Competitiveness in the Latin American manufacturing sector: trends and determinants

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Abstract

After analysing the evolution of exports from the large Latin American countries over the last decade, and examining on a case by case basis the determinants for each country's performance, this study concludes that competitiveness in the manufacturing sectors of most countries in the region went down from 2007 to 2012, after relatively favourable progress in the previous five-year period between 2002 and 2007. This recent deterioration, which has been more noticeable in countries such as Brazil and Colombia, is related to the real exchange rate appreciation, high labour costs and insufficient progress in labour productivity. The main exception to these regional trends is Mexico, where gains in the manufacturing sector's competitiveness continued beyond 2007, partly because the exchange rate stayed relatively depreciated and labour costs, as well as work productivity, performed better than in the South American countries. However, from 2011 onwards, the reversal of these trends has been making it difficult for the Mexican manufacturing sector to gain competitiveness. Case studies of each of the region's main countries show that in general the exchange rate, labour costs and work productivity were the main determinants in the evolution of manufacturing competitiveness in the last decade. In fact, the countries and periods where these variables performed poorly coincide with losses of market share in international trade and deteriorating competitiveness. Nevertheless, the impact of the remaining variables affecting the manufacturing sector's competitiveness is not insignificant either. In fact, gains in competitiveness have been greater (and losses in competitiveness smaller) in Chile and Peru, where the institutional framework has improved and logistics and energy costs reduced or kept under control.

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h: Author of section 8 on Peru.

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1. Introduction

Latin America has grown at an annual rate of 3.7% in the last decade, a significant expansion both in historical terms and in comparison with other regions. As well as growing at a faster speed, the region has succeeded in increasing its development level and reducing vulnerabilities – see BBVA Research (2013a) and BBVA Research (2013b), for example.

In many countries in the region, growth and the transition to development have been accompanied by appreciation in real exchange rates, wage increases and in some cases a rise in taxes. As a result, there is increasing concern that these factors may determine a loss of competitiveness in the region's economies, despite the fact that in general countries have implemented reforms to improve the institutional environment and increase productivity.

This worry about a possible loss in competitiveness is particularly acute in the manufacturing sector, given that this sector did not have the advantage of a large rise in its prices on global markets, unlike the primary products sector; and it is also much more exposed to international competition than are the non-tradable sectors, such as services. In addition, the competition faced by the manufacturing sector in Latin American countries may have risen in the last decade due both to greater openness in the region's economies and greater dynamism in their demand compared with that of developed countries, particularly after the Lehman Brothers crisis in 2008.

In any event, a possible loss of competitiveness in the manufacturing sector would represent a bigger problem, the bigger the contribution of said sector to the economy. So, a lower degree of competitiveness in manufactured products would very probably be a more serious problem for Mexico and Brazil than it would be for Chile and Peru, for example.

The aim of this paper is to establish whether there have been losses or gains in manufacturing competitiveness in some of Latin America's biggest economies - Argentina, Brazil, Chile, Colombia, Mexico and Peru - between 2002 and 2012.

In view of the relative subjectivity of the "competitiveness" concept and the endless difficulties in measuring it – see Lall (2001), for example — we will adopt an approach that uses revealed competitiveness based on trade data. That is, we will focus on analysing international trade data to research whether there has been a loss of competitiveness or not in each of the countries over a specified period. So, a loss (or gain) in competitiveness in the manufacturing sector will on the whole be linked to poor (good) performance by a series of trade indicators, such as the reduction (increase) of manufactured products´ export share in world exports.

As well as identifying – and describing with detail – loss or otherwise of competitiveness, we will research the various factors which may have explained each country's competitiveness performance in the last few years, such as the real exchange rate, labour costs, labour productivity, terms of trade, the institutional environment, infrastructure, taxes, energy costs, the cost of capital, etc.

Although the evidence generated in this article may corroborate the existence of symptoms of Dutch disease or support some other theory about the impact on the economy of the abundance of natural resources, this is not an explicit aim of the paper (for a discussion on these theories and empirical evidence available, see Frankel (2010) and Van der Ploeg (2011), for example).

In general terms, the article's approach follows the methodology propounded by Reis & Farole (2012) in their research to design a diagnostic strategy of competitiveness based on trade data. Our paper is directly linked to that of Canuto, Cavallari & Reis (2013), which also follows the same methodology, and in a more general and less direct way, to a series of studies which research competitiveness changes in the manufacturing sector – see, for example, the study on industrial competitiveness in Latin America in the nineties by Lall, Albaladejo & Moreira (2004).

Trade data used in this article are available from WITS (World Integrated Trade Solutions), the tool designed by the World Bank for accessing a series of international trade data.

After this introduction, in the second section we present the main stylised facts on international trade for each of the countries being analysed, between 2002 and 2012, using WITS data.

Then, in the country sections, we diagnose each territory's competitiveness loss or gain, according to the trade data presented before, and we analyse the idiosyncrasies and main determinants for changing competitiveness in each case. At the end of each section there is a conclusion which sums up and comments that country's key results.

The study ends with final conclusions on the paper's most significant findings.

2. Latin American export performance in the last decade

This section will analyse the results from a range of international trade indicators as a first approximation in looking at competitiveness changes in the region during the 2002-2012 decade, with particular attention being paid to the manufacturing sector. First, we present export performance in relative terms and the openness of countries to international trade depending on their per capita income. Then we show the results of a competitiveness indicator based on trade data and we look at whether countries have lost or gained market share in their export products. Finally, we present the changes in export diversification and the technological sophistication of exports. Each of these indicators has potential weaknesses, so it is helpful to look at the bigger picture when analysing the results below.

The boost of raw materials has not generated a significant increase in the export/GDP ratio

The contribution of primary product exports[1] to GDP has increased between 2002 and 2012 in practically all the countries reviewed (see Figure 1), to a large degree because of historically high raw material prices. However, the contribution of non-basic manufactured goods, i.e. more sophisticated manufactured products (less primary-resource intensive) has dropped, with the sole exception of Mexico which is, precisely, the only country in the region in which these more advanced exports are predominant. When it comes to basic, more primary-resource intensive, manufactured goods, their contribution to GDP fell in some countries (Argentina, Brazil and Colombia) and rose in others (Chile, Mexico and Peru). If we look at the manufacturing sector as a whole, i.e. basic and non-basic manufacturing, the ratio of these exports to GDP has only risen in Mexico (+2.9pp), Peru (+2.4pp) y Chile (+1.5pp)[2].

Figure 1
Total exports: % of GDP
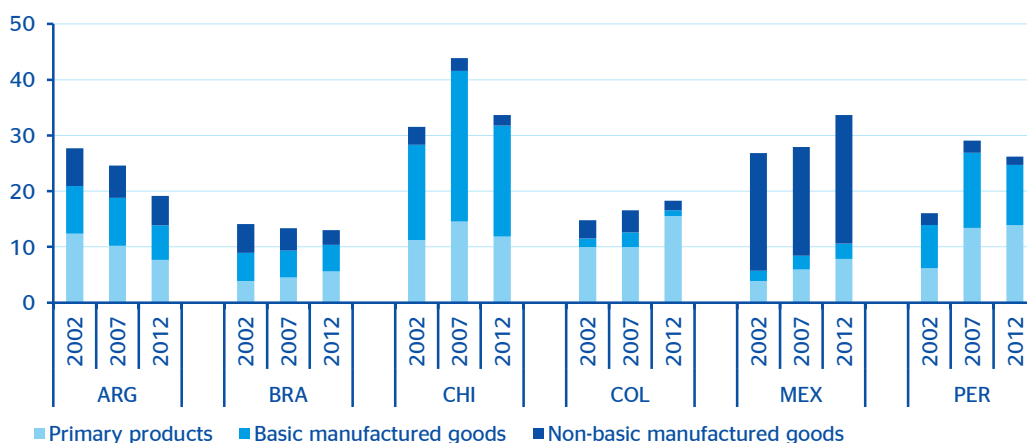
Source: WITS and BBVA Research

The boost of raw materials has not generated a significant increase in the export/GDP ratio in the last decade – one needs to bear in mind the denominator effect — with the sole exception of Peru (+10pp). In the other countries, the ratio has gone slightly up (Colombia and Chile), slipped a little

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1: We have used the Harmonised System (HS) revised in 2002 (HS 2). See http://unstats.un.org/unsd/tradekb/Knowledgebase/HS-Classification-by-Section for more details. We have made a simple (two digits) classification of the product universe. Primary products: agriculture, meat and dairy products, fish and shellfish (HS 1-10, 12-14) and extractive industries (HS 25, 27, 68–71). Basic manufactured goods: food, beverages, tobacco, wood, paper (HS 11, 15–24, 44–48) and iron, steel and other metals (HS 26, 72–83). Non-basic manufactured goods: chemical products, plastics, rubber (HS 28–36, 38–40), textiles, clothing, leather, footwear (HS 41–42, 50–65), machinery, electronics, transport equipment (HS 84–89) and other industries (HS 37, 43, 49, 66–67, 90–97).
2: WITS data, used constantly in this section, are based on UN COMTRADE data. Despite their limitations (see http://comtrade.un.org/db/help/uReadMeFirst.aspx), they are widely used in international trade literature.

(Brazil) or fallen significantly in the case of Argentina (-9pp)[3]. In Mexico, this ratio has also improved (+7pp), but to a large extent this has been a consequence of changes in manufactured products.

Where we do see generalised gains throughout the decade, mainly due to the growth of primary products, is in the countries' shares in world exports (see Figure 2), with Mexico the only exception, and this is precisely because the country depends less on primary product exports, those which most benefitted from a positive price effect over the period we have analysed.

In absolute terms, compound annual growth of total exports between 2002 and 2012 was 19% in Peru, between 15% and 17% in Colombia, Brazil and Chile, 12% in Argentina and 9% in Mexico. This growth is mainly explained by a steep increase in the value of exports (between 22% YoY in Peru and 9% in Mexico, see Figure A.1 in the Appendix) due mainly to the increase in the price of raw materials over the decade (for example, 17%, 16% and 12% in copper, oil and soybean, respectively). In general, export volumes have risen, although much more modestly than value. The biggest volume increases have been recorded in Colombia (7%), Peru and Argentina (6% each).

