Box 1
RECENT PERFORMANCE OF PRODUCTION AND INTERNATIONAL TRADE IN THE INDUSTRIAL SECTOR

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Colombian industry has stagnated in the last four years, compared to the relatively favorable performance of the country's economy as a whole. The national accounts produced by DANE show the manufacturing sector grew 0.3%, on average, between 2012 and September 2015, while GDP and domestic demand rose at respective average rates of 4.2% and 5.0% during the same period. Poor industrial performance is not only a problem in Colombia; it is a worldwide phenomenon. However, Colombia seems to have emerged from it relatively unscathed compared to its peers in Latin America (Table B1.1). Poor industrial performance in Colombia has been associated, in part, with appreciation of the peso (mainly between 2012 and 2013) and the loss of competitiveness it would have entailed. However, that phenomenon was reversed during the past year by devaluation of the peso in 2015. The purpose of this section is to analyze whether the current trend in the exchange rate has somehow influenced in the recent performance of industrial production.

Table B1.1
Real Industrial Production
(Annual change)

	2014	Jan-Nov 2015
Mexico	2.56	1.04
Chile	0.33	(0.01)
Peru	2.35	2.74
Brazil	(2.87)	(7.95)
Colombia	1.53	0.61
Argentina	(1.84)	0.01

Source: Bloomberg; *Banco de la República*'s calculations.

Devaluation of the peso could have affected industrial production in two ways. Firstly, by making imports more expensive, peso depreciation would have reduced foreign purchases in certain sectors, and possibly prompted their replacement with domestically produced goods. Secondly, the increase in earnings of exporters (in pesos) as a result of depreciation of the exchange rate, could pose an incentive for industry to expand production in the hope of increasing exports.

The latest information from the Monthly Manufacturing Survey (with data up to November 2015) indicates that industrial production overall and production without oil refining have increased 0.7% and 1.4% so far this year, respectively. Yet, despite the recent improvement (4.8% and 2.6% by November for total production and without refining, in that order), performance within the sector remains mixed. While coking, oil refining and fuel blending (17.4%), manufacturing of beverages (6.6%) and manufacturing of pharmaceuticals and medicinal chemicals (11.1%) grew considerably, other activities such as basic iron and steel industries (-12.9%), manufacturing of machinery and equipment n.c.p. (-15.3%), manufacturing of other transport equipment (-24.0%) and manufacturing of appliances and electrical equipment (-7.8%) have fallen significantly.

The evidence also indicates the industrial sector is highly diverse when it comes to international trade. A look at the figures on annual growth in exported and imported quantities during the period from 2014 to 2015 (through November) shows major expansion in some sectors, while others have experienced sizeable contractions in both components of the trade balance (Table B1. 2). The highlights in terms of exported quantities include the growth of sectors dedicated to the manufacture of oils and automobile bodies, while the notable declines were in glassmaking and other types of transport equipment. As for imports, the increase in the sectors producing dairy products and beverages is significant, while milled products, sugar and bakery goods posted major declines.

Table B1.2 contains relevant information for analyzing the hypothesis on import substitution. There would be evidence of this process in sectors where industrial production increased and the quantities (tons) of imports

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Table B1.2
Annual Growth Year to Date: January-November 2015

