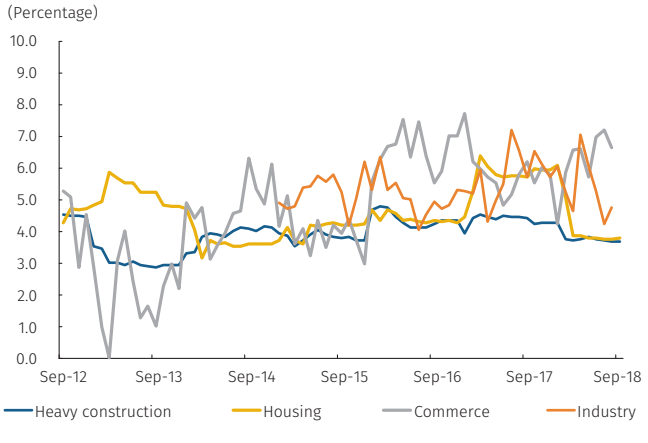
Source: DANE; calculations by *Banco de la República.*

Graph 3.3
PPI, by Origin
(Annual change)



Source: DANE.

Graph 3.4
Nominal Wages
(Annual change)



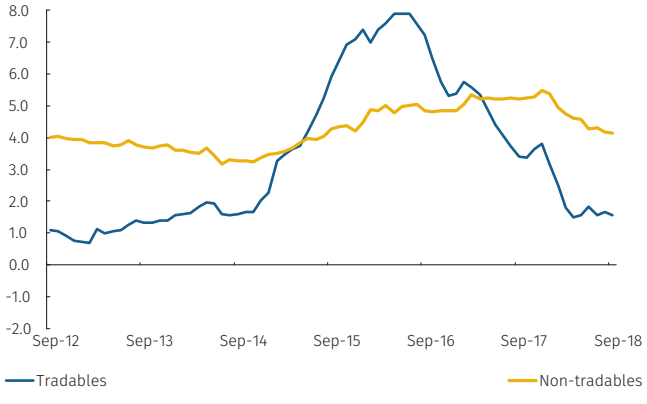
Source: DANE; calculations by *Banco de la República.*

the job market during the remainder of this year, as mentioned in Chapter 4 of this *Report*.

3.2 Performance by Components

When analyzing the four major groups in the CPI (tradables, non-tradables, regulated items and food) one sees two opposite inclinations that have affected the momentum in consumer prices so far this year. The first one, which explains the drop in annual inflation during this period, focuses on the tradable and non-tradable component of the CPI basket. The second exerts upward pressure and is led by food (especially perishables) and by regulated items (particularly public utilities).

Graph 3.5
CPI for Tradables and Non-tradables Excluding Food and Regulated Items
(Annual change)
(Percentage)



Source: DANE; calculations by *Banco de la República.*

Downward pressure from the tradable CPI was observed between December 2017 (3.79%) and September of this year (1.57%), with a descending trend that has yet to incorporate the pass-through of peso depreciation in recent months (from COP 2,800 per dollar in April to nearly COP 3,100 in mid-October, when this Report was produced) (Table 3.1 and Graph 3.5). In fact, tradable inflation has been quite stable since last April, moving in a range between 1.51% and 1.83%.

Although an upward adjustment in this sub-basket is expected, given the lag in exchange rate pass-through to the CPI, together with the recent rebound in the dollar, it is likely this pass-through will weaken during the remainder of the year, due to the downward effect of the reductions in vehicle prices that usually come with the biannual automobile show scheduled to be held in early November. The weight of this item in the basket of consumer goods and services is relatively high (4.35%).

Likewise, the annual variation in the non-tradable CPI has contributed to the drop in annual inflation, as it has decreased gradually during 2018 (Table 3.1, Graph 3.5). It went from 5.49% in December 2017 to 4.27% in June and 4.13% in September. This bearish performance reflects the weakness of demand and a lower rate of indexing for a number of prices.

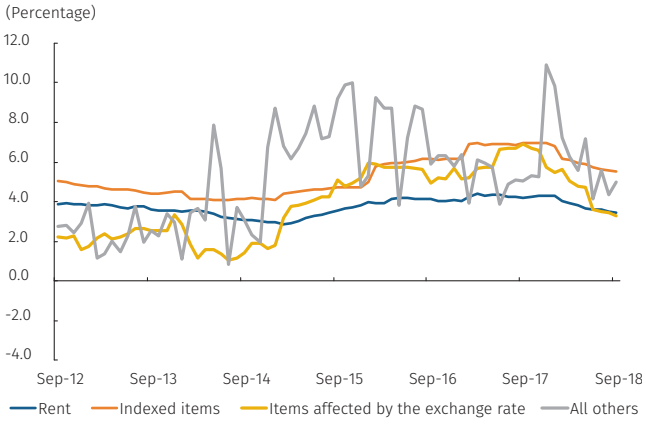
The reduction in the rate of inflation was generalized within this group, with rentals perhaps being the least relevant (since they account for 18.6% of the basket). The annual adjustment went from 4.28% in December to 3. 61% in June and 3.45% in September. This performance is consistent with the appearance of some surplus supply of housing in certain strata, as well as lower indexing levels.

Likewise, inflation in the so-called indexed subgroup (which includes education and health services, among others) declined from 6.96% in December to 5.76% in June and to 5.54% in September. Yet, despite the drop, this subgroup remains high with respect to the inflation target, which is an indication there is still significant inflationary inertia (Graph 3.6).

The adjustments in non-tradable items, affected through exchange rate costs, suggest continuation of the downward trend witnessed so far this year (5.72% in December, 3.61% in June and 3.27% in September), confirming (as noted above) that even the pass-through of peso depreciation to the CPI is weak. Likewise, inflation in the "all others" subgroup (which includes soccer tickets) declined from 10.88% in December to 4.97% in September.

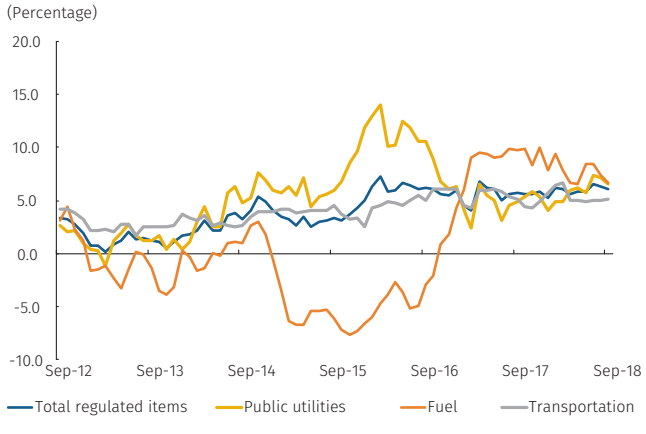
In contrast to the performance of tradables and non-tradables, the regulated group has pushed up inflation, with annual variations marked by considerable volatility between December 2017 (5.86%) and September 2018 (6.03%) (Table 3.1 and Graph 3.7). As illustrated, the rate of adjustment in the regulated group is high and is still far from the target, which prevented annual inflation from declining more than was observed. This behavior is explained by the increase in annual inflation in the CPI for public utilities (from 5.39% in December to 6.57% in September) and in transportation (from 4.92% to 5.17%), which, as mentioned, is partly a reflection of the rise in the international price of oil.

Graph 3.6
CPI for Non-tradables Excluding Food and Regulated Items
(Annual change)



Source: DANE; calculations by *Banco de la República.*

Graph 3.7
CPI for Regulated Items and Components Thereof
(Annual change)

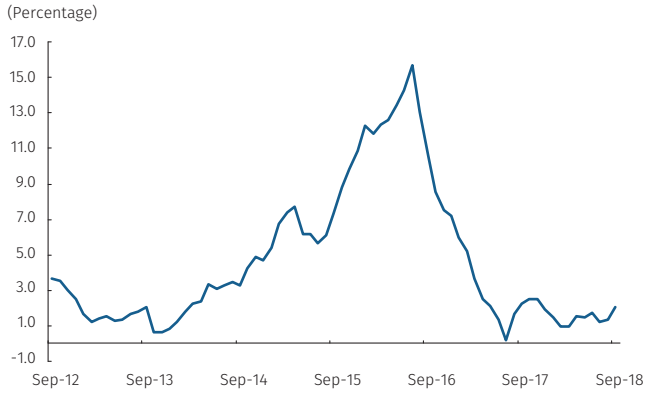


Source: DANE; calculations by *Banco de la República.*

In the case of public utilities, the inflationary impulse is the result of investments in infrastructure to expand the electrical distribution infrastructure in the energy service. The annual variation in these rates went from 2.07% in December to 7.69% in September.

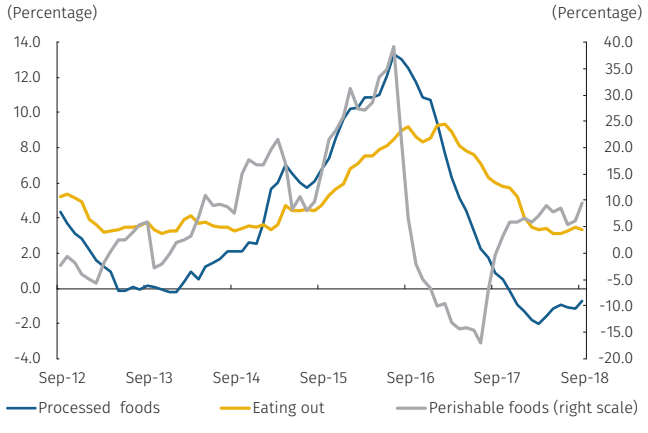
It should be noted that further increases in energy during in the coming quarters are not ruled out, given the recent depreciation of the peso and the latest news about the possibility of a new bout of El Niño weather towards the end of the year and in the first half of 2019. Depending on its intensity, this phenomenon could raise energy rates, due to a possible increase in the demand for thermal energy (which is more expensive to generate). In the case of transportation, a change in the technology platform for charging cab fares in Bogota is about to be finalized and would imply an increase of nearly 7.0% in the cost of taxi service.

Graph 3.8
Food CPI
(Annual change)



Source: DANE; calculations by *Banco de la República.*

Graph 3.9
Food CPI, by Groups
(Annual change)



Source: DANE; calculations by *Banco de la República.*

In recent months, food has been the second major CPI component to exert upward pressure on inflation, although moderate. By September, the annual variation was 2.05%, which is slightly above the figure observed in December 2017 (1.92%) and somewhat more than in June (1.74%) (Table 3.1 and Graph 3.8). Even so, it is important to mention that the contribution to inflation from food is still low, thanks to minor increases and even declines in prices for processed foods, a sub-basket that has kept annual changes in negative terrain throughout the year and ended September at -0.72% (Graph 3.9). Meals outside the home also have exerted downward pressure on food inflation so far this year, which fell from 5.21% in December to 3.32% in September. Clearly, weak demand and lower inflationary inertia are helping to keep this food component at a level that is currently not too far from the target.

In contrast, the CPI for perishable foods has increased considerably during 2018, posting 9.51% annual inflation by September, which is more than it was in June (8.47%) and December (5.84%). This surge is associated with relatively low prices and, hence, with a low statistical base of comparison during the same period the year before. Accordingly, this can be interpreted as part of the normal cycle with respect to supply and prices for these foods, and was largely anticipated in previous editions of this *Report*. The hikes observed in the third quarter also would be the result of closure of the highway between Bogotá and Villavicencio, which temporarily affected the food supply in Bogotá, a city that carries considerable weight in the national CPI.

Box 1
The Measurement Bias in the CPI: an Update

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1. General Considerations

The National Bureau of Statistics (DANE) is planning a new change in the methodology used to calculate the consumer price index (CPI), effective as of 2019 when the weights assigned to the items that make up the basket of consumer goods and services will be reviewed and updated. This will be an opportunity to arrive at a more accurate estimate of the increase in the cost of living during the last ten years, correcting what is known in specialized literature as the substitution bias in consumption, which is the primary subject of this analysis.

For the past several decades, but particularly since 1996 when the Boskin Commission Report was published in the United States[1], it has been acknowledged that the traditional approach to measuring the CPI (with the Laspeyres index) implies a variety of different biases that misrepresent the true cost of living.[2] The biases identified in that report are consumption substitution, quality-change in products, new products and new outlets.[3]

The consumption-substitution bias is the best known and most important, and perhaps the easiest to estimate. It occurs for two reasons. The first is because the weights now assigned to the basket of consumer goods and services fail to reflect the current structure of household spending, having been established for a given period of years, and without the possibility of including, in the CPI computation, the dynamics of household consumption in response to changes in relative prices. The second reason is that the CPI cannot be calculated with a functional form that approximates it to the true cost of living index.