Figure 2
Country share in world exports (%)
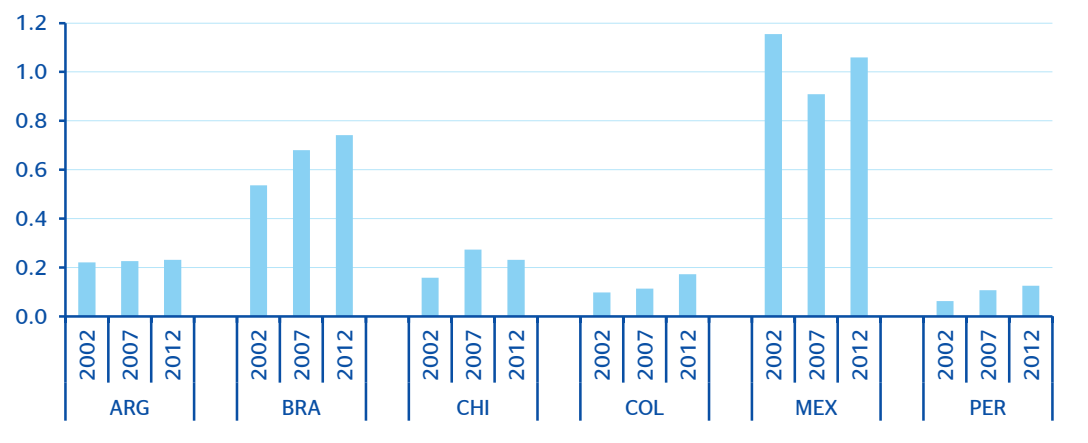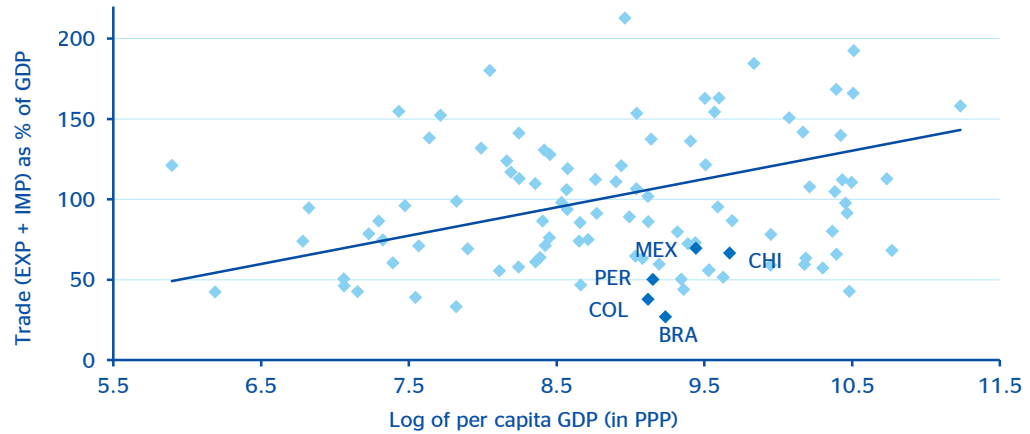

Source: WITS and BBVA Research

Nevertheless, despite export increases over the decade we analysed, all countries in the region remained relatively closed to international trade in proportion to what might be expected from their per capita GDP level based on Purchasing Power Parity (see Figure 3)[4].

3: In the case of Argentina, there is a major base year effect, since 2002 was the year with the steepest GDP fall, measured in dollars, in its history, so taking this as the base year involves magnifying the exports in dollars to GDP ratio for that year.
4: Openness to international trade is measured by the ratio of exports plus imports to GDP. The figure shows the linear relationship between this variable and GDP per capita for a total of 105 countries. The seven countries in the region are well below this linear trend, with Brazil the most closed as a ratio of its per capita GDP and Mexico at the other extreme, with the smallest difference between its trade openness and the linear trend. This basic analysis does not factor in other geographic and demographic features which determine a country's potential openness to international trade. See, for example, OECD (2013).

Figure 3
Openness of countries to international trade vs. GDP per capita (2012)

Source: WITS and BBVA Research

The RCA competitiveness indicator suggests an increasing comparative disadvantage in non-basic manufactured goods

A standard competitiveness indicator based on trade data is the Revealed Comparative Advantage (RCA), calculated as the ratio between the participation of a sector in a country's exports and the participation of that same sector in world exports[5]; an RCA of over 1.0 means that the country has relative advantage in that sector, while a lower indicator shows relative disadvantage[6].

All countries, with the sole exception of Mexico, have a comparative disadvantage in non-basic manufactured exports (see Figure 4) and, furthermore, the RCA for this group of products — taken as a whole[7] — has fallen in the last decade, apart from Argentina thanks to a large extent to transport equipment (see Table 1). In the case of Colombia, the deterioration only started in the second half of the decade after a small improvement in the first. Mexico, meanwhile, has a comparative advantage in non-basic manufactured goods and has gained competitiveness in most subsectors. In the other countries, non-basic manufacturing sectors showing a positive performance (RCA rises) are: transport equipment in Peru and Colombia, footwear and headgear in Peru and chemical products and textiles in Brazil.

5: Since it is calculated as the ratio of a sector's quota in the country and in the world, RCA is affected by the performance of all products. For example, although a country may have a clear competitiveness gain in one product and considerably increase its quota in world exports, that sector's RCA might fall if the country's other exports have grown even more, which will imply a loss of quota for that product. For more information about this indicator, see Reis & Farole (2012).
6: Nevertheless, as a high export volume may be due to subsidies or other incentives (such as devalued currency), the RCA is considered by some authors a better way of measuring competitiveness than a country's comparative advantage. See, for example, Siggel (2006).
7: A country may have increased its comparative advantage in those non-basic manufactured goods that make up its export portfolio and still show a drop in the RCA for the non-basic manufacture aggregate. This may happen, for example, if at a global level those non-basic manufactured goods the country does not export have grown more.

Figure 4
Indicator of Revealed Comparative Advantage (RCA) by groups of products
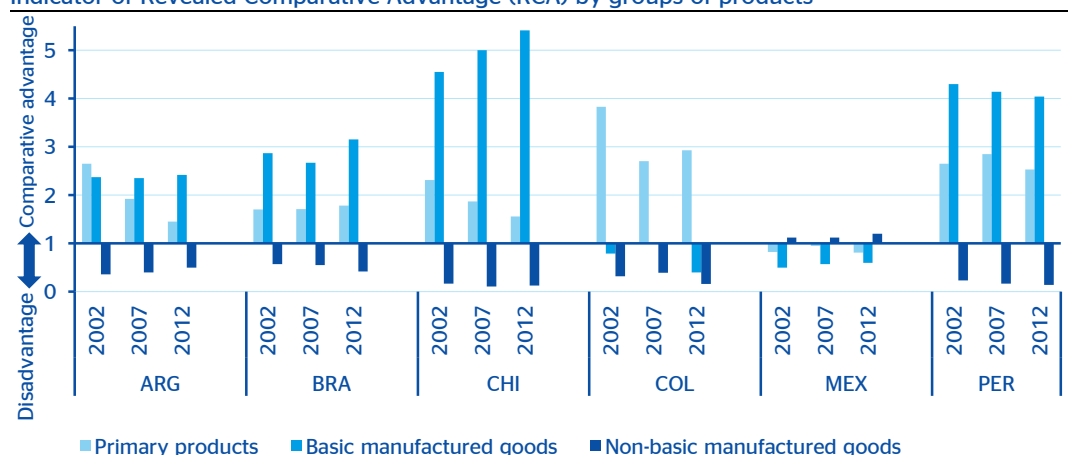
Source: WITS and BBVA Research

Table 1
Indicator of Revealed Comparative Advantage (RCA) by sectors

	Argentina			Brazil			Chile			Colombia			Mexico			Peru		
	2002	2007	2012	2002	2007	2012	2002	2007	2012	2002	2007	2012	2002	2007	2012	2002	2007	2012
Animal products	3,4	4.1	3,4	2.7	3,5	2.7	4.9	3,7	4.2	0.6	1,1	0.2	0.3	0.4	0.5	1,3	1,1	1,1
Vegetable products	9,6	12.2	9,6	4.2	4.2	5,0	5,8	3,0	3,2	8,1	6,2	3,5	0.9	1,1	1,0	4.4	3,0	3,6
Food products	5,0	6,4	6,7	4.3	3,9	4.2	2.9	1,9	1.8	1,4	1,5	0.7	0.7	0.9	0.9	5,7	3,0	2.9
Mineral products	2.4	1,8	1,6	10.3	9,6	10.5	15,6	17,5	13,8	1,1	0.5	0.1	0.5	0.6	0.8	24.6	25,8	19,2
Fuels	2.0	0.9	0.5	0.4	0.5	0.6	0.2	0.1	0.0	4.3	2.7	3.5	1,0	1,1	0.7	0.7	0.6	0.6
Chemical products	0.6	0.6	0.9	0.5	0.6	0.6	0.7	0.4	0.6	0.7	0.6	0.2	0.3	0.3	0.3	0.3	0.2	0.2
Plastics and rubber	0.8	0.6	0.6	0.6	0.7	0.5	0.3	0.2	0.3	0.8	1,0	0.5	0.4	0.5	0.5	0.3	0.3	0.3
Hides and skins	4.0	3.4	2.4	2.1	2.3	1,4	0.2	0.1	0.1	1,4	1,4	0.6	0.2	0.2	0.2	0.3	0.2	0.2
Wood products	0.5	0.6	0.5	2.1	2.1	1,8	3,7	2.8	3,2	0.7	1,0	0.2	0.2	0.3	0.3	0.7	0.5	0.4
Textiles	0.3	0.3	0.2	0.3	0.3	0.4	0.1	0.1	0.0	1,0	1,2	0.3	1,1	0.7	0.5	1,8	1,4	1,0
Footwear and headgear	0.1	0.1	0.1	2.8	1,7	0.7	0.1	0.2	0.0	0.2	0.5	0.0	0.2	0.2	0.3	0.1	0.1	0.1
Stone and glass	0.2	0.2	0.8	0.8	0.6	0.3	0.4	0.5	0.5	1,3	1,5	1,9	0.6	0.7	1,1	2.7	3,1	3,5
Metals	1,0	0.5	0.5	1,6	1,2	1,0	4.3	4.5	5,3	0.6	1,0	0.4	0.6	0.6	0.6	2.9	2.0	1,5
Machinery and electrical equipment	0.1	0.1	0.1	0.4	0.4	0.3	0.0	0.0	0.0	0.1	0.1	0.0	1,3	1,4	1,4	0.0	0.0	0.0
Transport equipment	0.5	0.9	1,6	0.9	1,0	0.8	0.1	0.1	0.0	0.2	0.3	0.3	1,6	1,7	2.4	0.0	0.0	0.0
Miscellaneous	0.2	0.1	0.1	0.3	0.2	0.2	0.1	0.0	0.0	0.1	0.2	0.1	1,3	1,2	1,3	0.1	0.1	0.0

Source: WITS and BBVA Research

In basic manufactured goods there is more heterogeneous performance: four countries have comparative advantages (Chile, Peru, Brazil and Argentina), while Colombia and Mexico have comparative disadvantages. Over the period we have studied, some countries have gained competitiveness in these products (Chile, Brazil and Mexico), others have suffered losses (Peru and Colombia), while Argentina has a marginal increase, according to the RCA indicator. In the case of Colombia there was an improvement up until 2007, reaching comparative advantage in basic manufactured goods, but a subsequent reversal, with the same thing happening in non-basic manufactured goods.

Tables A.1 and A.2 of the Appendix show sectors' shares in total exports and annual export growth by sectors.

Gain in market share in the first half of the decade and deterioration in the last few years

Another competitiveness indicator is the loss or gain of global share that a country may have suffered in the different products it exports, for which we compare the growth rate of a product's exports in that country with the world average. The data show that Argentina has gained market share in its main manufactured products in the 2002-12 decade, although this slackens in the last five years, with the key exception of transport equipment – the country's main non-basic manufacture — which has continued to gain world share (see Figures 5 and A.2). In Brazil, exports have grown above the global average in most products, but non-basic manufactured goods have suffered a setback in the last five years of the period (see Figures 6 and A.3).