Branches	Industrial Production	Imports			Exports		
		Value in dollars	Value in Pesos	Quantities (Tons)	Value in dollars	Value in Pesos	Quantities (Tons)
Processing and preservation of meat, fish, crustaceans and mollusks	7.2	(13.4)	18.1	(1.3)	(20.5)	9.7	(11.9)
Processing of oils and fats of vegetable and animal origin	5.0	(13.9)	15.3	12.7	69.5	146.6	121.2
Manufacturing of dairy products	2.1	26.5	70.1	65.2	(34.0)	(8.9)	(23.3)
Manufacturing of milled products, starches and derivatives	(0.7)	(58.7)	36.9	(64.4)	3.9	41.7	13.7
Manufacturing of white sugar and brown sugar	0.9	(51.3)	(40.5)	(68.5)	1.8	40.4	11.0
Manufacturing of bakery goods	1.7	(53.6)	(38.3)	(50.7)	(13.6)	19.1	(8.6)
Manufacturing of prepared animal feed	14.6	6.3	46.3	1.6	(33.7)	(10.0)	(14.3)
Preparation of beverage	4.4	23.1	72.3	120.6	(4.3)	30.5	(15.3)
Spinning, weaving and finishing of textile products	(8.3)	(15.3)	17.0	(2.8)	(18.1)	11.8	(10.1)
Manufacturing of wearing apparel	3.3	(17.8)	14.4	(13.1)	(7.0)	27.3	2.3
Tanning and re-tanning of hides, re-tanning and dyeing of fur	(4.6)	(22.6)	6.3	46.7	(16.7)	11.7	5.9
Manufacturing of luggage, handbags and similar articles in leather	11.3	(25.8)	0.8	(27.2)	(6.8)	28.0	(7.8)
Shoemaking	(7.2)	(17.4)	14.0	(11.4)	(9.9)	23.3	6.6
Wood processing and products	8.1	(16.0)	14.8	(7.8)	2.7	41.5	(27.4)
Manufacturing of paper, cardboard and products thereof	4.2	(11.6)	21.3	(7.3)	(18.4)	11.0	(11.5)
Printing activities	1.4	21.6	70.0	(16.7)	(25.0)	(0.3)	(7.7)
Coking, oil refining and fuel blending	(5.1)	(34.6)	(10.4)	9.1	(54.1)	(37.7)	(16.3)
Manufacturing of basic chemicals and products thereof	6.9	(12.8)	22.5	5.1	(19.2)	16.0	(11.9)
Manufacturing of other chemical products	3.0	(3.0)	32.8	4.8	11.2	54.6	4.1
Manufacturing of soap and detergents, perfumes and toiletries	(3.9)	(7.7)	26.2	(6.5)	(10.3)	22.4	(2.2)
Manufacturing of pharmaceuticals and medicinal chemical substances	2.6	0.5	37.9	11.9	(3.8)	31.8	(9.4)
Manufacturing of rubber products	(10.2)	(14.1)	17.2	(7.3)	(15.3)	14.2	(29.7)
Manufacturing of plastic products	4.9	(8.5)	25.2	(0.0)	(5.0)	30.3	(0.3)
Manufacturing of glass and glass products	(2.9)	(8.5)	25.1	5.5	(29.7)	(3.5)	(53.4)
Manufacturing of non-metallic mineral products - n. c. p.	1.9	(1.0)	36.3	41.2	(18.6)	11.4	(14.3)
Manufacturing of basic iron and steel	(2.0)	(23.7)	4.2	(2.7)	(31.9)	(7.2)	(22.3)
Manufacturing of basic precious and non-ferrous metals	6.1	(13.8)	17.5	(6.3)	(11.8)	(3.0)	3.2
Production of metal manufactured goods	(3.3)	(11.7)	20.4	(2.1)	(4.2)	31.3	(6.6)
Manufacturing of electrical appliances and equipment	(3.8)	(18.2)	12.0	(11.8)	2.8	40.7	5.3
Manufacturing of machinery and equipment-n. c. p.	(2.3)	(10.4)	22.7	(7.1)	(17.6)	12.6	(10.0)
Manufacturing of motor vehicles and their engines	(4.4)	(31.4)	(6.5)	(24.8)	(11.0)	21.6	3.4
Manufacturing of bodies for motor vehicles, trailers	(16.1)	(18.6)	12.4	2.1	127.9	197.4	127.0
Manufacturing of parts (auto parts) and accessories (luxury) for vehicles	(9.1)	(11.6)	20.6	(0.4)	(17.2)	13.0	(12.5)
Manufacturing of other transport equipment	(4.7)	5.7	42.3	9.5	(17.2)	16.4	(68.5)
Manufacturing of furniture, mattresses and box springs	(3.7)	(19.4)	10.2	(17.4)	(9.4)	24.6	(13.8)
Other industrial manufacturing	(9.8)	(8.5)	26.0	(9.1)	0.4	38.7	(0.8)

n.c.p. – not classified previously
Source: DANE; *Banco de la República*'s calculations.

declined during the year to date. This is true for nine of the 36 industrial sectors analyzed (shaded in yellow). However, sectors for which there appears to be evidence of import substitution only account for 17.3% of industrial production, according to the weights obtained from the Industrial Production Index (IPI).