International organizations such as the International Monetary Fund (IMF, 2006) have developed specific recommendations to reduce the influence of this bias on the CPI. There also are several works in international literature that quantify this and the other biases in computation of the CPI. See the work of Lizardi (2008), Boldsen (2011), Kalish (2017) and Karsaulidze (2018).

It is recommended that a superlative index (e.g., the Fisher, Walsh or Törnqvist-Theil indexes) be used to estimate the substitution bias and to calculate a cost of living index that is closer to reality. The difference between the official CPI (usually calculated with the Laspeyres index) and one of the superlative indices mentioned above is the substitution bias for goods and services.

The IMF (2006) suggests Fisher's ideal index can provide a satisfactory approximation to the unobservable index of the true cost of living: "More and more economists and users conclude that, in principle, the preferable, ideal index for the purposes of the CPI would have to be a superlative index, such as Fisher's. This idea is reinforced by the fact that Fisher's index also is a very attractive one from an axiomatic standpoint." In response to that recommendation, we have adopted this superlative index number for our analysis, as a satisfactory proxy for the true cost of living index.[4]

In this box, we will estimate the substitution bias for the upper level of the CPI (from basic spending upwards), because the lower level (found within each basic expenditure) cannot be approximated, as it is the statistical reserve of DANE. Moreover, by applying the geometric mean (functional form that tends to approximate a superlative index) to calculate up to the basic expenditure level in the CPI, DANE minimizes the substitution bias.[5]

Similarly, with the current CPI methodology (December 2008 base year = 100), DANE significantly reduced the other biases by making all goods and services that are part of the basic expenditure in the consumer basket flexible. The possibility of including and excluding references or varieties of new products, from the basic expense downward, reduces the quality-change bias. Also, the new sources of information that are incorporated or replaced reduce the bias for new outlets. Moreover, the possibility of including new items at this level reduces the new-product bias.

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1 See https://www.finance.senate.gov/imo/media/doc/Prt104-72.pdf

2 A consumer price index quantifies the variation in the cost of a particular "basket" of consumer goods and services, while a cost of living index measures the change in the cost of maintaining a certain standard of living or utility.

3 For a more detailed analysis of the different biases, see Karsaulidze (2018) and FMI (2006, Chapter 11).

4 An axiomatic analysis of superlative indices can be found in IMF (2006), Chapter 16.

5 In this respect, see IMF (2006, p. 249).

2. Calculating the Substitution Bias in Colombia

As mentioned, the substitution bias in the upper level (which goes from basic to total expenditure) is the difference between the official DANE CPI and the cost of living index. The latter is approximated by a superlative index, which in our case will be Fisher's ideal index $(Fp_{t,0})$,[6]

where, $(Fp_{t,0}) = [Lp_{t,0}\, xPp_{t,0}]^{1/2}$

$(Fp_{t,0})$ is the geometric mean of the product of the Laspeyres $(Lp_{t,0})$ and Paasche $(Pp_{t,0})$ *indexes*, so its path will be found in the middle of these two indexes. The theory states, precisely, that the true cost of living follows a path between $(Lp_{t,0})$ and $(Pp_{t,0})$; so, Fisher's ideal is a good approximation to the cost of living index.

The Laspeyres index is defined as:

$$Lp_{t,0} = \Sigma_{i=1,n}(P_i^t\, Q_i^0/\Sigma_{i=1,n}\, P_i^0 Q_i^0)$$

$$=\Sigma_{i=1,n}[\alpha_i^0(P_i^t/\mathrm{P}_i^0)]$$

By having fixed weights (α_i^0), this index tends to overestimate (but not always)[7] the true cost of living, since its functional form does not allow households to maximize their utility by replacing expensive goods with inexpensive products when it comes to their consumption.

For its part, the Paasche corresponds to:

$$Pp_{t,0} = \Sigma_{i=1,n}\,(P_i^t\, Q_i^t/\Sigma_{i=1,n} P_i^0 Q_i^t)$$

$$=1/\Sigma_{i=1,n}[\alpha_i^t(P_i^0/P_i^t)]$$

The Paasche index has a formula that uses weights in the current period (α_i^t). This allows consumers to substitute products in response to changes in relative prices, with a downward calculation in the CPI.

To estimate the dynamic weights (αit), we used the weight structure published by DANE for the CPI base year 2008 = 100. Subsequently, with a linear progression, they were transformed into the weights obtained from the National Household Budget Survey (ENPH in Spanish) for 2016-2017 [8] (footnote no. 7 and Table B1.1).

3. Results

Graph B1.1 summarizes the behavior of the different index numbers calculated between December 2008 and September 2018.[9] The results corroborate what the theory and the empirical evidence indicate; namely, the Laspeyres index [10] tends to behave as an upper limit of the true cost of living, while the Paasche index generally follows a path below the true cost of living index.

Table B1.2, for its part, summarizes the calculation of the change in the substitution bias of the upper level of the CPI (from basic expenditure to the national total), which is estimated as the difference between the annual variation in the official CPI calculated by DANE (with the Laspeyres index) and the annual adjustment from Fisher's ideal index. According to the results, not having an updated consumption basket of goods and services and, hence, the impossibility of calculating the CPI with a superlative index, means the official CPI computed by DANE (Laspeyres) has been overestimating the true cost of living.

Additionally, the trend in the substitution bias was found to be positive. This indicates it has increased over the years, having gone from a bias of 0.10 percentage points (pp) in 2009 to a bias of 1.35 pp so far during 2018, with an average 0f 0.75 pp for the entire period under study.

4. Conclusions

In view of the foregoing, a complete update of all aggregate levels in the household basket of goods and services would eliminate, to a large extent and for a time, biases with respect to quality, outlets and new products. Updating the weight structure also would place DANE's official CPI calculation closer to the true cost of living index, by reducing the substitution bias.

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6 Where P_i^t = price in the current period
P_i^0 = price in the base periodQ_i^0 = quantities in the base year
Q_i^t = quantities in the current period
α_i^0 = weights in the base period
α_i^t = weights in the current period

7 Sometimes, the Laspeyres numerical index is lower than the Paasche index. This occurs when the weighted variations in price and quantity correlate positively. When they are negatively correlated, the level of the Laspeyres index exceeds that of the Paasche index.

8 DANE recently published the results of this survey with the international classification of consumption according to purpose (COICOP). To do so, it was necessary to construct a correlation between the 2016-2017 ENPH and the weight structure of the CPI base December 2008 = 100. Once the CPI was constructed with the descriptions from the ENPH, each of the sub-categories resulting from that correlation was indexed up to September 2018, so as to ultimately obtain the definitive weights for the CPI, using the COICOP classification from the ENPH. This correlation involved eliminating several categories from the COICOP, since they did not correspond to the basic expenses included in the CPI. This left only eighty sub-categories. Due to space limitations, Table B1.1 only shows the subsequent weights for the total, food and non-food CPI. It should be noted that these weights may be very different from DANE's definitive weights as of 2019.

9 This is the period corresponding to the calculation methodology for the current basket of goods consumer and services.

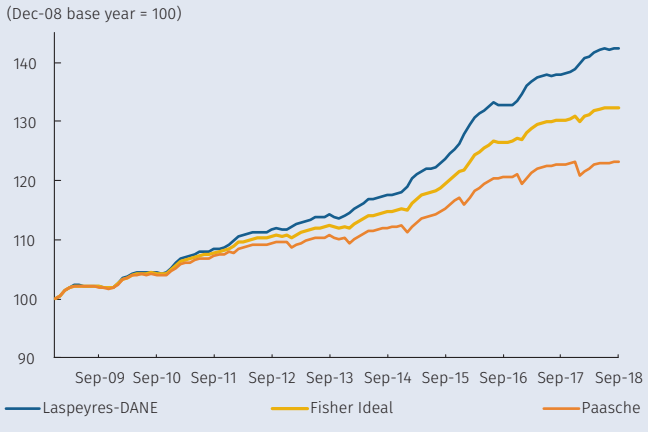
10 The Laspeyres index corresponds exactly to that observed and published by DANE.

Table B1.1
Weights Used to Calculate the Index Numbers

Description	2009[a/]	2010	2011	2012	2013	2014	2015	2016	2017	2018[b/]
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Food	28.2	28.0	27.9	27.7	27.5	27.3	27.1	27.0	26.8	26.6
Non-food	71.8	72.0	72.1	72.3	72.5	72.7	72.9	73.0	73.2	73.4

a / The weights for 2009 pertain to the official CPI, Base December 2008 = 100.
b / The weights for 2018 are from the 2016-2017 National Household Budget Survey. They were indexed with the respective CPI up to September 2018.
Source: DANE; authors' calculations.

Graph B1.1
Total Consumer Price Indexes
(CPI – survey weighted)



Source: DANE; authors' calculations.

Last year, the official figure for annual inflation (with the Laspeyres index) was 4.09%, while the cost of living index (approximated by Fisher's ideal index) closed out the year at 2.93%. Apparently, the Laspeyres index overestimated 2017 inflation by 1.16 pp, a level slightly below the long-term target for inflation (3.0%).

On the other hand, the fact that the path of the substitution bias follows a positive slope suggests that calculating the CPI with household consumption patterns from years back tends to result in overestimates of inflation. So, it would be ideal if DANE were to update the weight structure of the CPI more frequently. In an effort to prevent an accumulation of upward biases in the calculation of the official CPI, several countries have been updating their CPI weights every year: Italy, Spain, England, Japan and the Netherlands are examples. The United States, on the other hand, does so twice a year.

Table B1.2
Total Inflation and Substitution Bias
(Percentage points)

Total	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018[a/]	Average
Laspeyres-DANE	2.00	3.17	3.73	2.44	1.94	3.66	6.77	5.75	4.09	3.07	3.66
Fisher Ideal	1.91	3.06	3.38	1.97	1.35	2.74	5.46	4.57	2.93	1.72	2.91
Paasche	1.81	2.94	3.03	1.50	0.77	1.83	4.17	3.40	1.78	0.39	2.16
Bias	0.10	0.11	0.35	0.47	0.59	0.92	1.31	1.18	1.16	1.35	0.75

a/ Corresponds to year-to-date inflation at September 2018.
Source: DANE; authors' calculations.

It is important to improve the production of the CPI in Colombia on a regular basis, since this indicator has broad implications for the country's economy. For example, letting biases in the CPI measurement accumulate outsizes inflation; these higher levels affect the growth of many real economic variables and lead to indexing for salaries, leases, public utilities, taxes and balance sheets, among other items. Likewise, oversized inflation anchors expectations to high values, reduces the credibility of monetary policy management, and distorts decision-making on the part of economic agents.

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04

Medium-Term Forecasts

The GDP growth forecast for 2019 was reduced slightly in this *Report*. Mainly, this is because of a slump in the production of some exportable raw materials and an additional lag in the recovery of investment in construction.

In 2019, GDP is expected to continue to recover, although there is considerable uncertainty in that regard, particularly concerning external conditions and the performance of the construction sector.

At the end of the year and the beginning of 2019, annual consumer inflation is expected to increase slightly to 3.4%. Although there would be some temporary price hikes for food and regulated items during the early months of 2019, due to supply factors, the core inflation measures would continue to converge towards 3.0%.

4.1 Economic Growth in the Remainder of 2018 and in 2019

In this *Report*, the forecast for economic growth in 2018 was revised downward slightly with respect to what was published last quarter. As discussed in Chapter 2, the information at hand suggests some of the downside risks contemplated in the past have materialized, particularly those related to the performance of domestic demand. However, the technical staff's projections on how the fundamentals of the external sector will perform in 2019, as applies to growth of the Colombian economy, together with assumptions about an improvement in the performance of investment in civil works, would suggest GDP growth could accelerate next year towards rates that are close to what is estimated as the pace of the economy's long-term potential for expansion.

No significant recovery in investment in civil works is expected during the remainder of 2018.

Accordingly, for this *Report*, the technical staff changed its 2018 forecast from 2.7% to 2.6%. In 2019, the most likely figure will be 3.5% growth. The forecasts for both years are skewed slightly towards the lower end of the range, reflecting the fact that some downside risks have materialized during the current year and could persist into 2019, as will be explained in detail later. As usual, the ceiling and floor of the forecast range are consistent with the balance of payments scenarios outlined in Chapter 1.