In Chile, manufactured goods gained ground in the world market to 2007 and slid somewhat after that, although their principal non-basic manufactured product has continued to increase its share (see Figures 7 and A.4). In Peru, manufactured goods also performed better in the first five years than in the second (see Figures 10 and A.7).

Colombian manufactured goods — residual in the context of the country's exports — gained market share in the first five years, but in general lost it in the next five (see Figures 8 and A.5). Finally, Mexico, the country with the most diversified export base, has not experienced significant variations to the shares of the products it exports and, unlike the other countries, performed better in the second five years than in the first (see Figures 9 and A.6)[8].

Figure 5
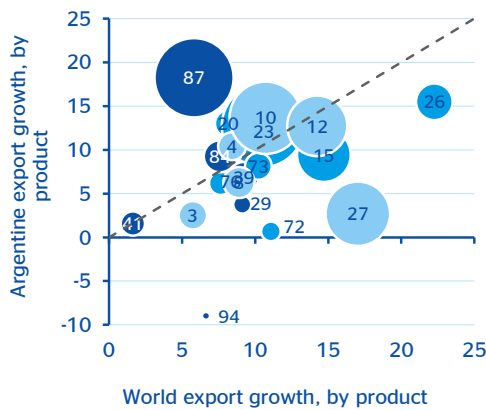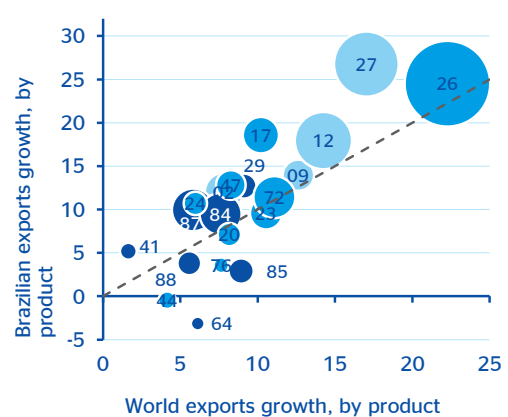**Argentina: main exported products, YoY growth (%) between 2002 and 2012***

Figure 6
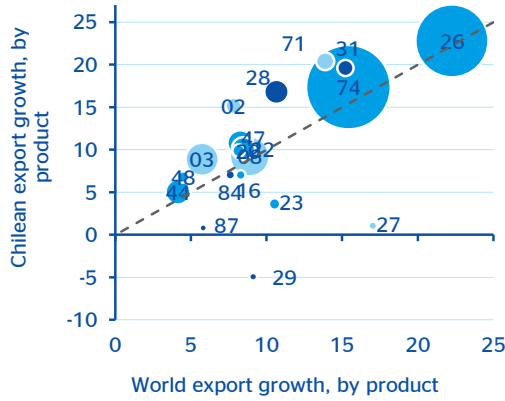**Brazil: main exported products, YoY growth (%) between 2002 and 2012***

* Bubble size indicates the product's share in the country's exports and the colours classify the products according to whether they are: ● Primary, ● Basic manufactured goods ● Non-basic manufactured goods. Furthermore, each product is identified with its two HS 2002 classification digits. Above the 45º line, product exports have grown more in the country than in the world, and therefore, the country has gained share in global exports.

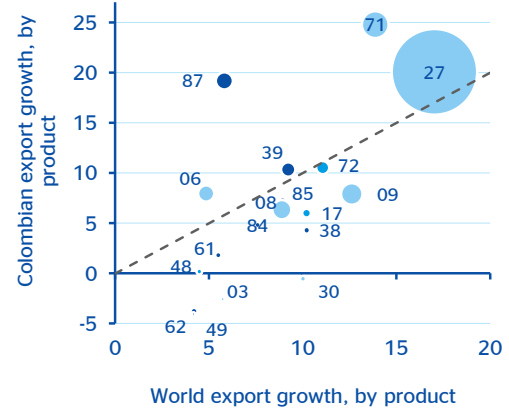Source: WITS and BBVA Research   Source: WITS and BBVA Research

8: The figures identify the products with the two-digit HS 2002 classification. Above the 45º line, the product's exports have grown more in the country than in the world average and, as such, the country has gained share in world exports.

Figure 7
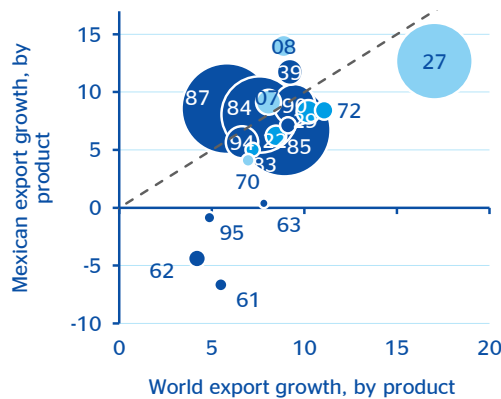**Chile: main exported products, YoY growth (%) between 2002 and 2012***

Source: WITS and BBVA Research

Figure 8
Colombia: main exported products, YoY growth (%) between 2002 and 2012*
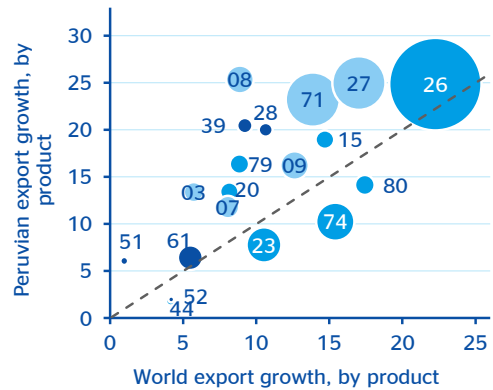

Source: WITS and BBVA Research

Figure 9
Mexico: main exported products, YoY growth (%) between 2002 and 2012*

Source: WITS and BBVA Research

Figure 10
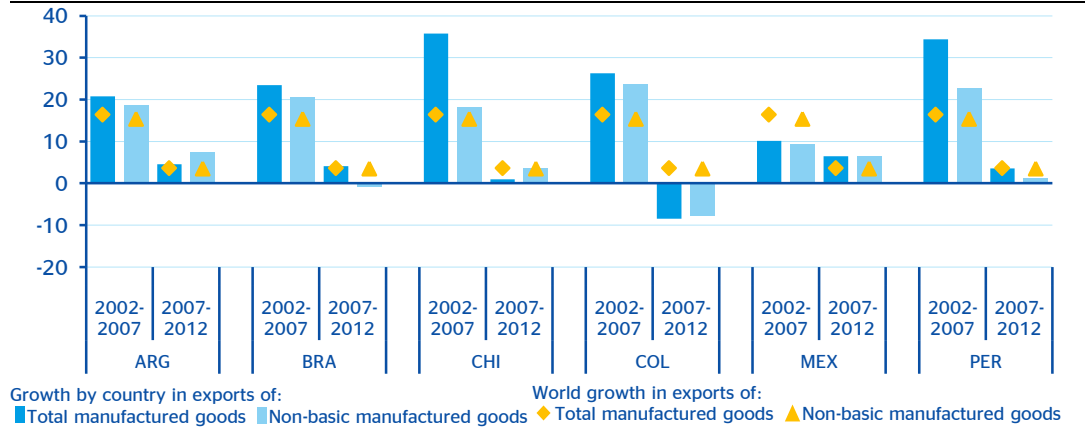**Peru: main exported products, YoY growth (%) between 2002 and 2012***

Source: WITS and BBVA Research

* Bubble size indicates the product's share in the country's exports and the colours classify the products according to whether they are: ● Primary, ● Basic manufactured goods ● Non-basic manufactured goods. Furthermore, each product is identified with its two HS 2002 classification digits. Above the 45º line, product exports have grown more in the country than in the world, and therefore, the country has gained share in global exports.

If we analyse manufactured products (basic and non-basic) as a whole, they have experienced annual growth rates which range from 10% in Mexico to 36% in Chile in the 2002-07 period and from -8% in Colombia to 6% in Mexico between 2007 and 2012 (see Figure 11). Most countries had growth rates above the world average in the first half of the decade and below it, or practically the same, in the second, which suggests competitiveness gains in the first half, and a subsequent deterioration. One important exception to this general behaviour is Mexico, whose manufacture exports grew less than the world average to 2007 and more in the second five years. Of those countries following the general pattern, Chile and Peru had the strongest performance in the first five years and Colombia was the worst performer in the second. If we restrict the comparison to non-basic manufactured goods (less intensive in natural resources) we also see growth rates above the world average in most countries in the first half and lower or similar between 2007 and 2012.

Figure 11
Annual growth (%) of manufactured exports: Latam vs. world

Growth by country in exports of: ■ Total manufactured goods ■ Non-basic manufactured goods
World growth in exports of: ◆ Total manufactured goods ▲ Non-basic manufactured goods

Source: WITS and BBVA Research

Growth around the world in the products and markets making up a country's portfolio also serves as an indicator of its exports' growth potential. In this case, a country has a better export orientation if it sells products with increasing demand to economies experiencing major growth. In the case of Argentina, it is noticeable that it has lost market share in those products which are growing most at a global level and has gained share in exports with more modest growth, a trend which has been significantly more marked in the last five years. To the contrary, in Brazil, Chile and Peru, those products with a bigger share in their portfolio have registered high global growth in the last ten years, although in Chile this focus has worsened considerably in the past five years.

In terms of market orientation, Figure 12 illustrates how all countries have a positive relationship between how much they trade with different markets and the contribution of the latter to world growth, with Chile and Brazil being the best focused. For more information, see Figures A.8 to A.19, which show, for each country, their different market share (bubble size) and the growth of their exports to those destinations compared to the growth of exports from the whole world to those markets.