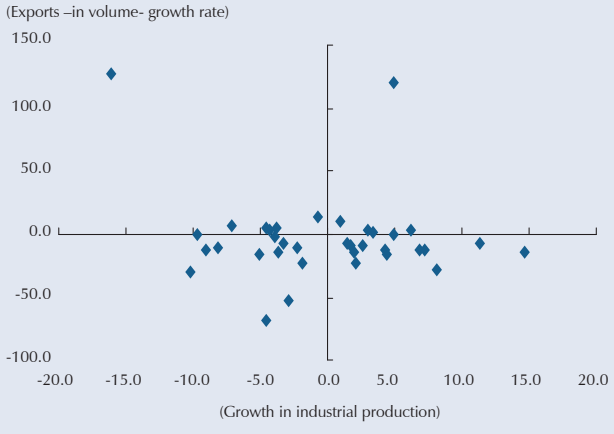
As for exports, there have been increases in both production and exported volume (in tons) in five sectors (shaded in gray in Table B1.2). In the other sectors, there are setbacks or, in a few cases, very moderate increases in real foreign sales that are not accompanied by growth in production.

When analyzing sectoral production compared to respective international sales and purchases during the period from January to November 2015, we see that production is not systematically related to the components of international trade. The correlation coefficient between production growth and both exports and imports is not statistically significant.[1] This outcome is similar to what was reported by Carranza et al. (2013),[2] who found no evidence of a correlation between imports and production (Graph B1.1).

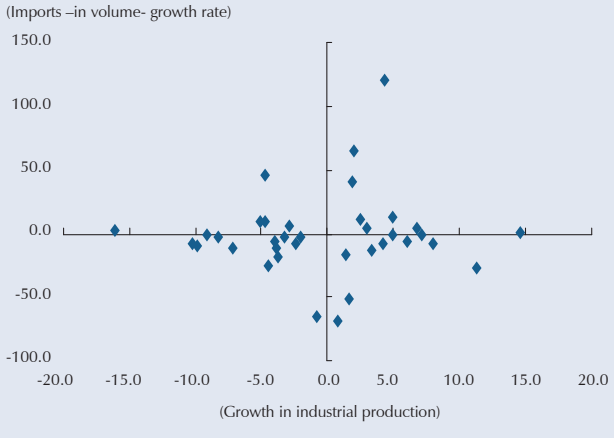
Table B1.3 lists the annual changes in exports and imports, by destination, between 2014 and 2015, specifically during the period from June to November. It shows that, by destination, despite the decline in trade in dollars, the variation in current pesos is positive. While exports and imports fall by about 14%, in dollars, there is an increase of more than 20% in pesos. Accordingly, as a result of peso devaluation, exporters saw their income increase significantly. However, this does not necessarily mean more profits for exporting firms; as shown in the same table, the peso value of imports for the sector also increased. This suggests that some of the costs for companies in this sector that make intensive use of imported inputs and raw materials have

Graph B1.1
Scatter Plots Showing Trade Volume versus Production in Real Terms, by Branches (Annual variations, accumulated from January to November 2015)

A. Exports



B. Imports



Source: *Banco de la República*'s calculations.

increased as well, offsetting the rise in revenue, at least to some extent. In fact, according to the ANDI industrial opinion survey, employers raised concerns about problems with the exchange rate, possibly reflecting the fact that depreciation has increased their production costs (Graph 1.2).

Of course, it is important to point out that the decline of manufacturing output in Colombia during the last two years was not due solely to the exchange rate; other supply and demand shocks also played a role. Closure of the refinery in Cartagena (Reficar) during 2014 and 2015, less external demand, less dynamic domestic demand and, to some degree, competition from imports are other shocks that affected industry in the recent period. Added to this is the drop in trade with Venezu-

1 Cross-correlations between real production and trade, in volume and dollars, showed similar results, except for the manufacture of textiles and garments and plastic products. For those branches of manufacturing, a positive and significant correlation between imports and production was found. It also was noted that industry has grown and imports have declined in 2015.