The GDP growth forecast exercise for 2018 contemplates less momentum in domestic demand than is implicit in the figures that were presented in the last edition of this *Report*. In particular, and as explained in previous chapters, the information at hand does not suggest the shock to investment in civil works would have reversed during the third quarter, nor does not seem likely this will happen altogether in the fourth quarter. Furthermore, the forecast for growth in private consumption during the remainder of the year was revised downwards slightly. The recent deterioration in consumer confidence contributed to this situation, which —if maintained— could limit possibilities for an expansion in this GDP item during the third and fourth quarters.

Additionally, although Colombia's main trading partners registered positive throughout the year, recent quarters have seen signs of an economic slowdown in some countries in the region. On the other hand, despite good performance of late with respect to international prices for Colombia's export commodities, the increases still are perceived as temporary, so their impact on investment in these sectors is likely to be moderate. Furthermore, even though access to international financing is still relatively broad, one cannot ignore the effects normalization of monetary policy in the United States and US-China trade tensions can have on the volatility of international capital flows and on the perception of risk in emerging markets (including Colombia). Although these effects are still moderate, they have exerted pressure to depreciate the region's currencies.

In this context, no significant accelerations in the GDP growth rate are anticipated for the remainder of 2018. Domestic demand, in particular, would continue to register moderate growth, similar to what has been observed so far this year, due to less growth in government consumption towards the fourth quarter. This assumption is consistent with what is outlined in the Medium Term Fiscal Framework (MFMP), and would be consistent with the expected adjustment in the national government's fiscal accounts to meet the deficit allowed under the fiscal rule. On the other hand, private consumption would accelerate slightly towards the end of the year with respect to what was observed up to the third quarter of 2018, but it would continue to post increases below its historical average. This would be due largely to the anticipated growth in durable goods, within the scope of organization of the XVI International Motor Show in Bogotá.

Growth in domestic demand would continue to be moderate during the remainder of 2018.

In the case of gross capital formation (GCF), growth also would be moderate, although somewhat more than in previous quarters. Even though investment in capital goods is expected to improve, this would not entirely 0ffset the continuation of tough times for investment in construction. It should be noted that construction has important productive links to other branches of economic activity and is a major creator of jobs. So, additional or more persistent weakening in this sector than is anticipated has indirect effects that might not be contemplated in the baseline forecast.

Gross capital formation would see a moderate increase, but only slightly more than in past quarters.

Also, considering the changes explained earlier with respect to the assumptions for the external context, the real foreign trade accounts are expected to grow at a faster pace during the second half of 2018. In this sense, real exports would perform well, above and beyond the majority of GDP components, due to good momentum in sales of non-traditional goods and services. Imports, on the other hand, would be propelled mainly by more demand for capital goods, durable consumption and raw materials. Net exports will continue to contribute negatively to GDP growth during the remainder of 2018.

The results of the forecast exercise for next year suggest the pace of economic growth will accelerate somewhat compared to this period. The models used by the technical staff contemplate an external context in 2019 that would continue to be favorable for GDP growth, even though the economy would face lower terms of trade. As discussed in Chapter 1 with respect to the assumption for the balance of payments, the economies of our main trading partners would grow at a pace similar to the one projected for this year, which would maintain the contribution of external demand to the momentum in GDP. This would be reinforced by the accumulated effects exchange-rate depreciation in recent months would have on the competitiveness of the tradable sector of the economy. In addition, and as will be explained below, supply increases are expected in the sectors that produce the commodities Colombia exports (mainly coal, coffee and, to some extent, petroleum and ferronickel). All this allows us to forecast good performance for real exports in 2019, both traditional goods and non-traditional goods and services.

With regard to the domestic context, the technical staff team foresees a boost in absorption, primarily because of the anticipated momentum in investment. In principle, GCF is expected to perform better in 2019, with the largest contribution coming from civil works, due to an improved outlook for investment in this particular item. In fact, most of the delays in financial closures and the environmental, property, social and law-and-order difficulties that have affected some infrastructure projects related to the so-called fourth generation highways (4G) are expected to be overcome in 2019. Furthermore, the expectation is that the cumulative impact the hikes in crude oil price witnessed in recent months would have on the momentum in national

Absorption would accelerate in 2019.

Investment in civil works is expected to improve during 2019.

revenue and on exploration and development in the oil sector would contribute to more investment in capital goods and to oil production. However, it is important to point out that the prospects for a standstill in investment in building construction continue. In this regard, the sluggish momentum in demand for medium and high-income housing is likely to persist and, for the most part, there will continue to be a surplus supply of non-residential buildings.

On the other hand, private consumption is likely to continue to recover gradually in 2019, as was the case throughout 2018. The performance of this item would be driven by the multiplying effect the increase in investment would have on the other sectors of the economy. Accordingly, job creation is expected to recuperate, which would allow household spending to continue to experience a moderate but steady recovery in growth. Similarly, the anticipated increase in absorption supposes a slowdown in the rate of expansion in public consumption with respect to 2018. Nevertheless, this GDP component would register annual growth somewhat above the average rate observed for 2014-2018. This assumption is similar to what was outlined in the latest version of the Medium Term Fiscal Framework, and would be consistent with the anticipated adjustment of the imbalance in the fiscal accounts to meet the deficit established under the fiscal rule.

From a sector standpoint, the forecast for GDP growth in 2018 as a whole was revised downward, mainly because the production of some raw materials has declined and the construction industry would have slowed more than was estimated in the previous report. The forecast for GDP growth in 2019 implies an increase in the production of exporTable Baw materials, partly due to a low base of comparison in 2018 and positive growth in construction, driven by the belated spending of 4G resources.

In the case of industrial production, positive growth is forecast for 2018, given a relatively stable environment for growth on the part of Colombia's trading partners and a favorable exchange rate for the sector. This performance would persist during 2019, supported by the growth of our trading partners, which is expected to continue next year.

In terms of agricultural production, its growth this year would be positive as well, but less so than in 2017. This is due mainly to a smaller increase in crops (especially coffee), which are being affected by adverse weather conditions. However, by 2019, a recovery in production is expected for crops such as coffee, which should help the agricultural GDP to perform well.

The growth forecast during 2019 assumes the production of exporTable Baw materials will increase and the construction sector will see positive growth.

With respect to GDP in mining, 2018 as a whole is expected to see more of a downturn in than what was predicted in the previous report, but less than in the past two years. The reduction in anticipated growth is based on a lower forecast for coal production during the year. Despite a recovery in the price of this product, its production declined sharply

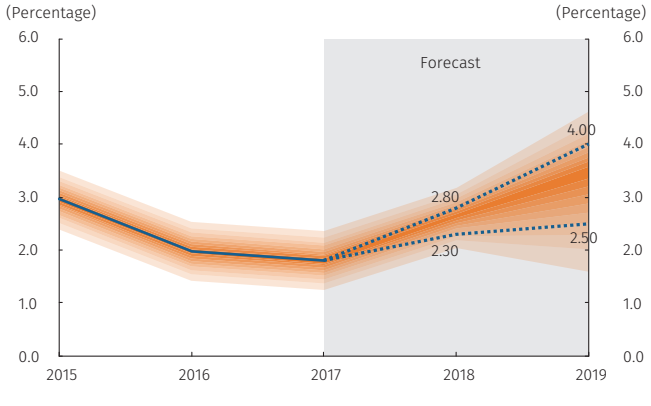
during the second quarter, and this trend could continue throughout the rest of the year. The modest increase forecast for oil production would offset this effect, in part. An expansion in this sector is anticipated for 2019, given the low level reached in 2018 and the short and medium-term boost the rise in international prices observed in recent months would imply for oil and coal production.

Finally, 2018 is expected to see construction deteriorate sharply. This is due, on the one hand, to construction delays in several 4G projects, owing to contract renegotiations. Financial closure of these projects during the remainder of 2018 should allow this item to register positive growth in 2019. On the other hand, the poor performance reported for building construction during the first half of the year and that of several related indicators in the third quarter suggests this subsector will not recover significantly during the remainder of the year.

As usual, the baseline forecasts presented at the beginning of this chapter are accompanied by high and low growth scenarios, which are within the fan Graph of economic growth derived from the medium and long term models used by the Technical Department at *Banco de la República*. These ranges are between 2.3% and 2.8% for 2018 and between 2.5% and 4.0% for 2019. On this occasion, the breadth of the intervals remains high and, as illustrated in Graphs 4.1 and 4.2, the biases are downward for this year and the next. The baseline forecast path was reduced slightly for 2018 compared to what was outlined in the previous quarterly report. The main downside risks in the baseline forecast come from the performance of domestic demand and the external context. Table 4.1 shows the probability ranges in the fan Graph of GDP growth.

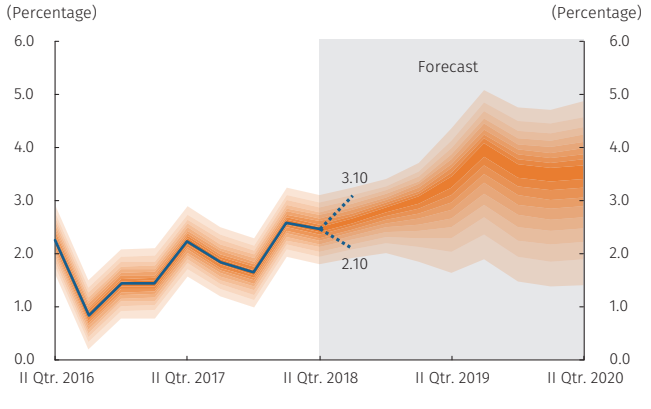
In the domestic context, the most important downside risk concerns weaker than expected performance for domestic demand, due to a slower recovery in the construction sector. This would be the result of a lower level of execution in terms of civil works, with respect to

Graph 4.1
Fan Chart of Annual GDP Growth



Source: DANE; calculations by *Banco de la República.*

Graph 4.2
Fan Chart of Annual Growth in Quarterly GDP



Source: DANE; calculations by *Banco de la República.*

Table 4.1
Probability Ranges in the Fan Chart of Annual GDP Growth (Percentage)

Range	2018	2019
<-1.0	0.00	0.01
-1.0 - 0.0	0.00	0.16
0.0 -1.0	0.00	1.87
1.0 - 2.0	4.11	10.55
2.0 - 3.0	83.30	29.72
3.0 - 4.0	12.58	40.80
> 4.0	0.00	16.89
Between 3 & 5	12.58	56.71
Between 2 & 4	95.89	70.52
Between 1.5 & 3	87.32	36.82

Source: Calculations by *Banco de la República.*

the forecast, and more of a downturn in building construction than is anticipated. It should be noted that the construction sector has important productive links to other branches of economic activity and is a major creator of jobs. So, further or more persistent weakening than is expected in this sector has indirect effects that might not be contemplated in the baseline forecast.

In the external context, the main downside risks that weigh on domestic growth are those related to: 1) lower external demand associated with less growth on the part of the country's main trading partners, and 2) higher external financing costs than those considered in the baseline forecast. The technical staff believes the probability of an adverse scenario in this regard is greater than was indicated in the previous *Report*. Another of the downside risks being considered is related to a lower path for oil prices than is contemplated in the baseline forecast scenario.

4.2 Inflation

In the third quarter of this year, annual consumer inflation was less than what was predicted in the June edition of the *Inflation Report*. This applies to the total CPI and core inflation (measured on the basis of the CPI excluding food and regulated items) and to the food CPI. Only in the case of the CPI for regulated goods and services did the actual figures exceed the Bank's forecasts.

Given these circumstances, the baseline forecast for headline inflation presented in this *Report* maintains convergence towards the target of 3.0%, in the medium term, with some temporary deviations that are associated with supply factors, as will be explained later. Specifically,

the baseline forecast for headline inflation during the remainder of 2018 and in the first half of 2019 declined, but with several slight increases in the quarters thereafter, compared to the forecast outlined in the last quarterly report.

Consumer inflation would increase slightly during the remainder of the year, in keeping with some pressure on food and regulated items. However, it would not move away much from 3.0% and would converge with that level in 2019.

As for core inflation, the reduction in the forecast was more pronounced and occurred along the entire forecast horizon. The convergence to 3.0% should be achieved in the next three months, and values slightly below this figure are anticipated for 2019, which would then return to the target in 2020.