Figure 12
Growth focus of export markets

── Argentina ── Brazil ── Chile ── Colombia ── Mexico ── Peru
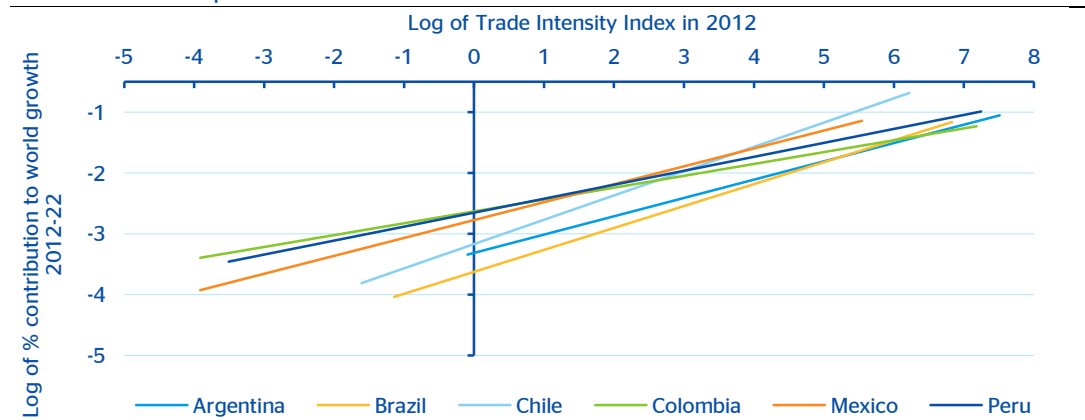
The lines show the trend, for each country, between trading intensity[9] in 2012 with all those economies for which there are data available and the contribution of these to world growth in the next decade (in line with BBVA Research forecast). An upward angle indicates the country has a deeper trading relationship with those economies which will contribute most to world growth.
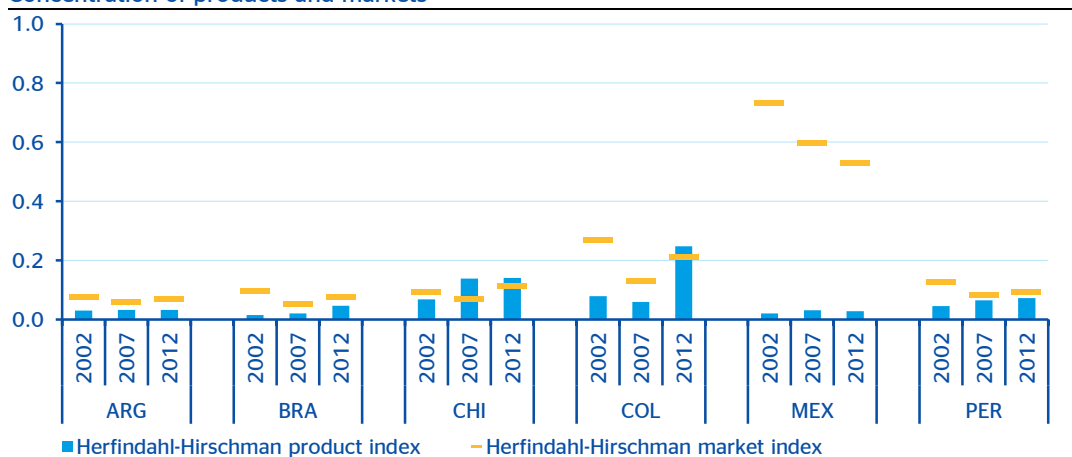Source: WITS and BBVA Research

9: The Trade Intensity Index is similar to the Revealed Comparative Advantage indicator, but applied to export markets instead of products. It is calculated as the ratio between the market share in a country's exports and the share of the same market in world exports.

Diversification worsens in products, but improves in markets

Figure 13 shows the evolution of the Herfindahl-Hirschman (HH)[10] indexes for products and markets in 2002, 2007 and 2012. Export product diversification is shown to have gone down in all countries between 2002 and 2012. Although in some the fall has been very slight (Argentina and Mexico), while in others (such as Colombia, Brazil and Chile) the reversal has been more significant relative to the diversification they enjoyed in 2002. In Colombia the situation began to worsen from 2007 onwards after an improvement in diversification in earlier years. In Brazil, too, the bulk of the deterioration occurred between 2007 and 2012. In Mexico, on the other hand, product concentration increased between 2002 and 2007, but diminished in the years following.

Market diversification, on the other hand, increased in all countries, with the sole exception of Chile, although it remains particularly low in Mexico because of its intense trading relationship with the US. This improvement in market diversification is also illustrated − with certain differences − in the Market Penetration Index (see Figure 14), since most countries have succeeded in exporting to a higher proportion of total markets which are buyers of their portfolio products, although there are still significant differences between countries, Brazil and Mexico being the countries which best exploit their products' export potential[11].

Figure 13
Concentration of products and markets
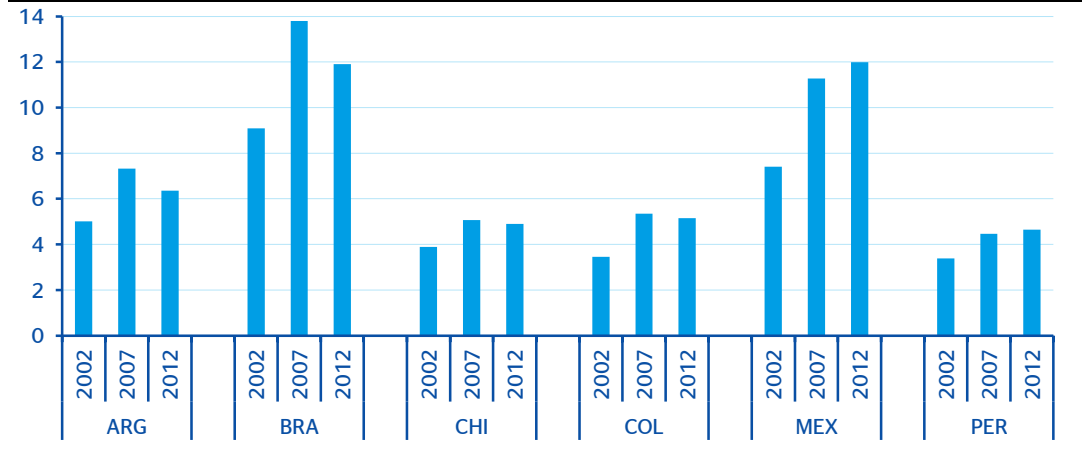

Source: WITS and BBVA Research

We should highlight, nevertheless, that diversification has played only a walk-on role in how exports have changed, for if this evolution is broken down by the intensive margin (growth in pre-existing products and markets) and the extensive margin (new products and/or new markets), the first is responsible for practically all the changes in exports (see Figures A.21 and A.22).

10: One index close to 1 indicates a high concentration of the export portfolio on a small group of products or destinations, while an index with a zero value means that the export portfolio is perfectly diversified.
11: Figure A.20 shows the changes in the number of products and markets by country.

Figure 14
Market Penetration Index
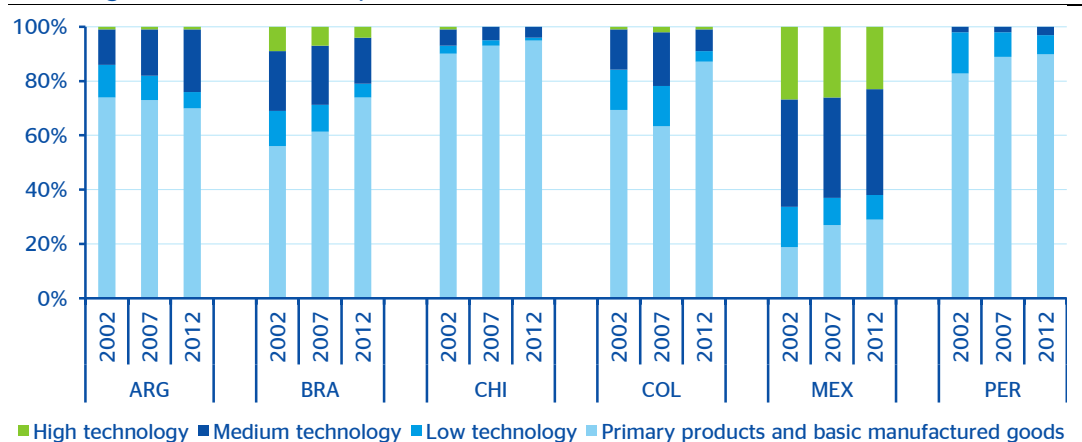

Source: WITS and BBVA Research

Reversal in the technological sophistication of exports

The proportion of more sophisticated manufactured goods (medium and high tech)[12] in the export total fell in most countries between 2002 and 2012 (see Figure 15), mainly as a result of the steep increase in raw material exports, as we explained above. In Colombia the second five year period saw a big step backwards, after increases in the years before. Similarly, in Brazil most of the reversal took place between 2007 and 2012, while in the first five years the drop was very small.

The only two countries that have increased the contribution made by more sophisticated manufactured goods to total exports are Argentina and Peru; even so, this increase has only occurred in medium technology products and not in high tech. In Mexico the slide has been very small and it is still the only country in which products with technological content make up the biggest percentage of total exports. If we look just at high tech-content products, their contribution is marginal in most countries, with the exception of Mexico and, to a lesser extent, Brazil.

Figure 15
Technological classification of exports

■ High technology ■ Medium technology ■ Low technology ■ Primary products and basic manufactured goods

Source: WITS and BBVA Research

12: We have used Lall's classification (2000).

The deterioration in export sophistication is also corroborated by the EXPY[13], an indirect estimate which has fallen slightly in all the countries we are looking at apart from Colombia, where it has remained stable (see Figure 16). These falls, together with the generalised increase in per capita wealth, have narrowed the gaps between the EXPY and per capita GDP, with the latter beating the former in the case of Chile. That is, the sophistication of exports has gone down relative to the wealth of the countries.

Figure 16
Export sophistication
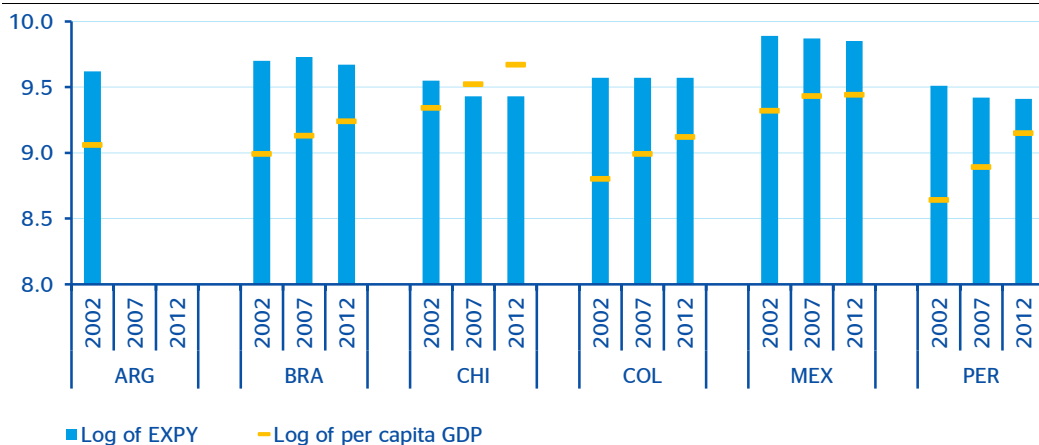
Source: WITS and BBVA Research

As we pointed out at the beginning of the section, the indicators we have presented should be analysed as a whole before reaching conclusions about competitiveness losses or gains the region's manufacturing sector has experienced in the decade from 2002 to 2012. In view of the data presented, it is obvious that the contribution of manufactured products to total exports has gone down, but this is mainly explained by the boost that raw materials have enjoyed, since manufactured exports have grown in most countries more than the world average, even though the region on the whole continues to have a relative disadvantage in exporting this type of products.

However, we can see different behaviour patterns if we divide the period we are analysing into two halves: whilst in general there are gains in world shares between 2002 and 2007, which suggests improved competitiveness, after this there have been deteriorations or losses in competitiveness. Mexico is a case apart, since its performance in the second five-year period is better than in the first. In subsequent sections of this paper we will put the data in context by country and analyse the idiosyncrasies and specifics affecting the competitiveness of their manufacturing sectors.