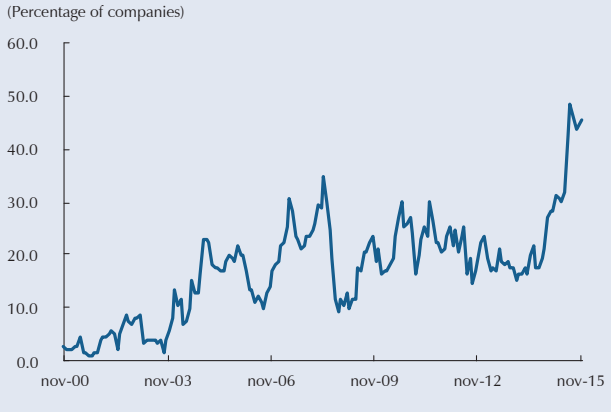
2 Carranza, J. E., Gonzalez, A. Serna, N. "La relación entre la producción y el comercio exterior de la industria manufacturera colombiana (2000.2010)" (The Relationship between Production and Foreign Trade in Colombian Manufacturing (2000-2010). *Borradores de Economía*, No. 806, *Banco de la República*, 2014.

Table B1.3
Annual Changes in Exports and Imports by Destination, Accumulated from June to November 2015

Country	Exports		Imports	
	Value in dollars	Value in Pesos	Value in dollars	Value in Pesos
United States	0.2	47.0	(16.1)	23.2
Euro zone	(2.3)	43.4	(10.3)	31.6
China	(21.5)	15.2	(12.6)	28.3
Panama	4.7	53.7	(5.6)	38.5
Mexico	22.9	80.4	(29.4)	3.6
Brazil	(24.4)	11.0	(10.2)	31.9
Switzerland	59.5	134.1	(2.4)	43.3
Singapore	(29.7)	3.1	12.9	65.8
South Korea	(14.9)	24.9	(23.5)	12.3
Ecuador	(30.6)	1.9	(33.6)	(2.6)
Peru	(4.3)	40.5	(23.7)	12.0
Japan	5.9	55.4	(13.4)	27.0
Chile	5.0	54.1	(31.5)	0.5
Venezuela	(51.4)	(28.7)	(62.7)	(45.2)
Costa Rica		45.3	7.5	57.8
Weighted average	(13.3)	27.2	(14.9)	24.9
Weighted average (without Ecuador)	(10.2)	31.8	(14.5)	25.5
Weighted average (without Venezuela)	(6.6)	37.1	(14.7)	25.2
Weighted average (without Ecuador and Venezuela)	(1.3)	44.9	(14.3)	25.8

Note: Inflation pertains to the annual change in the price indexes reported by the IMF (last update at October 2015). The calculation for Ecuador does not include the effect of tariff measures that reduce the real price received by Colombian exporters. The manufacturing industry is classified according to CIIU REV 4, excluding petrochemicals and metals.
Average weighted by the share of trade in 2014.
Sources: DIAN, DANE, IMF and central banks; *Banco de la República*'s calculations

Graph B1.2
Problems Associated with the Exchange Rate, as Indicated by Industrialists in the ANDI Industrial Opinion Survey



Source: ANDI.

ela and Ecuador, as evident in the decline in exports in dollars to those destinations (Table B1.3). This is a demand shock and it has had a significant impact on the momentum in industry in recent months.

To date, there is still no evidence to support the hypothesis that depreciation of exchange rate has significantly affected foreign trade in Colombia's industrial sector. However, accumulated depreciation in 2015, which favors the competitiveness of domestic industry, is expected to allow for some degree of import substitution during 2016. The reopening of Reficar is expected to prompt an expansion in the industrial sector during 2016, inasmuch as the facility is expected to be operating at one hundred percent capacity by the first quarter of the year.