An important point to bear in mind is that these forecasts do not contemplate the effects of the Financing Bill announced by the Colombian government, since the text of that legislative proposal was not known at the time this *Report* was produced. The baseline forecasts do not take into account the effects of a likely bout of El Niño weather towards the end of this year and during the first half of 2019. After the forecast exercises for this *Report* had been completed, it became known that the probability of the occurrence of this phenomenon had increased to 90%. According to the experts, its intensity would be weak or moderate, which should imply no macroeconomic effects or significant variations in prices, as suggested by similar episodes in the past.

Bearing that in mind, this forecast exercise indicates consumer inflation during the remainder of the year and in 2019 will still be subject to bearish pressure derived from the presence of surplus production capacity. As indicated in the first part of this chapter, the Colombian economy in 2019 should continue to recovery gradually towards its potential growth rate. This would be coupled with a revival in several investment segments, in terms of trade, and continued favorable growth for our trading partners, all amidst relatively broad external financing conditions, despite the hikes anticipated in external interest rates. Even so, the growth forecast for 2019 (3.5% in the baseline scenario) is lower than what was projected a quarter ago and not enough to eliminate fully the surplus production capacity that still persists in the economy, which should happen by around 2020.

Therefore, in the next year and a half, consumer inflation in Colombia will continue to benefit from the absence of demand-pulled inflationary pressures. This situation should allow for a reduction in non-tradable inflation to levels closer to 3.0% and, if so, would facilitate the convergence of headline inflation to the target.

No demand-pulled inflationary pressures are expected, at least until the end of 2019.

Moreover, the persistence of surplus production capacity in the economy will help to contain upward consumer price pressures, which would originate mainly on the foreign exchange front in the coming quarters. According to this *Report,* signs of pressure to depreciate the

Surplus production capacity in the economy will help to contain upward consumer price pressures, which would originate mainly on the foreign-exchange front.

peso are looming on the forecast horizon, more so than those anticipated in the June edition. Although the international price of oil and prices for several other Colombian raw material exports were revised upwards, the current levels are still regarded as relatively high and temporary, and a correction should occur sometime towards 2019. Added to this are the expected hikes in external interest rates and a gradual return of the country risk premium to its average historical value, in a context of greater uncertainty about the performance of emerging economies, all of which plays in favor of a weaker peso in the medium term.

In principle, peso depreciation tends to increase consumer inflation in Colombia, with a lag of one to two quarters. However, the extent of that pass-through depends on the origin of the exchange shock and, above all, on the phase of the economic cycle. With a gradual recovery in domestic demand, as is expected in the coming quarters, where surplus production capacity would not be overcome quickly, we can expect only limited pass-through of depreciation to consumer prices, especially if the adjustment in the exchange rate is moderate, as continues to be contemplated in this *Report*. Therefore, given the environment in which it occurs, in addition to its intensity, the foreign exchange pressure that is anticipated should not divert inflation from its path of convergence towards 3.0% in the forecast horizon.

As in the June edition of this *Report*, there are two sources of upward pressures on consumer prices that continue to be identified at present. They are due to supply factors and are temporary, in principle, which is why they should generate only temporary deviations in inflation from its path to convergence at 3.0%. However, to the extent they have an impact on the formation of expectations and on indexing, some their repercussions could be permanent.

One of these supply shocks concerns the price changes anticipated for some regulated goods and services. On this occasion, the forecasts for these variables increased, largely because of the revision in the external price of oil for the remainder of 2018 and in 2019. Given a higher price, the forecasts for domestic fuel prices increased, with readjustments that exceed the inflation target and those of most consumer goods and services in the coming quarters. These increases are more likely if, as contemplated in this *Report*, there is no expectati0n of appreciation in the exchange rate to offset the hikes in the external price of crude oil, as did happen on previous occasions.

With a higher external price for oil and a more depreciated exchange rate path, there are upward pressures on regulated prices.

Regulated items are expected to see readjustments above 3.0% during the rest of the year and mainly in 2019, a with respect to energy rates. The latter is because of the added investment required to expand the infrastructure for energy distribution, which must be covered by these rates.

Accordingly, in the case of the regulated CPI, the central path of the forecast in this *Report* contemplates an annual variation that would stay above 6.0% during the next two quarters. As of the second quarter of next year, it should begin to decline gradually, but still would close out 2019 at well over 3.0%, converging towards this target only into the start of 2020.

The adjustments in the food CPI are expected to exceed those observed recently, particularly for imported items and some perishables.

The other supply factor that is expected to influence consumer inflation during the remainder of the year and in part of 2019 is related to the behavior of the food CPI. Up to now, the relative stability in the exchange rate and external prices in past quarters has meant only limited adjustments in the prices of a wide range of foods, especially those of imported origin. However, in the future, these conditions are expected to be less favorable and would tend to produce larger hikes in those prices. On the other hand, in the case of several perishable items, relative prices were low in previous quarters and, therefore, should rise towards the end of this year and at beginning of 2019, in keeping with the normal cycle of agricultural production. By 2020, the same cycle also induces temporary food price adjustments in excess of the target. In all cases, the higher international oil price anticipated in this *Report* tends to generate increases in this segment of the basket through different channels, as has happened in the past.

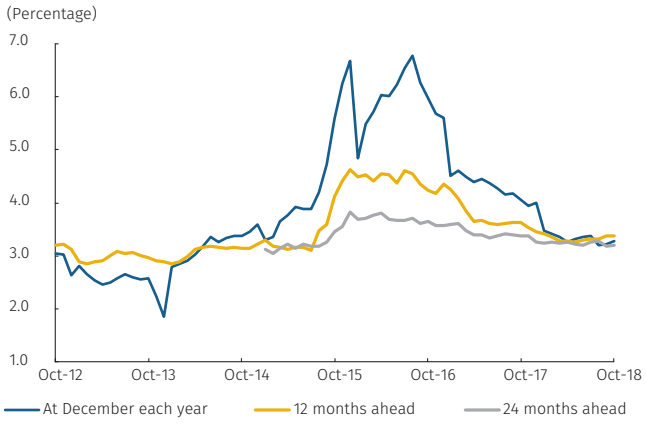
The upward pressure from regulated and food prices will operate in the fourth quarter of 2018, during 2019 and in part of 2020. These factors delay convergence of the baseline inflation forecast to the 3.0% target and would produce some temporary deviations in 2020.

In this *Report*, the baseline forecast assumes indexing mechanisms will play less of a role in price formation at the beginning of 2019, unlike what happened in previous years, and will not prevent the target from being met. Among other reasons, this is because inflation at the end of 2018 should be near 3.0%.

The projected path for inflation also contemplates medium-term expectations anchored to the target. The available indicators in this regard continue to show inflation expectations close to that value. According to the monthly survey of expectations conducted among financial market operators during in the second week of October, inflation at twelve months, twenty-four months, and by December 2019 is expected to be 3.4%, 3.2% and 3.3%, in that order. These values are close to those obtained last quarter (Graph 4.3). For December of this year, expected inflation is 3.28%, which is less than it was three months ago (3.37%). For its part, the October quarterly survey of entrepreneurs, analysts and trade unions shows somewhat higher levels than those obtained from the monthly survey, and slightly

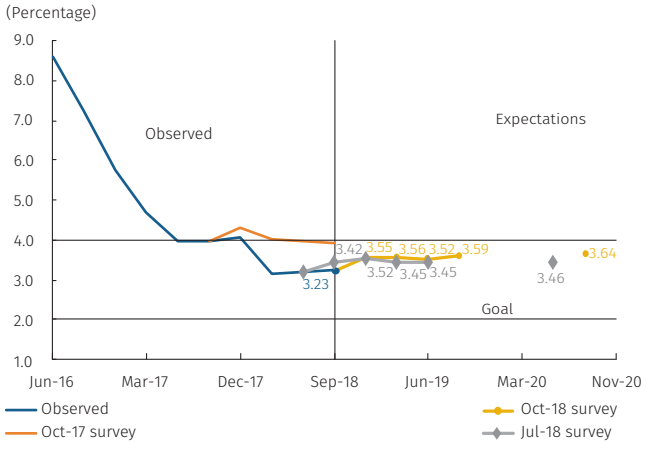
Anchored inflation expectations are forecast for the medium and long term.

Graph 4.3
Annual Inflation Forecasts by Banks and Brokerage Firms



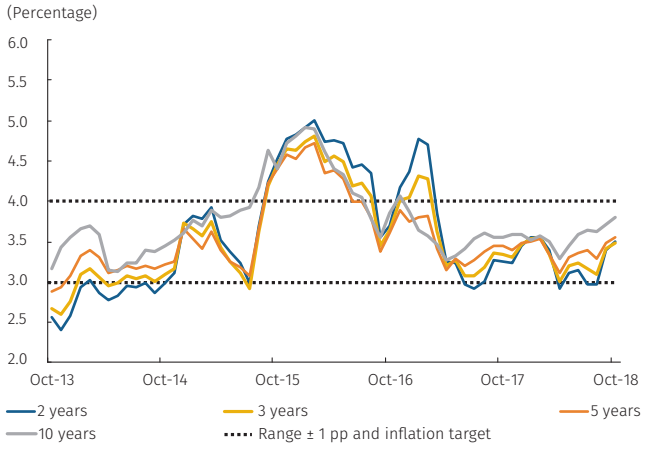
Source: *Banco de la República.*

Graph 4.4
Total Observed Annual Inflation and Inflation Expectations
(at three, six, nine, twelve and twenty-four months)



Sources: DANE and *Banco de la República* (Quarterly Survey of Expectations).

Graph 4.5
Break-even Inflation Expectations
(At two, three, five and ten years)
(Monthly average)[a/]



a/ Nelson & Siegel Method
Sources: *Banco de la República* (Quarterly Survey of Expectations).

above the rates anticipated three months ago, being at around 3.6 % for all forecast horizons. In particular, at twelve and twenty-four months, the survey showed just 3.6% anticipated inflation (compared to 3.5% in the July survey for both horizons). For December of this year, the forecast is 3.55% (Graph 4.4). On the other hand, the latest information from the TES yield curve shows inflation expectations at two, three and five years are at around 3.5%, which is somewhat higher than those registered in mid-July (Graph 4.5).

The rise in the price of oil in previous months and the higher level that is anticipated compared to what was forecast in the June report implies more pressure on inflation via the cost channel, something that was not contemplated in the previous forecast exercise. These pressures would have begun to appear at the end of the third quarter, as mentioned in Chapter 3 of this *Report*.

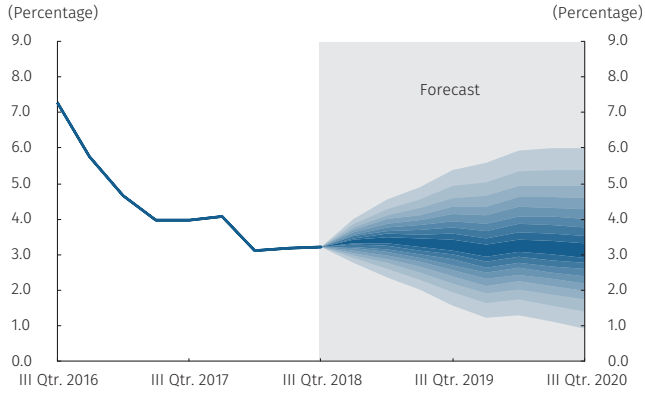
With respect to wages, the baseline forecast for inflation does not contemplate any major pressure during 2019, or later. It is estimated the job market will remain relatively loose and the economic growth anticipated for the following quarters should not change this scenario substantially. So, wage adjustments are expected to be compatible with compliance with the inflation target. The forecasts also assume there will be an adjustment in the minimum wage that guarantees its purchasing power is maintained.

In short, annual consumer inflation would build slightly during the remainder of the year, hand in hand with some food and regulated price pressures. However, it would not be far from 3.0% and clearly would be less than it was a year ago. In 2019, it would decline slowly at the beginning of the year, and then more distinctly towards the second half, finishing very near 3.0%.

4.3 Balance of Risks

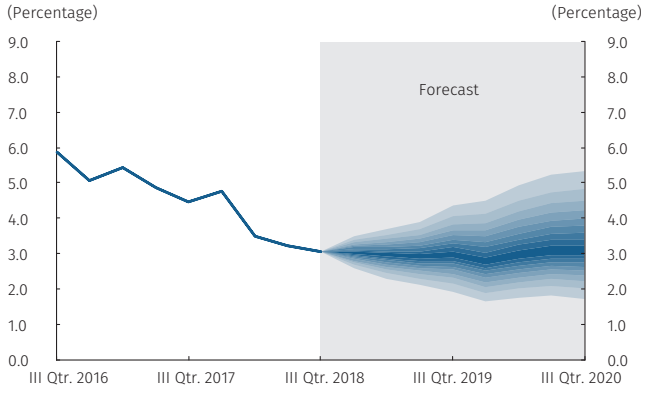
The balance of risks to total consumer inflation and inflation excluding food and regulated items is shown in the fan Graphs (Graphs 4.6 and 4.7). For this report, a fan Graph is estimated for headline inflation with upward biases that are slightly more pronounced as of the second half of 2019 than those identified in the estimate done for the June 2018 report. This is partly because new risks of depreciation in the exchange rate were included.