13: EXPY calculations are based on PRODY, which estimates product sophistication by a weighted average of GDP per capita of the countries which produce it. A country's EXPY is the weighted average of the PRODYs of all the products it exports. See Reis and Farole (2012) for more details on this indicator.

3. Argentina: the automotive sector boosted manufacturing competitiveness in the last decade

The growth of Argentinian exports at a compound annual rate of 12% since 2002 (see Section 2) has been attributed by some sectors to a more competitive real exchange rate. However, while it is true that after the collapse of the currency board at the beginning of 2002 the real exchange rate jumped to a more "competitive" (depreciated) level and stayed there for around five years, increasing inflation has gradually chipped away at these competitiveness gains through pricing (see Figure 17). This has been mirrored in the fall in the export to GDP ratio (see Figure 1), in particular manufactured goods (basic and non-basic) and, on a more general note, in the gradual loss of the current account surplus since 2002. Even more, various external factors have also played a role in Argentinian export performance, such as the terms of trade, which have helped Argentina a great deal between 2002 and 2012 (+70%, see Figure 19).
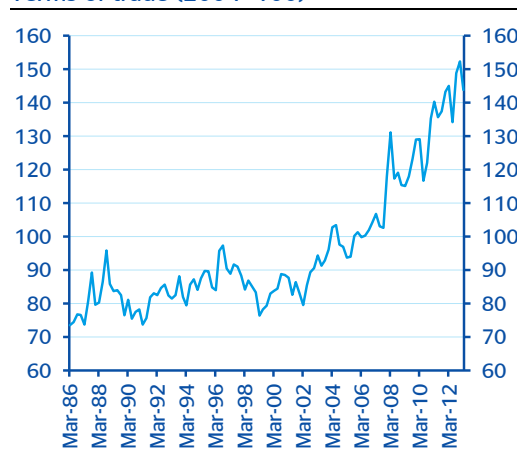
Given all this, the questions are: how has Argentina's competitiveness fared in the last decade? Does the country have a competitiveness problem, in particular when it comes to the manufacturing sector?

Figure 17
Bilateral real exchange rate with US & Brazil and real effective exchange rate (2001:12=1)
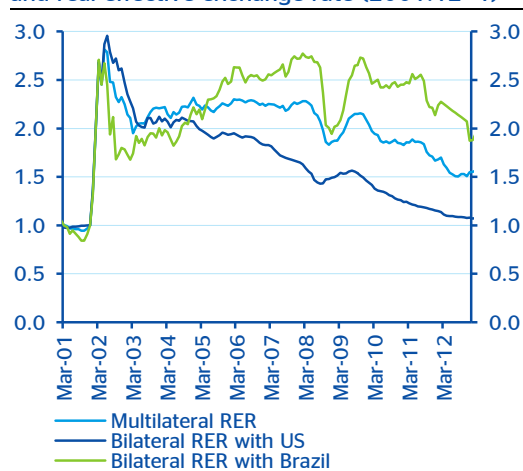
Source: BBVA Research

Figure 18
Terms of trade (2004=100)

Source: Indec and BBVA Research

## Sustained increase in labour costs, partially offset by productivity gains

Argentine industry has recorded continued hikes in its unit labour costs in pesos over the last decade, at a YoY average of 12% since 2002 (see Figure 19), due to the constant wage increases in current pesos (see Figure 20). If, on the other hand, we look at wages measured in USD in the industrial sector (see Figure 20), their rise was partially offset by the depreciation in the nominal exchange rate. As a result, average industrial wages in dollars have gone up at an average rate of 5.3% between 2002 and 2012, substantially below the increase in industrial wages if measured in pesos.

We should also bear in mind, too, that this process has taken place *pari passu* as an average productivity growth of 5.1% between 2002 and 2012. Therefore, the relative labour cost measured in pesos, that is, the unit labour costs adjusted by growth in productivity, increased at

an annual average of 6% since 2002 (see Figure 19). Although this annual average increase is substantial, it needs to be contextualised with the base year for comparison, 2002, a year when the country suffered a major macro-economic crisis after the traumatic exit from the currency board system, and as such the unit labour cost stood at minimums, having fallen by 38% that year compared to 2001, all of which means that a good part of the labour cost increments in industry since 2002 have simply recovered to the level lost during the crisis.

Figure 19
Industry: average product, unit labour cost and relative labour cost (per worker, 4Q01=100)

Productivity — ULC — RLC
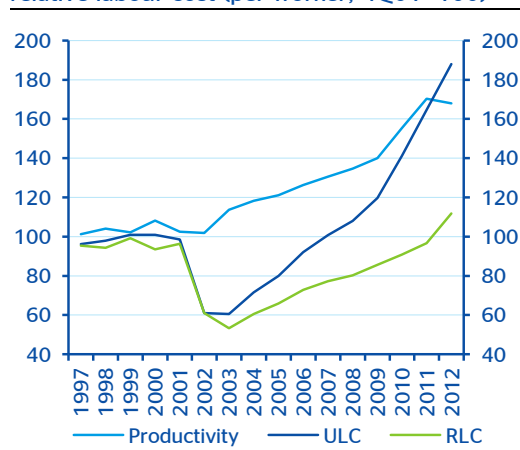
Source: Indec and BBVA Research

Figure 20
Industry: wages in ARS & USD 1999-2012

Wages in ARS — Wages in USD

Source: Indec and BBVA Research

The change in industry's export ratio is consistent with these figures, since in the last few years 23% of industrial production has been exported (see Figure 21), but the trend has shown a gentle decline since 2006 in line with the above-mentioned increase in unit labour costs. In turn, the participation of imported inputs has shown a slightly upward trend in the last few years, consistent with the currency's real appreciation (see Figure 21).

On the other hand, we need to highlight that this "average" behaviour conceals differences between industry sub-sectors. If we break down this information into its 21 industrial sub-sectors, we see that the industry which grew most in the decade was radio, TV and communications equipment manufacture, with an increase in the physical volume of production of 23% a year, on average, between 2002 and 2012; followed by the manufacture of "automotive vehicles, trailers and spare parts" (basically saloon cars), which grew an average of 13.2% YoY in these years (see Figure 32); and by "leather and footwear", which increased by 11.9%. In fact, these sectors explain Argentina's relatively good performance in terms of the RCA indicator (see Figure 4 and Table 1 in the second section). In particular, the automotive sector accounted for more than 12% of Argentina's exports in 2012, enabling us to confirm that this sector is the principal cause of the rise in the RCA and in Argentina's market share of manufactured goods. Since over 80% of vehicles exported go, on the whole, to Brazil, it is true to say that a good part of the increase in the Argentine manufacturing sector's competitiveness is related to its preferential access to the Brazilian market and to competitiveness gains over Brazil, which are apparent in the change in bilateral RER with Brazil (see Figure 17).

At the other extreme of the sub-sector spectrum, the least dynamic between 2002 and 2012 was the "manufacture of means of transport" (tankers, train engines, aeroplanes) which fell 1% throughout the period; followed by "coke manufacturing, oil products refining and nuclear fuel" which grew by an average of a mere 1% a year over the period; and by "tobacco product creation", which increased by just 3.5% on average.

In terms of productivity by sub-sectors, most growth came from manufacturing "radio, TV and communications equipment" (+198% between 2002 and 2012; +11.6% YoY, Avg.) and in

"Leather and Footwear" (+169%; +10.4% YoY, Avg.), while in "automotive vehicles, trailers and spare parts" productivity growth was more modest (+58%; +4.7% YoY, Avg.), bolstering the argument that a good part of this sound export performance is down to the preferential access Argentina has to Brazil because of Mercosur (more details throughout this section).

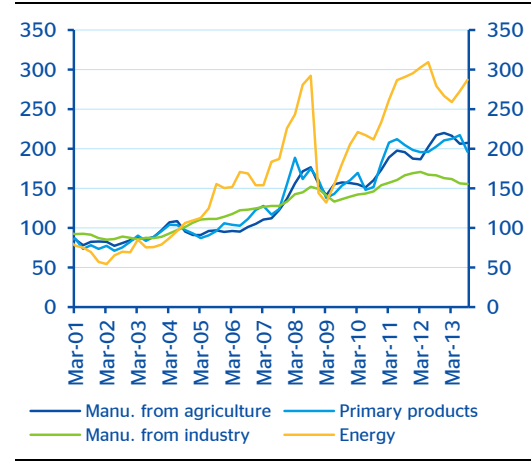## Positive shock in the terms of trade, especially for primary goods

Terms of trade have given a powerful positive shock to the Argentine economy since 2002 (see Figure 18), given that it accumulated 70% growth to 2012 — an annual growth rate of 5% — reaching record series highs in 2012. By sub-periods, over these 10 years the terms of trade grew at an annual rate of 4.5% from 2002 to 2006 (inclusive), and by 6.2% annually from 2007 to 2012. Clearly, this growth in terms of trade has had a major wealth effect for the country, and has been a driving factor in Argentine exports, since the increase in export prices over import prices has offset part of the increase in costs we mentioned above.

Figure 21
Industry: export coefficient and import penetration

Ind. Exp./GVP — Ind. Imp./Apparent cons.
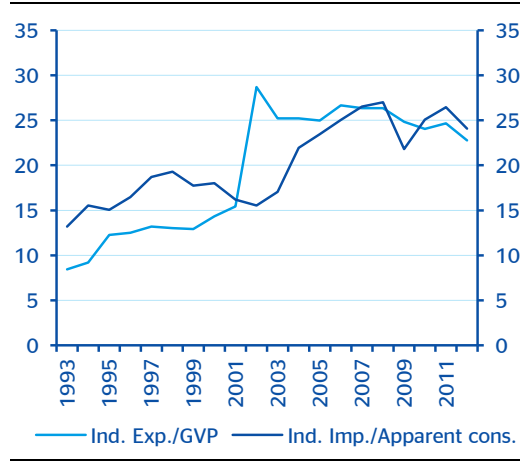
Source: Indec and BBVA Research

Figure 22
Price of export products by sector (2004=100)

Manu. from agriculture — Primary products
Manu. from industry — Energy

Source: Indec and BBVA Research

However, it should be pointed out that the main sectors to suffer a positive price shock in their exports were primary products (commodities) and energy (fuels and lubricants), while industrial manufactured goods went through substantially lower price rises (see Figure 22).

What is more, since 2002 exports have been subject to a "retention" duty (export rights) such that part of the price increase in export goods does not reach producers (see Figure 23). This fact is key if we are to understand the impact of the increase in export prices on the performance of exports. Quotas for these export rights vary from 5% in the case of most manufactured goods, 15% for meat and hides, and up to 30-35% for most agricultural commodities, while hydrocarbon exports have a special scheme which sets a "benchmark value" as the cap for what the exporter can receive (for example, USD70 for a barrel of oil).

Figure 23
Nominal export duties (in ARS bn) & real export duties (by CPI deflator)

Figure 24
Monthly interest rates (nominal & real, in %)
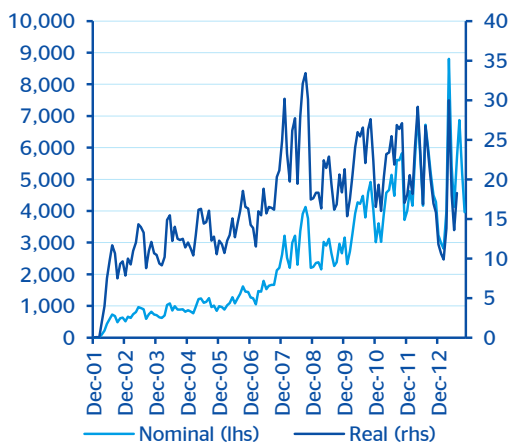
Source: Ministry of Economy, Indec and BBVA Research
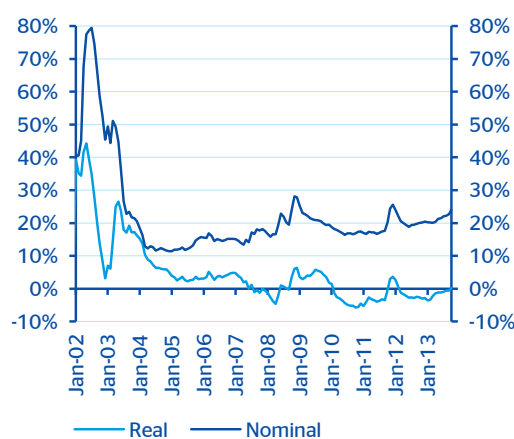
Source: BCRA and BBVA Research

Exchange rate appreciation in real terms since 2007 harms exports

The effective multilateral real exchange rate in Argentina since 2002 has behaved in two clearly differentiated ways, which exactly match the periods used in this paper. Between 2002 and 2006 (inclusive), after the major nominal and real depreciation which meant the end of the currency board in January 2002 (the nominal exchange rate sank from 1 ARS/USD in December 2001 to 3.80 ARS/USD in July 2002, leaving the REER 150% higher than in December 2001), the real exchange rate remained depreciated in historical terms, given that price growth was low in this five-year period compared to the leap in the exchange rate. That is, the pass-through of the exchange rate to prices was very low in these first five years.

To the contrary, in the second five-year period (2007-2012), inflation gradually rose and started gaining ground over the exchange rate. Thus, Argentina's real effective exchange rate appreciated continually between 2007 and 2012, standing in December 2012 only 50% higher than its December 2001 level. This final period coincided with that of relative stagnation in Argentine exports, which suggests that the appreciation in the real effective exchange rate has been an important factor in this performance. However, it also needs to be borne in mind that, as we discussed in Section 2, this is also the five-year period of the global crisis in which, as well as Argentina, other countries in the region such as Chile went through significant falls in the contribution of exports to their GDP, suggesting that global factors account for part of this deterioration.

We should point out that the real appreciation of the Argentine currency has been attenuated by the nominal appreciation in the currencies of Argentina's principal trading partners and the inflation they experienced as well. This can be seen, for example, if we compare the bilateral (with the US) real exchange rate change with that of the multilateral real exchange rate (see Figure 17). In particular, what happened with inflation and the exchange rate in Brazil, Argentina's principal trading partner, has been key in this differential performance, which meant that the Argentine peso depreciated continuously between 2002 and 2008 (see Figure 17). This has had a positive influence on exports to its giant neighbour, especially automotive exports. Since 2009 onwards, after the high volatility of bilateral RER at the end of 2008/beginning of 2009, the Argentine peso appreciated gradually against the real although, as above, less than the aggregate of its trading partners.

Low borrowing costs, although the recent exchange system limits foreign investment

In the decade we are looking at, borrowing costs for firms in Argentina stayed fairly low. Although in nominal terms the active interest rate for companies[14] was on average 22.8% between 2002 and 2012 (see Figure 24), in real terms the average was 5.4% over the ten years. What is more, since 2007 and until 2012 (both inclusive) the average real rate for firms was negative, at -0.5%, because of the spike in inflation (and inflation expectations) in this period in a context of relatively stable nominal interest rates over this period.

Therefore, Argentinian firms have borrowed at negative real rates for a good part of the last decade, meaning that borrowing costs have not been a burden. In fact, the rate of non-performing loans has remained at all-time lows for the last 5 years (see Figure 25), a sign of this context of persistently negative real rates for Argentine firms, together with major product growth in the last decade.

A negative recent factor in this area is the foreign exchange system that has been in force since 2011, which is closing off access for Argentine firms to foreign lending, and has truly stifled direct foreign investment inflows.

Figure 25
Default rate for the non-financial private sector (as % of total credit to that sector)
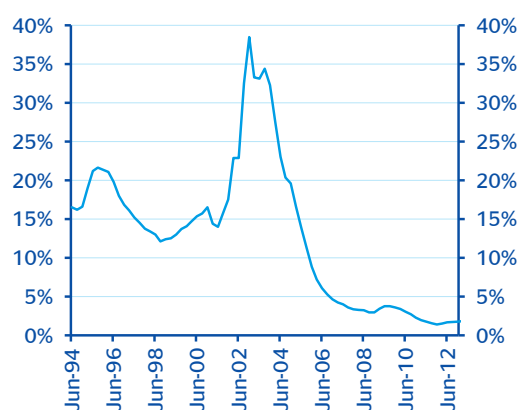
Source: BCRA and BBVA Research

Figure 26
Quality of infrastructure (year 2012)
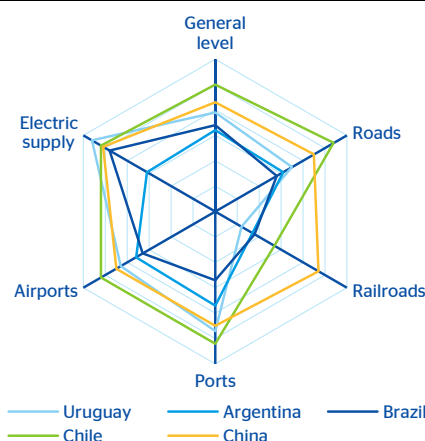
Source: World Bank and BBVA Research

Conformism with Mercosur; no new trade deals signed

The country's main trading agreement is the Southern Common Market (Mercosur in the Spanish acronym) it forms with Brazil, Uruguay, Paraguay and, recently, Venezuela, which has been key for the development of the automotive segments, which is the main industrial manufacture exported by Argentina. Mercosur's main industrial protection mechanism is the Common Foreign Duty (AEC in the Spanish acronym) applied by the member countries to extrazonal products, and which has helped to develop the internal market and intrazonal exports. However, in the case of the automotive sector, as well as the existing AEC duty of 35% for the final vehicles, there are agreements on the minimum regional content of parts in the final car produced in each member country and on the establishment of the Free Trade zone. For example, the last negotiation conducted in 2008 concluded with the setting of an asymmetric "flex" for five years (subsequently extended in 2013), which sets out the relationship between imports and exports with a value that indicates the maximum amount of dollars that can be imported for each dollar exported, and which gave Argentina greater protection. Goods included in this scheme include goods produced by other sectors which are

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14: This is an active rate for current account overdrafts in national currency for the non-financial private sector (people with legal title).

used in automotive production (rubber, plastic, etc.). So, this special protection scheme for the automotive sector, together with AEC duties and the appreciation of the Brazilian real, has stimulated the Argentine automotive sector's exports to Brazil a great deal.

This positive aspect of Mercosur, which enables sectors to develop within the protection of the AEC, however, also has the cost of capping competitiveness gains that member countries might have if they were to compete head on in the international market. Furthermore, as happened with the other Mercosur countries, belonging to the shared market has brought with it a degree of conformity and there has been no active search for further trade deals with other extrazonal countries. Thus, Argentina has not signed important trade agreements in the last few years: this has, to an extent, limited local firms' export capacity.

Poor infrastructure and difficulties in doing business

The quality of its infrastructure is an area where Argentina clearly has room for improvement, since in general it is below other countries in the region such as Brazil and Chile, or other regions such as China (see Figure 26). After a major overhaul of its infrastructure in the nineties, in the noughties the country has suffered continuous deterioration of the same (ports, railways, etc.), which has had a definite impact on the country's "non-price" competitiveness.

Evaluations of its business environment are not positive about Argentina, either. In the World Bank's latest *Doing Business* ranking, Argentina comes 121st out of 189 countries evaluated (see Figure 27), and in the lower group of Latin American economies, below Chile (34), Mexico (51) and Brazil (118). By sections, Argentina's worst score is for the time and procedure required in getting a construction permit (181st out of 189 countries), starting a business (155) and paying taxes (152). It achieves its best scores in contract execution (49), getting a loan (71) and having electricity connected (77). Clearly the evaluation of these structural factors does not help Argentina, and some of the reasons for stagnation in the country's export performance are to be found in these obstacles, once other issues such as price rises and the exchange rate appreciation stop impacting.
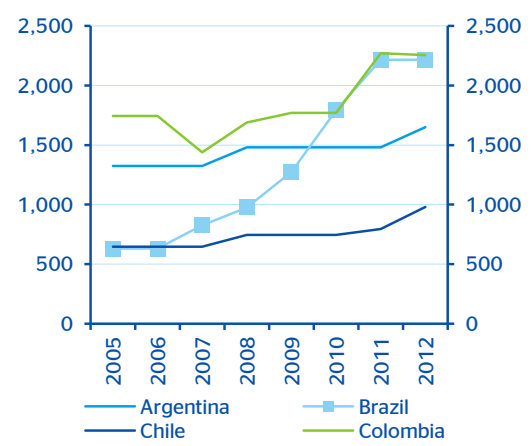
When it comes to export costs, these have gone up from USD1,350 per container exported in 2005 to USD1,650 in 2012 (see Figure 28), although this increase was below that of other countries in the region such as Brazil and Colombia. If we bear in mind the time it takes in Argentina to export, this has stayed at 13 days in the last few years, similar to the time for other countries in the region (see Figure 30).

Figure 27
**Doing Business index (positions in the 2013 ranking)**

Country	Position
Chile	34
Peru	39
Colombia	42
Mexico	51
Panama	61
Uruguay	85
Latin America	98
Brazil	118
Argentina	121
Ecuador	134
Bolivia	158
Venezuela	180
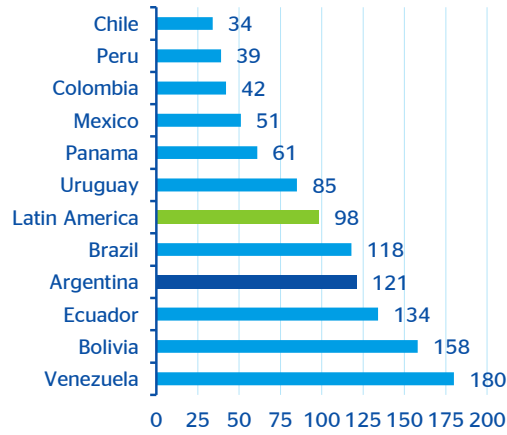
Source: World Bank and BBVA Research.

Figure 28
**Cost to export (USD per container)**

Source: World Bank and BBVA Research.

If we look at the logistical barriers to export in the World Bank's International Trade Logistics Performance Index (see Figure 29), which evaluates areas such as the degree of competition and quality of a country's logistics and the efficiency of its customs procedures, this shows that Argentina has a performance level similar to that of South America's major countries, Brazil and Chile, and better than that of Colombia.