Graph 4.6
Fan Chart of Annual Headline Inflation



Source: DANE; calculations by *Banco de la República.*

Graph 4.7
Fan Chart of Inflation Excluding Food and Regulated Items



Source: DANE; calculations by *Banco de la República.*

As usual, the balance of risks was constructed based on the baseline forecast path for annual headline inflation and inflation in food and regulated items, both derived from the Patacon model. The risks considered when constructing the fan Graph are outlined below.

The following are the main upward risks.

More depreciation in the exchange rate than what is contemplated in the baseline forecast scenario

The main upward biases affecting inflation would come from a more depreciated exchange rate and less favorable weather conditions.

A number of circumstances in the external context could lead to a more depreciated exchange rate than what is contemplated in the baseline forecast path. The following are the major ones: 1) a steeper drop in the international price of oil in the coming quarters; 2) higher external financing costs, and 3) less external demand. If these risks materialize, the currencies of several emerging economies, including the Colombian peso, could be weakened, which would have a subsequent upward impact on consumer inflation via the pass-through of

exchange depreciation to prices. The magnitude of the pass-through would vary in each situation; in other words, it would depend on the origin of the shock.

Some events that could result in these situations becoming a reality are described as follows.

1) This *Report* contemplates a reversal in the international price of oil starting in 2019. Accordingly, it should drop from levels somewhat above USD 80 per barrel (Brent crude) at the end of September to an average of UDS 73 per barrel in the year thereafter. This correction is based on several assumptions; namely, the global demand for crude continues to grow at a rate similar to that of 2018; OPEC's discipline in terms of export quotas is maintained; the sanctions imposed on Iran by the United States have an important impact on its crude export quota; and production in some countries, such as Venezuela, continues to decline.

A lower oil price, higher external financing costs, and less external demand are circumstances that could result in more depreciation in the exchange rate than what is contemplated in this Report.

However, as discussed below, it is important to remember there are currently downside risks to global growth that can halt the increase in the demand for crude oil. Moreover, on the supply side, there is evidence the world could have more production capacity than is implicit in the price forecast for 2019. For example, further accelerated erosion of the OPEC agreement, with larger than expected production hikes by Saudi Arabia or non-member countries, such as Russia and the United States, cannot be ruled out. Also, it is important not to forget there could be a situation where the scope of the announced sanctions is less than expected.

All of these circumstances could lead to an oil price in the coming quarters that is lower than the one contemplated in this *Report*. In this scenario, there would be two ways consumer inflation would be affected: on the one hand, depreciation would occur and an upward effect on consumer prices by means of the pass-through mechanism would be expected; on the other hand, there would be compensation from the reduction in various costs, especially for some raw materials and transportation. However, considering similar events in the past, the upward effect is expected to prevail.

2) The advanced economies have begun to normalize their monetary policies and likely will continue to do so. For example, the Fed has responded to recent favorable figures, both observed and anticipated, primarily with respect to production and employment, and the upward pressure they have exerted on consumer inflation. In doing so, the Fed has clearly communicated its intention to continue to raise its policy interest rate. In response, the baseline forecast scenario incorporates an upward path for external interest rates, as explained in Chapter 1 of this *Report*. However, considering how tight the job

market seems to be in the United States, more than expected pressure on inflation cannot be ruled out, which could lead to faster hikes in the Fed's interest rate than what is expected.

Added to this is the uncertainty surrounding the behavior of the risk premium for the Colombian economy, which is now at record low levels. The baseline scenario assumes a slow but sustained increase in country risk, which would return to average historical levels. However, in a global environment where the perception of risk in emerging economies is growing, it is impossible to rule out that a shock, such as one caused by an unexpected hike in the Fed's rates, would lead to an increase in the risk premium that is more than anticipated.

In general, both these situations (the normalization of US monetary policy and the increase in Colombia's risk premium) translate into depreciation of the Colombian peso, since they generate higher external financing costs and reduce the flow of foreign currency into the country.

3) The baseline forecast path outlined in this *Report* contemplates a slight deceleration in the growth in external demand during 2019, in response to the lesser momentum expected from most of the economies in the region and the United States, Europe and China. However, the actual growth rates could be lower than those anticipated, especially because of the indeterminate effect that trade barriers originating in the United States and the uncertainty surrounding China's growth could have. Again, this would imply consequences for inflation in both directions, but the upward impact would be expected to dominate, because the pass-through pressures (generated by the depreciation that would occur in response to the decline in foreign currency inflows) would not by offset fully by the weakness in demand.

Unfavorable weather conditions that lead to food and regulated price hikes above those projected in the baseline forecast path

The baseline forecast in this *Report* does not include pressure on food and regulated prices due to climate factors. However, as mentioned already, several meteorological agencies recently detected significant increases in the likelihood of a mild or moderate bout of El Niño weather occurring in in the coming months. Consequently the baseline forecast path faces an upward risk associated with adverse weather, in the event an episode of El Niño and / or its intensity is more pronounced than anticipated. This would have repercussions on consumer prices that, in principle, would be low if the phenomenon is weak or moderate in intensity, but otherwise high, as has been observed in the past. However, this historical regularity is also subject to uncertainty. In any case, the greatest risk is to food and regulated prices. Food prices could be impacted by a decline in the amount of

The likely occurrence of *El Niño* could exert inflationary pressure, especially on food and regulated items.

area sown and in productivity, while regulated prices could be affected primarily by an increase in the cost of generating electricity.

Finally, it is important to mention that if any of the aforementioned risks were to materialize, not only would headline inflation be affected directly and temporarily, it also could be influenced indirectly and more permanently, given the repercussions these events could have on expectations and the activation of indexing mechanisms.

The following are the main downside risk considered in this *Report*.

Less growth in domestic demand than what is included in the baseline forecast path:

So far in 2018, civil works and building construction have posted negative annual growth rates. In the first case, the second-quarter figures were better than those for the first, which would imply a recovery in domestic demand in line with what was forecast for the remainder of the year. However, there are still problems associated with project financing and delays, especially in the case of highway projects. These difficulties pose the risk of performance that is less than what is projected in the baseline forecast path outlined in this *Report*.

On the other hand, building construction declined even more during the second quarter and, although it is expected to recovery slightly, there is the possibility it will continue to experience even worse momentum during the year, especially considering the unsold inventory of homes (for medium and high income buyers), offices and commercial premises.

Therefore, if performance proves to be less that what is expected for these sectors, and taking into account the productive chains and the role these activities have in job creation throughout the economy, the country would be faced with a scenario where domestic demand would be hard hit and would be less than is projected in the baseline forecast path presented herein. This, in turn, would delay the elimination of surplus production capacity and tend to exert more downward pressure on inflation.

Less growth in domestic demand is the main downward risk to inflation.

According to the set of risks outlined so far, the fan Graph suggests the probability of headline inflation falling below 4.0% by the end of 2018 has risen to 95.1%, and is 68.7% for 2019 (tables 4.2 and 4.3). It is worth noting that the impact of a possible tax reform in 2019 (or "financing law," as the Government calls it) was not considered when the fan Graph in this *Report* was developed, since all that was known at the time this *Report* was written was that the government intended to introduce a proposal in Congress to that effect.

Table 4.2
Estimated Probability of Annual Headline Inflation between 2.0% and 4.0% by December 2019
(Percentage)

Report	Probability
December 2017 Report	47.8
March 2018 Report	51.7
June 2018 Report	52.8
Sept 2018 Report	54.2

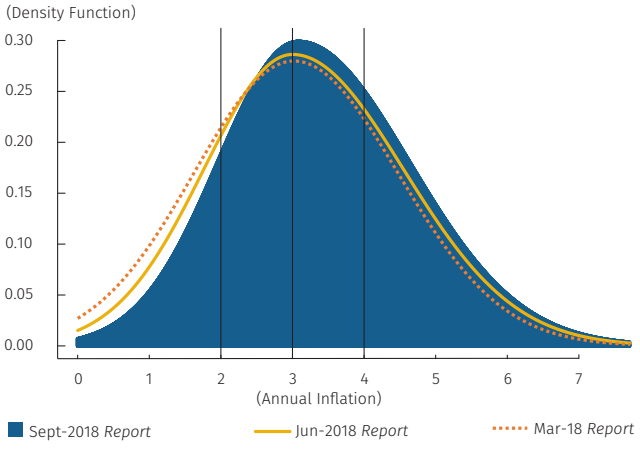
Source: Calculations by *Banco de la República.*

Table 4.3
Probability Ranges in the Fan Chart of Annual Headline Inflation
(Percentage)

Range	2018	2019
<2.0	0.0	14.5
2.0 - 2.5	0.9	11.4
2.5 - 3.0	14.7	14.3
3.0 - 3.5	47.3	14.9
3.5 - 4.0	32.2	13.6
>4.0	4.9	31.3
Between 2 & 4	95.1	54.2

Source: Calculations by *Banco de la República.*

Graph 4.8
Cross-section of the Fan Chart of Annual Headline Inflation for December 2019



Source: Calculations by *Banco de la República.*

The extent of the forecast density function shown in Graph 4.8, according to the shaded area, only includes 90% of it. The results, like the baseline forecast, suppose an active monetary policy in which the policy interest rate set by *Banco de la República* is adjusted to make sure the target for headline inflation is met. This is an important aspect to point out.

05

Risks to long-term Macroeconomic Stability

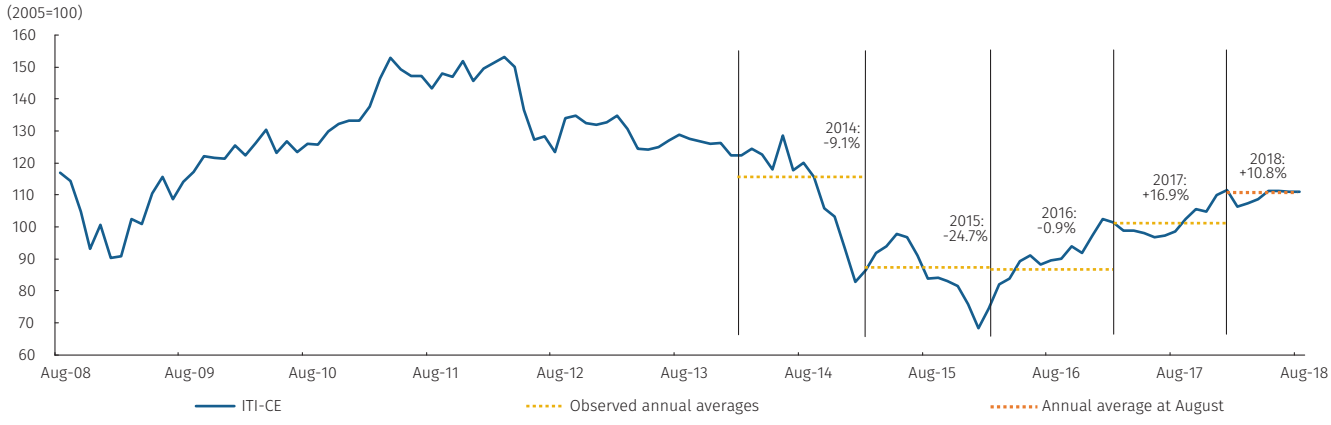
The main risks to long-term macroeconomic stability come from the external front.

Having an inflation targeting scheme with exchange flexibility and complying with the fiscal rule and maintaining a healthy financial system are among the factors that make the economy more resilient to these risks.

As documented in past editions of this *Report*, the Colombian economy faced strong external and domestic shocks as of mid-2014 that tested the capacity of the country's economic policy to respond. In 2014, national revenue deteriorated sharply due to the abrupt drop in the price of oil and to less momentum in external demand from several of the country's trading partners [8](Graph 5.1). In the two years thereafter, this caused the peso to depreciate against the dollar by more than 60%. In the domestic context, the fact that expenditure exceeded revenue was reflected in a positive product gap, which stood at around 1.6% in 2014. Moreover, at the end of 2015, the country experienced one of the most intense episodes of *El Niño* weather in the last thirty years, which affected the food supply and sharply raised prices in this group.

8 Affected by the decline in prices for its main export commodities.

Graph 5.1
Terms of Trade[a/]



a/ Foreign trade methodology
Source: *Banco de la República.*

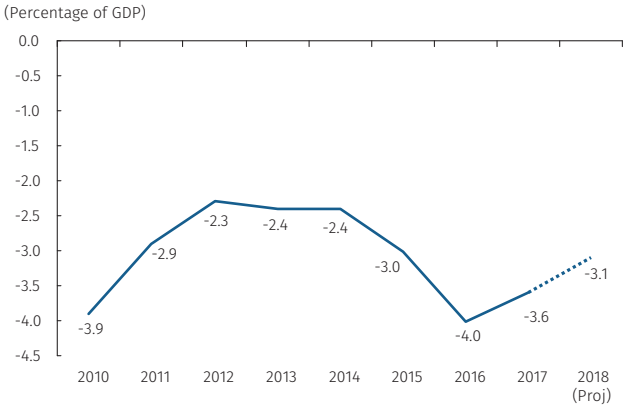
As a result, some macroeconomic imbalances in the Colombian economy became more pronounced, and others were generated. The current account deficit, total borrowing[9] and the CNG deficit continued to rise and, in 2015, reached 6.3%, and 61.9% and 3.0% (as a proportion of GDP), respectively (Graph 5.2). Annual inflation, which averaged 3.0% between January 2009 and December 2014, took off in 2015 and in part of 2016, driven by food prices and by the pass-through of peso depreciation to domestic prices.

Exchange flexibility, few exchange mismatches in the private sector, the fiscal rule, the inflation targeting strategy, and a solvent and healthy financial system were fundamental to dealing with these shocks. These institutional arrangements also helped to maintain the confidence of the markets and allowed for continued access to external financing, helping the process of gradual and orderly adjustment exhibited by the Colombian economy in the years thereafter. International interest rates, at historically low levels, also contributed to this performance.

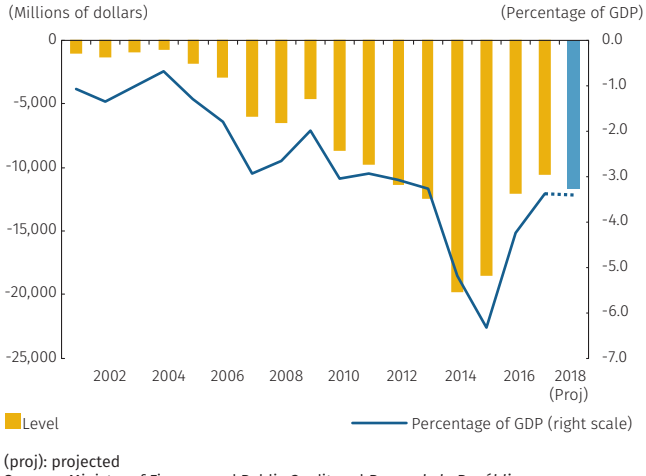
As of 2016, the process to correct the country's external imbalance can be explained by several events. Initially, sharp accumulated depreciation of the peso and the weakness in domestic

Graph 5.2
National Government Deficit and Current Account Deficit

A. National government deficit



B. Current account



(proj): projected
Sources: Ministry of Finance and Public Credit and *Banco de la República.*

9 Households plus companies: includes the bank loan portfolio in domestic currency (D/C) and foreign currency (F/C), bonds issued by companies, and direct external credit.

The shocks were severe, both in terms of their magnitude and persistence. They tested the economy's ability to adjust and the capacity of the country's macroeconomic policy to respond.

demand caused a drop in imports and encouraged non-traditional exports. This was followed by a period of recovery in the international price of oil, terms of trade and global demand, all of which improved external revenue.

Domestically, absorption also underwent a process of adjustment due, in principle, to a drop in private investment, particularly for mining.[10] High inflation, which was around 9.0% by mid-2016, undermined the purchasing power of families and reduced the momentum in their spending. The reference interest rate hikes observed in 2016,[11] which were necessary to re-channel inflation and inflation expectations towards the target, also affected the dynamics of domestic demand. On the fiscal front, the tax reform that was passed at the end of 2016 (necessary to recover government revenue) also reduced household purchasing power in 2017.

Thus, 2016 and 2017 were years of macroeconomic adjustment in which spending in the economy adapted to the reduced momentum in national revenue. The current account deficit, as a percentage of GDP, dropped and was 3.4% in 2017. Economic growth slowed and reached its lowest level in September 2016 (0.8%): in all of 2017, it was 1. 8%. Estimates suggest the economy's potential for growth also would have declined and could be around 3.3%. According to these calculations, the output gap would have closed in 2016 and entered negative terrain in 2017. For its part, the tax reform effective since 2017 helped to lower the CNG deficit, as a proportion of GDP, from 4.1 % in 2016 up to 3.6% in 2017; nevertheless, higher external and domestic debt service and less foreign income prevented more of a correction in the deficit.

The fundamentals of the economy and appropriate institutional arrangements sustained access to external financing and market confidence, allowing for a gradual and ordered adjustment.

The movement in monetary policy, coupled with very little demand-pulled pressure on prices and reestablishment of the food supply, helped inflation and inflation expectations to begin to converge towards the target. So, by the end of 2017, inflation was 4.09% and expectations at one year and more indicated it would continue towards 3.0%. Given this environment and a gr0wing amount of installed capacity, *Banco de la República*'s Board of Directors (BDBR) decided to reduce the reference interest rate throughout 2017 and to move it into moderately expansive terrain.[12]

10 This drop in demand, mainly for durable imported goods such as machinery and equipment, also helped to correct the external imbalance.

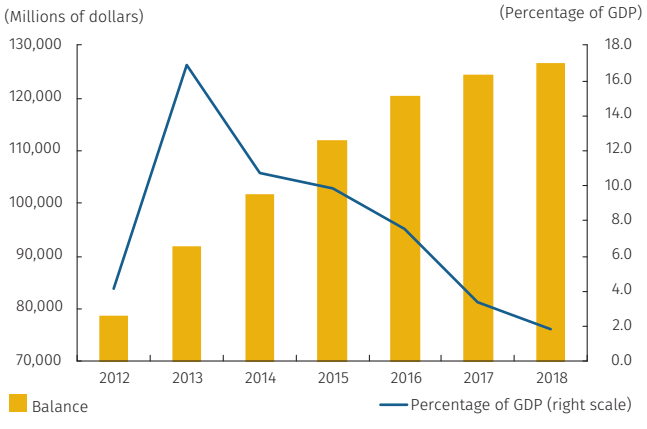
11 From 4.5% in September 2015 to 7.75% in August 2016.

12 From 7.75% in November 2016 to 4.25% in April 2018.

The estimates for all of 2018 indicate the current account deficit, as a percentage of GDP, would be similar to what it was last year (3.4%). This value, although still far from a level regarded as sustainable, reflects the convergence process. The expansion in GDP would be 2.6%, which is still below the economy's potential for growth. The job market has been resilient to the weakness in economic activity and has sustained unemployment rates without major changes.[13] Inflation, on the other hand, would end 2018 at around 3.0%.

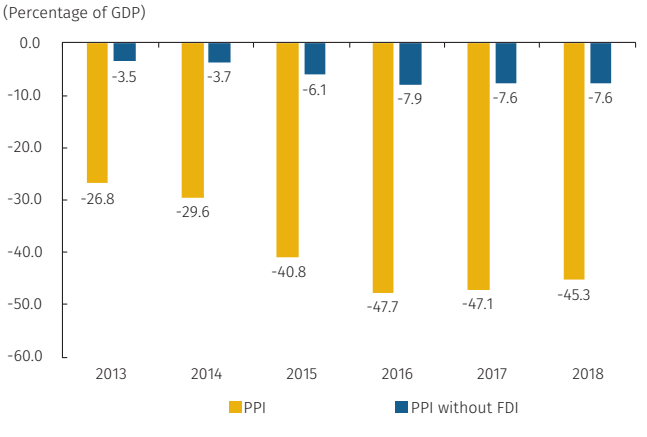
The external debt reached 37.1% of GDP in July 2018, which is higher than the figure five years ago.[14] Although it increased significantly in terms of value,[15] its growth has slowed (Graph 5.3), partly as a reflection of the reduced momentum in current spending. In addition and despite more external borrowing, this has not translated into significant exchange mismatches in the aggregate economy (Graph 5.4). In effect, as illustrated by our international investment position (IIP), when discounting FDI and direct investment by Colombians abroad (ICA),[16] one sees there have been moderate increases in Colombia's net debit position abroad. These realities give the economy more resilience in a scenario of high exchange volatility.

Graph 5.3
External Debt Balance and Annual Growth



Source: *Banco de la República.*

Graph 5.4
International Investment Position with and without FDI



Source: *Banco de la República.*

The weak economic growth witnessed throughout 2018 also is evident in the performance of the loan portfolio in domestic currency (D/C). Limited growth in the commercial portfolio in D/C, coupled with the reduction observed in interest rates on loans in this group, suggest the demand for credit on the part of companies is weak. The household loan portfolio continued to slow due to less of an increase in consumer loans. The only portfolio to maintain double-digit growth was the mortgage portfolio, with loans used mainly to buy existing homes.

Despite good performance in terms of mortgage loans, prices for new and existing homes have increased less than those observed prior to the shocks. In fact, when discounting inflation, they

13 In the first nine months of 2018, the average rate of unemployment was around 9.5%. It was 10.6% in the thirteen major metropolitan areas.

14 It was 22% in July 2013.

15 Having gone from USD 78,784 m in December 2012 to USD 126,782 m by June 2018.

16 For being long-term investments with low volatility.

grew around 10% in 2013 and are now posting increases between 2.0% and 3.0% (Graph 5.5). The slowdown in home prices during the last two years has discouraged new projects and generated less added-value in the sector.

The reduced momentum in external and domestic credit is reflected in the total debt of the economy, which has declined during the last two years as a percentage of output. However, it is still at what can be considered as historically high levels (Graph 5.6). In terms of government borrowing, the recent recovery in oil prices and the higher levels observed for the nominal exchange rate are expected to raise oil revenue and help to reduce the fiscal deficit, which is projected at 3.1% of GDP.

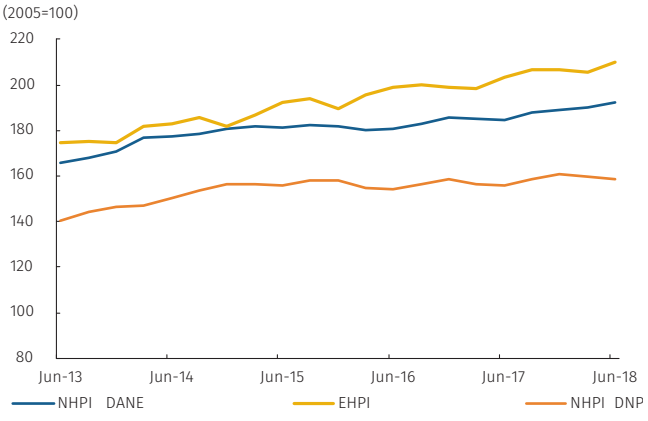
As for the health of lending institutions, according to the latest Financial Stability Report, their solvency and liquidity indicators remain solid, despite a reduction in profitability and low growth in the volume of loans. In terms of funding, the liquidity risk indicator suggests lending institutions have enough liquid resources to meet their short-term obligations. Moreover, there has been a slight recovery in traditional sources of financing.

The new estimate for the macroeconomic imbalance index (MII) in 2018 suggests somewhat of a rebound in this indicator, although at levels that can be classified as historically low. According to this unobservable index, the greatest imbalance would be in home prices and, to a lesser extent, in the current account (Graph 5.7).