Figure 29
Logistics performance index for international trade (1: low; 5: high)
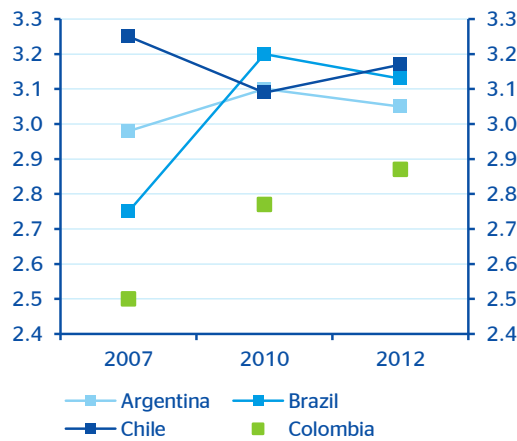
Source: World Bank and BBVA Research.

Figure 30
**Time to export (days)**
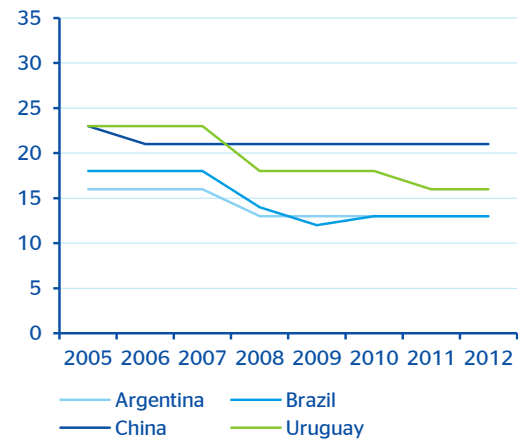
Source: World Bank and BBVA Research.

In terms of the price of electricity in Argentina, although it has gone up significantly since 2003, it is still cheaper than in most countries in the region, such as Brazil and Mexico (see Figure 31).

Figure 31
Electricity price in selected countries (USD/kWh)

Figure 32
Automotive demand (units)

Source: World Bank and BBVA Research.
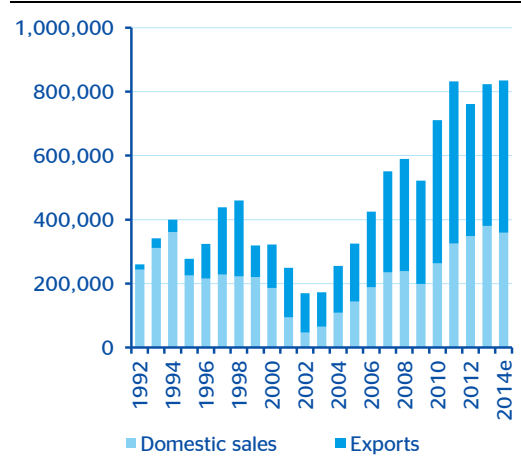
Source: BBVA Research.

Conclusions

Argentinian exports in general, and manufactured goods in particular, have performed well in the decade we are studying in historical terms, although they have declined in terms of GDP throughout the period, partly as a result of the comparison with a very low GDP in the base year (2002). The RCA indicator and the comparison between the performance of Argentina's main export products with worldwide exports of these same products, as well as other international trade indicators presented in Section 2, show that Argentina's manufactured exports in aggregate terms did not lose competitiveness in the decade we are looking at. However, behaviour is heterogeneous both by sectors and by five-year periods, with a few (but important) sectors with growth in RCA and global market shares (such as the automotive), and other sectors with gains in RCA and shares in the first five years, and losses in the second.

Compared with other export categories, industrial manufactured goods were the fastest growing in quantity in the decade we are examining, while agricultural manufactured goods and primary products have grown basically due to price rises. However, exports in general, and manufactured goods in particular, lost momentum in the latter years. In these pages we identify some factors which help to explain this lack of dynamism. On the one hand, the continued increase in labour costs, in the general context of increasing inflation since 2003, although this is partially offset by productivity gains, had an increasingly negative impact on production and industrial exports. The Argentine peso's real appreciation since 2007, the other side of the coin of the above-mentioned inflation, is also affecting exports negatively, despite the enormous shock of the terms of trade the country has been experiencing continually since 2002, especially for primary goods, on top of the current export tax scheme (retentions). The currency's real appreciation was reflected in the loss of the current account surplus in the second half of the period being studied. The low cost of borrowing for Argentine firms was a factor which helped export development, although more recently the current exchange system has been affecting alternative borrowing methods used by export companies, such as direct foreign investment inflows.

From a more structural point of view, there are many factors which are increasingly having a negative effect on Argentina's competitiveness in general, and on the industrial sector in particular, which explains the loss of momentum that industrial exports have suffered since 2007, and concerns that this trend will continue over the next few years.

4. Brazil: loss of competitiveness in the manufacturing sector in the last few years

International trade data reveal the loss of competitiveness in manufactured products, particularly non-basics, between 2007 and 2012

Performance data presented in the second section of this paper leave little room for doubt; in the last few years, between 2007 and 2012 to be precise, there has been a significant loss in competitiveness in the Brazilian manufacturing sector, particularly concentrated in the non-basic manufacturing group, that is, more sophisticated manufactured products, less intensive in primary resources[15]. This recent loss of competitiveness wiped out a great deal of the gains from the previous five-year period, between 2002 and 2007[16].

If we analyse the international trade trends between 2002 and 2012 shown above (see Figure 1), we see that Brazilian exports as a proportion of GDP remained virtually unchanged in the last decade, with an increase in the weighting of primary product exports being offset by a reduction in the weighting in GDP of manufactured goods exports, particularly non-basic manufactured products in the second half of the period analysed.

As a proportion of world exports, Brazilian exports did increase both between 2002 and 2007 and between 2007 and 2012 (see Figure 2). However, increased primary product exports account for a large part of this gain (57% and 147%, respectively). Basic manufactured goods account for 39% of growth in both periods, while non-basic manufactured goods contributed positively (+5%) in the first five-year period, but very negatively in the second (-86%). Taken together, basic and non-basic manufactured goods contributed positively to the expansion in Brazil's exports as a proportion of global exports between 2002 and 2007, and negatively between 2007 and 2012 (for the period as a whole the contribution is small, but positive)[17].

In line with the above, Brazilian exports of manufactured products grew at a noticeably faster rate than global exports of manufactured goods in the first five-year period analysed. However, the situation changed significantly in the second five-year period: Brazilian exports of manufactured goods slackened as did global exports, but the non-basic manufacturing segment showed a slight contraction, contrasting with global growth (see Figure 11).

The RCA revealed comparative advantage indicators (see Figure 4 and Table 1) and the comparison between the growth in Brazilian exports and global exports by product type (see Figures 6 y A.3) in general terms bear out these conclusions.

With few exceptions, the main primary product categories retained, and even increased, their (already high) level of competitiveness in the last decade, in line with the RCA indicator (see Table 1). Similarly, Brazilian exports of these products almost always grew faster than global exports (see Figures 6 and A.3). Performance in the oil sector was particularly good; here the country appears to be developing a comparative advantage.

There is a more varied set of results among the main categories of manufactured products. In basic manufacturing, the RCA indicators show relatively stable and relatively high levels of competitiveness in the last decade, with growth in exports equivalent to or higher than global exports, with the main exception in the wood and aluminium sectors (see Table 1 and Figures 6 and A.3). When it comes to non-basic manufacturing, most of the main product categories

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15: See the first section of this paper for the exact definition of basic manufactured goods, non-basic manufactured goods and primary products which we employ.
16: The relatively positive performance between 2002 and 2007 is in line with Dos Santos and Zignago (2012).
17: This correlation between good performance by primary products and poor performance in non-basic manufactured goods is consistent with theories, such as the Dutch disease theory, predicting that increased competitiveness in the raw materials sector may generate a reduction in competitiveness in the manufacturing sector.

showed a positive performance between 2002 and 2007 and very unfavourable performance between 2007 and 2012. This is the case of the "Machinery and electrical equipment" and "Transport" categories, which have more weight in Brazilian exports. RCA data show that only "Hides and skins" continues to be competitive (RCA>1), although less so than a decade ago. The loss of momentum and competitiveness in the "Footwear" category is very clear (see Table 1 again).

In general terms, these results are supported by the battery of other international trade indicators presented in the second section. In general, over the last decade and particularly in the last five years, Brazil has lost further competitiveness in the sectors where it had been uncompetitive (in non-basic manufacturing) and has gained competitiveness in the sectors where it already had an edge (primary products and, to a lesser degree, basic manufacturing).

It could be argued that poor growth in manufactured exports, in particular non-basics, is due to incentives to sell in the internal market, generated by the relatively high growth of the Brazilian economy between 2002 and 2012 (3.5% Avg. YoY) and the high share of internal consumption in GDP (84%, on average, between 2002 and 2012). In this case, manufactured goods' weak performance would not be due to a loss of competitiveness in industry, but a consequence of the dynamism in internal economic activity.

However, the national accounts and industrial production data show that the manufacturing sector expanded less than both GDP and internal consumption growth (see Figure 33). As a result, the manufacturing industry's share of GDP went down from 17% in 2002 to 13% in 2012 (see Figure 34)18. In addition, manufactured product imports, as a proportion of these products' internal consumption, increased from 12% to 22%, and manufacturing exports were practically flat at around 15% of domestic manufacturing production in this decade (see Figure 35). As the accompanying figures show, deterioration in all these indicators is highly concentrated between 2007 and 2012, consistent with the trade data presented earlier.

Figure 33
Average annual growth in 2002-2012 (%)

Figure 34
Manufacturing industry contribution to GDP (%)
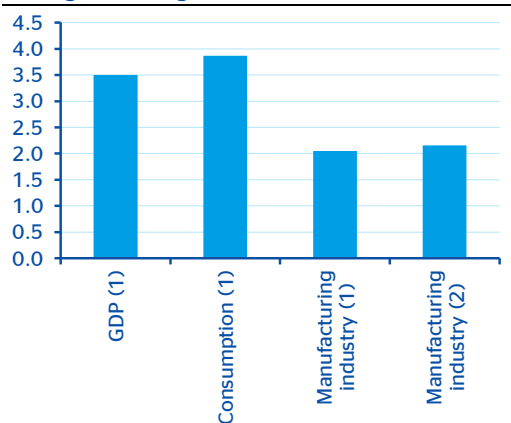
(1) From national accounts data. (2) From IBGE monthly industrial production indicator figures.
Source: IBGE.
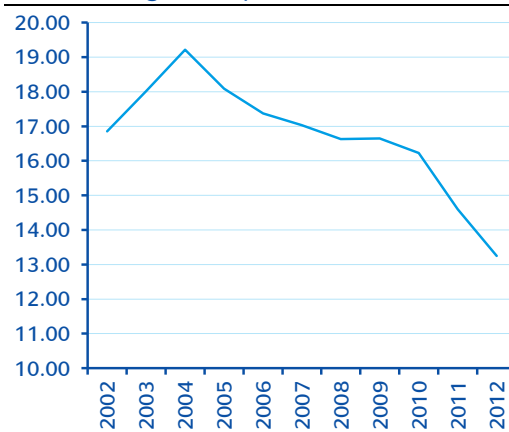
Source: IBGE.