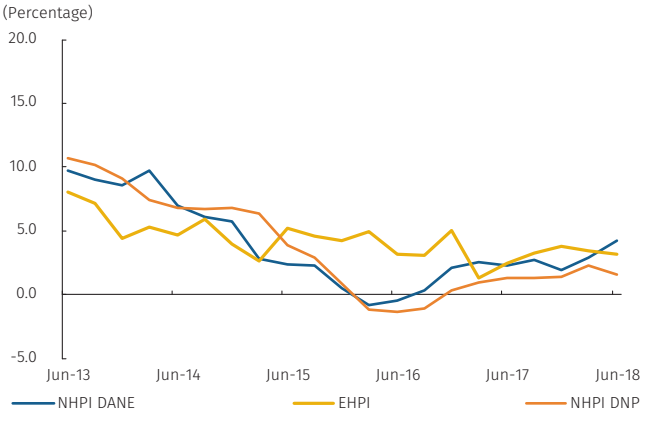
Going forward, there are several risks that are linked to the country's macroeconomic stability. As noted throughout this *Report*, the possibility of the advanced countries normalizing their monetary policies faster or more so than expected could bring additional pressures to bear on the availability of external financing and its cost. Indeed, inflationary pressures in the United States could increase due, for example, to a tighter job market, fuel price increases, higher costs as a result of increased tariffs, or excessive public spending, among other factors. In a scenario

Graph 5.5
Home Price Indexes
(Relative to the CPI)

A. Price Index

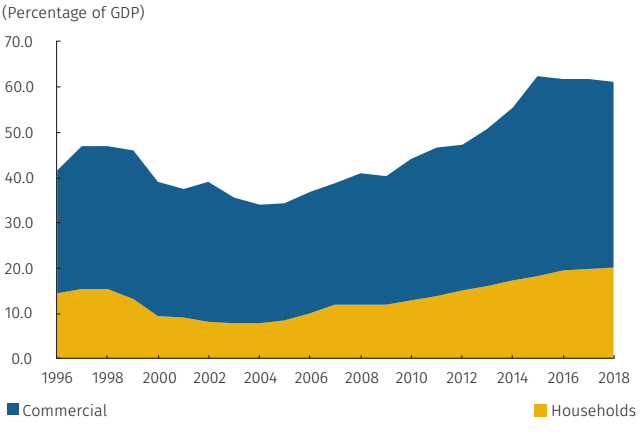


B. Percentage annual change



Source: DANE and DNP; calculations by *Banco de la República*.

Graph 5.6
Total indebtedness[a/] as a share of GDP



a / Includes the bank loan portfolio (D/C and F/C), bonds and direct external credit. In 2018, it includes the data by September.
Source: *Banco de la República*.

like this, the Fed could raise its policy interest rate faster than expected, exerting new depreciation pressure on the currencies of emerging economies.

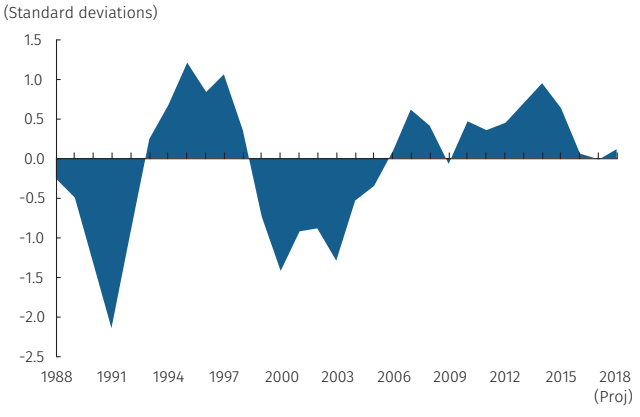
In this regard, it is important to bear in mind that risk premium measurements for Colombia have remained relatively stable and at historically low levels. This is despite the uncertainty that weighs on financing terms for emerging markets and the volatility seen in the risk indicators and currencies of some countries in the region.

Unexpected hikes in external interest rates or abrupt increases in measurements of the country's risk premium could result in extreme depreciation of the peso or less of an inflow of capital into the country. A high and unforeseen rise in the cost of external financing would not only impact the government's finances, but also could slow the recovery in investment through fewer imports. Added to this would be the increase in inflation, if unexpected devaluation were to be passed on domestic prices and move inflation expectations away from the 3.0% target.

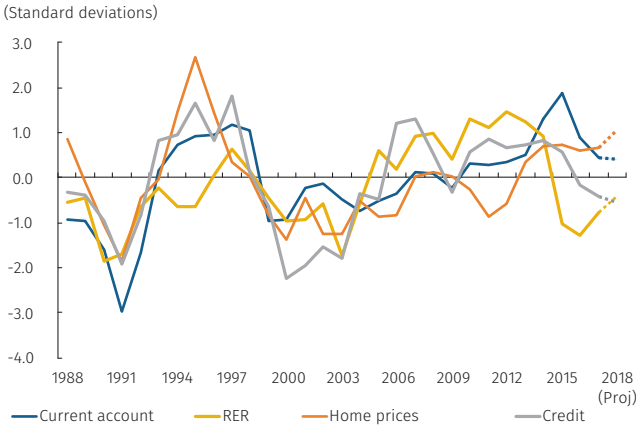
Another risk to bear in mind is the possibility of a decline in external income that could affect national revenue and, consequently, the recovery in economic growth predicted for 2019. Recent tensions in trade relations among the major powers, changes in the supply balance on the world oil market and geopolitical factors, among others, could generate a more-than-expected reduction in prices for Colombia's export commodities, the result being that the country's terms of trade might not be as favorable as anticipated in this *Report*. Moreover, Colombia's trading partners have seen an improvement in growth during recent years, which it is expected to continue on a path to recovery that is favorable for Colombian foreign trade. Nonetheless, there is still the risk of the trend being reversed in response to uncertainty in some emerging economies and the effects of trade tensions. This implies a downward risk for Colombia in terms of external demand, which could detract from growth due to fewer exports, as well as less of a contribution to national revenue from terms of trade.

Graph 5.7
The Macroeconomic Imbalance Index and Gaps

A. Macroeconomic imbalance index



B. Gaps in the current account, real exchange rate, home prices and credit [a/]



(proj): projected
a / The gaps are calculated as the difference between the observed value and the estimated long-term value. In the case of the RER, its negative is presented; so, a positive gap indicates the need for depreciation.
Source: *Banco de la República*.

Yet, despite these risks, having an inflation targeting regime framed by a free floating exchange rate, in addition to complying with the fiscal rule and maintaining a healthy financial system and an adequate level of international reserves makes the Colombian economy more resilient to external shocks and lessens the negative impact that possible risks could have on the country's economy if they were to materialize.

Box 2
New Estimates of the Neutral Interest Rate in Colombia

Anderson Grajales-Olarte
José David Pulido*

Identifying the monetary policy stance is of vital importance to the decisions households and businesses make with respect to consumption and investment. For example, when monetary policy is expansive, agents expect a boost in aggregate demand. This can generate inflationary pressures, depending on the state of the output gap. Therefore, having the means to recognize the stance of monetary policy allows households and companies to make better-informed decisions.

One way to infer the monetary policy stance is by contrasting the level of the policy rate set by *Banco de la República* with the level of the neutral interest rate in the economy. The neutral interest rate, a concept attributed to Wicksell (1936), is defined as the rate that does not exert pressure on the output gap or on inflation. Accordingly, the monetary stance is considered expansive when the policy rate is lower than the neutral rate. It is considered contractive when that level is above the neutral rate.

However, a practical difficulty arises when making that comparison; namely, the extent of the neutral rate cannot be known with certainty. The neutral interest rate is not observable and, therefore, its level and trend must be estimated. Irremediably, its estimated level poses a considerable degree of uncertainty that is inherent in any estimation process, but is associated with the choice of the estimating methodology.

There are several methodologies outlined in the economic literature that can be used to estimate the neutral interest rate. Each of them has advantages and disadvantages, making it difficult to reach a consensus on which of the different methods to estimate the neutral interest rate is better (Magud and Tsounta, 2012). Taking the foregoing into account, this box presents a series of estimates of the neutral real interest rate - developed with different methodologies - that expands and updates those presented in a previous *Inflation Report* (Amador and Beltrán, 2015). These include static approaches (the neutral interest rate is estimated as a constant value of steady state) and dynamic ones (the neutral interest rate can change over time).[1]

Static methods are based on the first order conditions of consumption smoothing models. Dynamic methods include three methodologies: 1) the HP filter; 2) methods based on compliance with a macroeconomic equilibrium equation (for example, uncovered rate parity), and 3) maximum likelihood (ML) estimates of simultaneous macroeconomic equations. Within this last group, the reference methodology in the literature is Laubach and Williams (2003), who jointly estimate a dynamic IS, a Phillips curve and a neutral real interest rate that depends on potential growth and other shocks.[2] In this note, the extension to Laubach and Williams (2003) is used for an open economy proposed by Armelius et al. (2018), which includes the real exchange rate channel.

Other dynamic models include a Taylor rule, an estimate of the neutral rate as a common factor between short and long-term interest rates, and the so-called short-run, long-term and long-run, long-term models proposed by Roberts (2018). In these last two models, the neutral rates are estimated based on the real rates of long-term instruments, specifically the rates on the 10-year TES. As pointed out by Mishkin (1996) and Roberts (2018), neutral long-term rates may be more important to spending decisions than short-term ones. To make their level comparable to other methodologies, these rates are normalized using the term-premium for the period under consideration.

Table B2.1 shows the neutral real interest rate estimates for 2018, developed with the methodologies mentioned earlier. A brief description of each methodology is provided below. The results report considerable uncertainty about the precise level of the neutral real interest rate. It should be noted that the amplitude of the range found using all the methods (between 1.08% and 4.60%) is due to the extreme value produced by the consumption smoothing model, which is known in the literature[3] for generating a puzzle. A more reasonable range (between 1.12% and 2.0%) is obtained by discarding the maximum and the minimum, thus generating a new average of 1.50%. This value is similar to

* The authors are junior researchers with the Macroeconomic Models Department. The opinions and possible errors or omissions found herein are not binding on *Banco de la República* or its Board of Directors.

1 The methods considered here are outlined in Giammarioli and Valla (2004), Basdevant *et al.* (2004), Sources and Gredig (2007), Magud and Tsounta (2012) and Armelius *et al.* (2018).

2 This technique calculates the neutral real interest rate as that consistent with an output level equal to its potential and with stable inflation.

3 It is the equity premium puzzle. This refers to the fact that Euler's condition in a consumption smoothing model usually generates very high interest rates for reasonable risk aversion coefficients (see Cochrane, 2001).

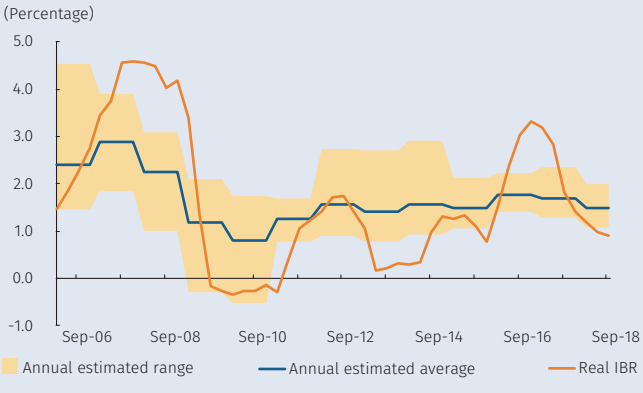
Table B2.1
Estimates of the Neutral Real Interest Rate for 2018

Model	Estimate (2018)
Dynamic models: ML estimates	
Armelius et al. (2018)	1.44
Long-run, "long term"[a/]	2.00
Common factor short and long term rates	1.16
Dynamic Taylor rule	1.72
Dynamic models: equilibrium equations	
Uncovered interest rate parity	1.46
Short-run, "long term"[a/]	1.08
Dynamic models: Statistical filters	
HP filter	1.59
Statistical models	
Consumption smoothing	4.60
Consumption smoothing with habits	1.12
Range	1.08 - 4.60
Range excluding outliers	1.12 - 2.00
Average	1.80
Average excluding outliers	1.50
Median	1.46

Observation: The shaded value pertains to the reference methodology in the literature, which is an extension of Laubach and Williams (2003) for a small and open economy. The other methods are explained in Magdu and Tsounta (2012) and in Roberts (2018).
a/ The estimated values are normalized by the term-premium of the 10-year TES.
Source: Calculations by *Banco de la República*

the estimate obtained with the model developed by Armelius *et al.* (2018), which is the reference model in the literature. Graph B2.1 offers a comparison between the temporal evolution of the range estimated with the dynamic models for each year of the sample of the average of those estimates and the real interbank rate (real IBR).[4] This contrast allows us to infer how the monetary policy stance evolves over time.

Graph B2.1
Temporal Evolution of the Different Dynamic Estimates of the Neutral Real Interest Rate



Source: calculations by *Banco de la República.*

1. A Brief Description of the Methodologies

1.1 Armelius *et al.* (2018): Laubach and Williams (2003) with the Exchange Rate Channel

This estimate is based on the approach developed by Laubach and Williams (2003), but adjusted for application to small and open economies. Accordingly, it takes the real exchange rate channel into account. This method simultaneously models output *(y)*, the real interest rate *(r)*, the real exchange rate *(q)* and inflation *(π)*, variables that are linked through a Phillips curve. As in the case of factor models for non-observed factors, it is assumed that output, the interest rate and the exchange rate have a long-term component and a gap component. In turn, long-term components are presumed to have an autoregressive term. Specifically, we have:

$$x_t = x_t^* + \tilde{x}_t \text{ para } x = y,q,r$$
$$r_t^* = cg_{t-1} + z_{t-1}$$

4 The range shown in Chart B2.1 was constructed by taking into account the maximum and minimum values produced with the different dynamic methodologies. The range does not consider the uncertainty associated with the point estimate of each of the methodologies.

$$z_t = z_{t-1} + \varepsilon_t^z,$$
$$q_t^* = q_{t-1}^* + \varepsilon_t^q,$$
$$y_t^* = y_{t-1}^* + g_{t-1} + \varepsilon_t^y,$$
$$g_t = g_{t-1} + \varepsilon_t^g,$$
$$\tilde{x}_t = \varphi_{x1}\tilde{y}_{t-1} + \varphi_{x2}\tilde{r}_{t-1} + \varphi_{x3}\tilde{q}_{t-1} + \tilde{\varepsilon}_t \text{ for } x = y, q, r$$
$$\pi_t = \delta_\pi \pi_{t-1} + \delta_q \Delta q_{t-1} + \delta_{\tilde{y}}\tilde{y}_t + \epsilon_t^\pi$$

where *c* and the different phis and deltas are parameters to be estimated; variables with an asterisk represent long-term values, and with a virgule they represent gaps; *g* is the growth in potential GDP and the epsilons represent residuals. Bayesian methods are applied in the estimation, using four observed variables: a real interest rate (+ IBR deflated using the expectations of analysts), real GDP, inflation and a real exchange rate (RERI-T-CPI). [5]

1.2 *Long-run, Long-term and Short-run, Long-term Interest Rates*

This estimate is based on Roberts (2018). With this methodology, the term *run* refers to the horizon at which the interest rate stabilizes output. Accordingly, a short-run rate stabilizes output, period by period, while a long-run rate stabilizes it in the long term. *Term* refers to the maturity of the instrument associated with the interest rate. Thus, a short-term rate is calculated, for example, using the IBR; a long-term rate uses, for example, the 10-year TES rate.

The short-run, long-term neutral real interest rate is calculated based on an IS curve for a closed economy, given by:

$$\text{gap}_t = \eta gap_{t-1} - (\sigma R_t - R_t^n),$$

and, therefore,

$$R_t^n = R_t + \frac{gap_t - \eta gap_{t-1}}{\sigma},$$

where *R* is the real rate on 10-year TES (deflated using 10-year inflation expectations); *gap* is that of output, η=0.4697 y σ=0.75. [6]

The long-run component of the long-term rate is calculated using a Kalman filter in which it is assumed the long-term component follows a random walk, while the cyclic component is first-order autoregressive:

$$R_t^n = \bar{R}_t^n + cyc_t,$$
$$\bar{R}_t^n = \bar{R}_{t-1}^n + \varepsilon_t,$$
$$cyc_t = \alpha cyc_{t-1} + \upsilon_t$$

In order to make these long-term rates comparable to the short-term rates, they are normalized by subtracting the 10-year term-premium.

1.3 The Common Factor of Short and Long-term Rates

In this estimate, which follows Basdevant *et al.* (2004), it is assumed there is a common trend between the short (r_t) and long (R_t) term nominal rates, which represents the neutral interest rate (r^*_t). Therefore, it is possible to write:

$$r_t = r_t^* + \pi_t^e + \varepsilon_{rt}$$
$$R_t = r_t^* + \alpha_t + \pi_t^e + \varepsilon_{Rt}$$

where α_t represents the term-premium and $\pi_t e$ represents expected inflation. The behavior of the common trend and the term-premium are modeled as first-order autoregressive processes:

$$r_t^* = r_{t-1}^* + \upsilon_{r,t}$$
$$\alpha_t = \lambda_0 + \lambda_1 \alpha_{t-1} + \upsilon_{t,2}$$

The system is estimated with a Kalman filter, using the IBR, the 10-year TES and the inflation expectations from *Banco de la República*'s survey.

1.4 Dynamic Taylor Rule

In this model, with specifications following Magud and Tsounta (2012), the neutral interest rate is construed from a policy rule in which the intervention rate (r_t) responds to the output gap ($\tilde{y}_t$) and to deviations in inflation (π_t) with respect to the target ($\bar{\pi}_t$). The neutral rate, in turn, follows a random walk with a drift (s_t) that varies over time. Therefore, the state-space representation is given by:

$$r_t = r_t^* + \beta(\pi_t - \bar{\pi}_t) + \theta\tilde{y}_t + \varepsilon_t$$
$$r_t^* = r_{t-1}^* + s_{t-1}$$
$$s_t = s_{t-1} + \upsilon_t$$

The system is estimated with a Kalman filter, using the IBR, observed non-food inflation, the quarterly target and the output gap estimated by the Programming and Inflation Department at *Banco de la República*.

1.5 Uncovered Interest Rate Parity

In this estimate, the domestic neutral real rate equals the sum of the external neutral real interest rate, the trend risk premium and the trend real depreciation rate. For the external neutral rate, the estimate made by Laubach and

5 The *priors*, both their distribution and their moments, were constructed on the basis of Armelius *et al.* (2018).

6 The value for σ is that used in Roberts (2018) and corresponds to estimated values in several DSGE models for the United States. In the case of η, it corresponds to an estimate of the persistence of the output gap in Colombia.

Williams (2003) for the United States, which is updated regularly, is used as a proxy. The trend risk premium corresponds to an estimate of the medium-term trend in the spread on five-year credit default swaps for Colombia. It is assumed that trend real depreciation is 0

1.6 Consumption Smoothing Models

In these models, the neutral interest rate is obtained as a steady state value based on log-linearization of the Euler condition of a consumption smoothing model. The following is obtained for a model without consumption habits:

$$r^* = -ln\beta + \gamma E(\Delta lny_{t+1}) - (\gamma^2/2)VAR(\Delta lny_{t+1})$$

where r^* is the neutral interest rate, β is the assumed discount factor between 0.97 and 0.99, and the aversion coefficient relative to the risk is presumed to be between 1 and 2. For its part, the rate of expected growth in output per capita $E(\Delta lny_{t+1})$ and its variance $VAR(\Delta lny_{t+1})$ approximate the average and the variance in the potential rate of GDP growth per capita, estimated by the Programming and Inflation Department at *Banco de la República*.

The following is obtained with log-linearization for the model without consumption habits:

$$r^* = -ln\beta + \gamma E(\Delta lny_{t+1}) - (\gamma/2)(1-\varphi)$$

where φ, a parameter that measures habits in consumption, is assumed to be between 0.94 and 0.96. The calibration of the parameters in both models follows Sources and Gredig (2007), and the estimated neutral interest rate pertains to the average value found in the parameter grid.

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Annex
Macroeconomic Forecasts by Local and External Analysts

Summarized in this annex are the latest forecasts by local and external analysts for the main variables of the Colombian economy in 2018 and 2019. At the time they were consulted, the analysts had data up to October 25, 2018.

1. Forecasts for 2018

On average, the local analysts expect 2.7% economic growth, which exceeds the estimate in the June edition of the *Inflation Report* (2.6%). On the other hand, the external entities that were consulted anticipate 2.8% GDP growth, on average. This is similar to the forecast in the *Inflation Report* for the previous quarter (2.7%).

In terms of prices, the local analysts estimate 3.3% inflation, which is the same as the rate noted in the previous *Report*. The external analysts also anticipate 3.3% by the end of the year.

Table A1
Forecasts for 2018

	Real GDP Growth (Percentage)	CPI Inflation (Percentage)	Nominal exchange rate end of	Nominal fixed-term deposit rate (DTF) (Percentage)	Fiscal deficit (Percentage of GDP)	Unemployment rate in the thirteen major metropolitan areas (Percentage)
Local Analysts						
Alianza Valores[a/]	3.1	3.5	3,100	4.5	3.1	9.3
ANIF[a/]	2.7	3.3	n.d.	4.5	3.1	10.8
Banco de Bogotá[a/]	2.5	3.2	3,000	4.5	3.1	10.4
Bancolombia[a/]	2.6	3.4	3,060	4.5	3.1	9.7
BBVA Colombia[a/]	2.6	3.3	2,960	4.5	3.1	9.8
BTG Pactual	2.5	3.3	3,028	n.d.	3.1	9.1
Corficolombiana	2.8	3.3	2,900	4.5	2.4	9.5
Corredores Davivienda[a/b/]	2.7	3.4	3,050	4.5	3.1	10.1
Credicorp Capital[c/]	2.8	3.2	2,950	4.4	2.2	10.3
Davivienda[a/]	2.7	3.4	3,050	4.5	3.1	10.1
Fedesarrollo[a/]	2.9	3.3	n.d.	n.d.	3.1	n.d.
Itaú[a/d/]	2.7	3.2	2,890	4.3	3.1	9.4
Ultraserfinco[e/]	2.6	3.2	2,890	4.6	3.3	12.5
Average	2.7	3.3	2,989	4.5	3.0	10.1
External analysts						
Citibank-Colombia[a/]	2.5	3.3	3,059	4.4	3.1	10.3
Deutsche Bank	2.8	3.2	n.d.	n.d.	3.1	9.4
Goldman Sachs	3.0	3.2	2,850	n.d.	3.1	n.d.
JP Morgan	2.9	3.4	3,050	n.d.	3.1	n.d.
Average	2.8	3.3	2,986	4.4	3.1	9.9

n.a.: not available
a/ The forecast deficit pertains to the national government (GNC)
b/ Formerly Corredores Asociados.
c/ Formerly Correval
d/ Formerly Corpbanca, up to June 2017
e/ Formerly Ultrabursatiles
Source: *Banco de la República* (electronic survey).

Table A2
Forecasts for 2019

	Real GDP Growth	CPI Inflation	Nominal exchange rate end of
	(Percentage)		
Local Analysts			
Alianza Valores	3.5	3.8	3,200
ANIF	3.3	3.5	n.d.
Banco de Bogotá	3.0	3.0	3,050
Bancolombia	3.2	3.4	3,130
BBVA Colombia	3.3	3.2	2,900
BGT Pactual	3.4	3.3	3,074
Corficolombiana	3.4	3.5	2,980
Corredores Davivienda[a/]	3.2	3.6	n.d.
Credicorp Capital[b/]	3.3	3.3	2,800
Davivienda	3.2	3.6	n.d.
Fedesarrollo	3.5	3.2	n.d.
Itaú[c/]	3.5	3.0	2,930
Ultraserfinco[d/]	3.1	3.2	3,000
Average	3.3	3.3	3,007
External Analysts			
Citibank-Colombia	3.1	3.0	3,046
Deutsche Bank	3.6	3.4	n.d.
Goldman Sachs	3.5	3.0	2,700
JP Morgan	3.4	3.5	3,125
Average	3.4	3.2	2,957

n.a.: not available
a/ Formerly Corredores Asociados
b/ Formerly Correval
c/ Formerly Corpbanca, up to August 2017
d/ Formerly Ultrabursatiles
Source: *Banco de la República* (electronic survey).

Both forecasts are within the 2.0% to 4.0% range around the inflation target set by the Board of Directors of *Banco de la República* (BDBR) for 2018. However, they are above the long-term inflation target (3.0%).

With respect to the exchange rate, the local analysts expect the market exchange rate (MER) to end the year at COP 2,989, on average. The estimate in the survey considered for the previous edition of this *Report* was COP 2,921. The external analysts are forecasting a MER near COP 2,986 by the end of the year.

The local analysts are forecasting 4.4%, on average, for the fixed-term deposit rate. They also expect the unemployment rate to be 10.1%.

2. Forecasts for 2019

As for 2019, the local analysts expect 3.3% economic growth, while the external analysts are predicting 3.4%. In terms of inflation, the local analysts are forecasting 3.3% and the external analysts, 3.2%. With respect to the nominal exchange rate, the local analysts expect it to average COP 3,007 and the external analysts are predicting COP 2,957.

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