Likewise, the manufacturing sector's trade deficit went from USD5bn in 2002 to USD94bn in 2012, due to an annual 14% increase in manufactured product imports compared with a growth of scarcely 6% in manufactured exports (see Figure 36).

These indicators support the argument that there has been a loss in competitiveness in the manufacturing industry in the last few years. Finally, recent literature on the subject — see Canuto, Cavallari and Reis (2013) and OECD (2013), for example — and rankings compiled by

18: Industry's total contribution, which includes extractive industry, dropped from 27% to 26% of GDP in the same period. Total industry grew at an average annual rate of 2.8%, in line with national accounts data, and by 2.4% according to IBGE monthly industrial production indicator figures. These figures are not included in the figures.

different institutions also support this view, helping to consolidate the diagnosis of competitiveness loss in the manufacturing sector in the last few years[19].

Figure 35
Manufacturing industry: trade openness indicators (%)

— Exports (% production) - Manufacturing industry
— Imports (% consumption) - Manufacturing industry
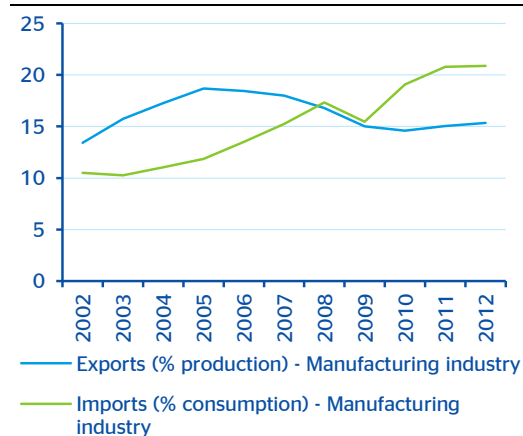
Source: IPEADATA and FUNCEX.

Figure 36
Manufactured products' trade balance (USD mn)
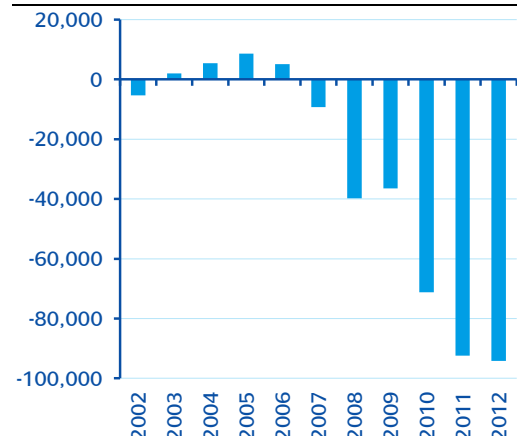
Source: MDIC and IPEADATA.

As we shall see below, there is a series of factors which explain the deteriorating levels of competitiveness in the Brazilian manufactured goods sector.

Exchange rate appreciation impacted negatively on competitiveness in the last decade

Independently of which measurement of internal prices is taken, the real effective exchange rate appreciated significantly in the 2002-12 period (see Figure 37). Likewise, accumulated appreciation over the period varies from 16%, according to CPI-FIPE, to 30% if one goes by the IPA-DI price index, which unlike the other three indexes presented in Figure 37 is a measure of producer prices, not consumer prices.

Most of the currency appreciation occurred between the end of 2002 and mid-2008, that is, in the period between the elections bringing Luiz Inácio Lula da Silva to power for his first term as President and nearly up until the bankruptcy of Lehman Brothers and the onset of the global economic crisis.

Similarly, the exchange rate was much stronger in the second half of 2002-12, which helps to explain the loss of competitiveness in the manufacturing sector in this period.


19: In terms of competitiveness rankings, in 2013 Brazil came 14th out of 15 "comparable" countries analysed by Brazil's National Industry Confederation (and 13th out of 14 in 2012), 37th out of 43 in 2012 according to the FIESP indicator (39th out of 43 in 2002), 56th out of 148 countries in the 2013-14 World Economic Forum ranking (48th out of 144 in their 2012 edition and 57th out of 125 in the 2005 ranking) and in 51st place out of 60 countries selected by the IMD in 2013 (46th and 40th, respectively, in 2012 and 2009).

Figure 37
Real Effective Exchange Rate, based on different domestic price indexes (indexes, 1994=100)
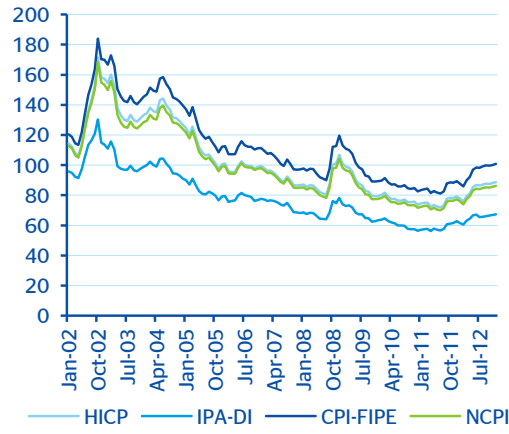
Source: BCB.

Figure 38
Unit labour costs in the industrial sector in BRL and USD (index, January 2002=100)
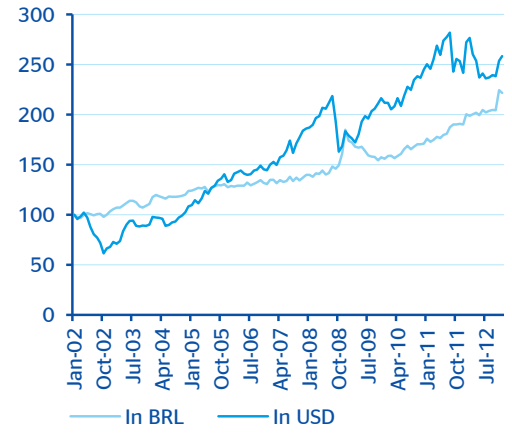
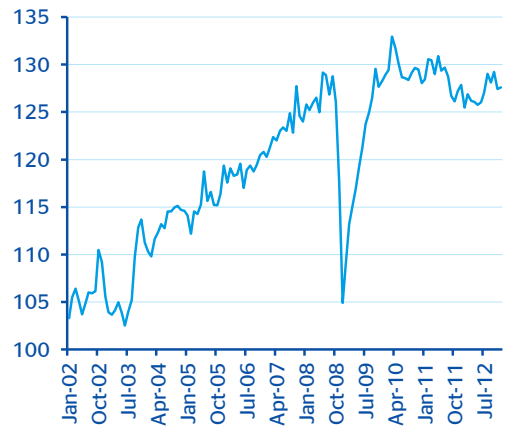Source: IPEADATA, BCB, IBGE and BBVA Research.

The increase in unit labour costs was much higher than that in job productivity, which also helps to understand the recent loss of competitiveness

In the 2002-12 period, unit labour costs in the industrial sector measured in BRL went up by 121% or, equivalently, an average of 7.5% a year. This growth was particularly high in the last two years of the period analysed, when it grew at a rate of around 14% a year (see Figure 38).

This growth is much higher than productivity in the Brazilian industrial sector, which grew by just 27% between 2002 and 2012, equivalent to an annual rate of 2.2% (see Figure 39). Growth was particularly low, even negative, in 2011 and 2012.

This gap between growth in labour costs and labour productivity is a key factor in understanding the deterioration in the manufacturing sector's competitiveness in the last few years.

Figure 39
Labour productivity in the industrial sector (index, January 2002=100)

Source: IPEADATA, BCB, IBGE and BBVA Research.

Figure 40
Exchange/wage ratios (indexes, January 2002=100)
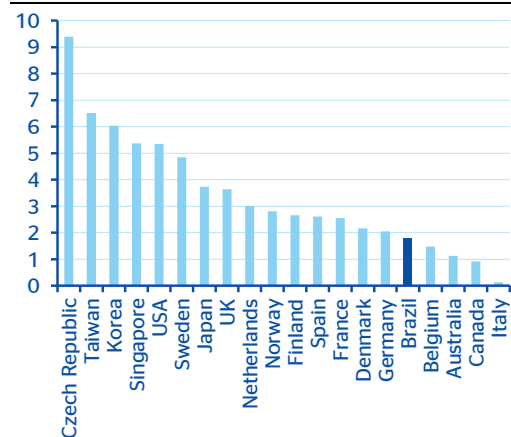

Source: BCB.

Measured in dollars, labour costs went up an accumulated 158% between 2002 and 2012, an average of 9.0% YoY. Thus, the gap between costs and productivity is more pronounced when measured in dollars, one of the results of the above-mentioned appreciation in the exchange rate.

Similarly, the cost-productivity gap measured in local currency is even more important than the exchange rate appreciation *per se* in explaining the lower competitiveness of Brazilian manufactured products, especially in more recent years.

The significant increase in domestic wages, coming at the same time as the exchange rate appreciation, caused a 60% deterioration in the exchange/wage ratio over the last decade. Productivity gains were too small to change this situation (see Figure 40). Thus, seen from this perspective, productivity increases were clearly insufficient to counteract the increase in labour costs and exchange rate appreciation.

When compared with other countries, the productivity increase in Brazil was small, whilst the change in the unit labour cost in the last decade (in both local currency and in dollars) was by a long way the most unfavourable of all the countries analysed (see Figures 41 and 42).

Figure 41
Annual growth in labour productivity in the manufacturing sector between 2002 and 2011 (%)

Source: Bureau of Labor Statistics.

Figure 42
Annual growth in unit labour costs in the manufacturing sector between 2002 and 2011 (%)
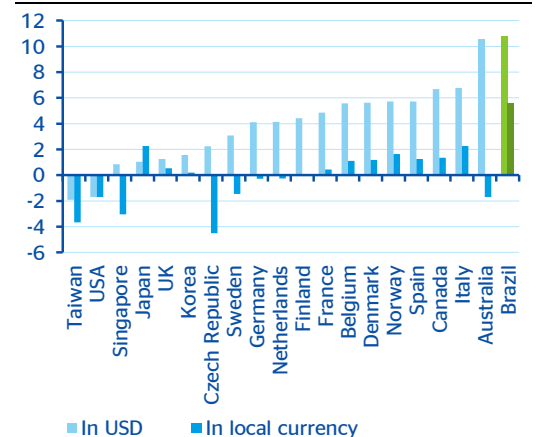

Source: Bureau of Labor Statistics.

Increasing productivity continues to be the unfinished business of the economy as a whole, although the problem seems to be more acute in the manufacturing sector - see Figure 43 or, alternatively, Frischtak (2012) -.

Furthermore, rises in primary product prices and in some basic manufactured goods have been the main determinant of a 28% increase in terms of trade between 2002 and 2012 (20% between 2007 and 2012), producing a wealth effect and the spike in wages over the period. This increase in costs was particularly burdensome for some tradable sectors, such as manufactured goods (and particularly non-basic manufactured goods), whereas non-tradables, such as the services sector, could adjust their prices upwards more easily, due to the lower degree of competition they face internally (Figure 44 shows that inflation in tradables has been consistently lower than that of non-tradables since the beginning of 2004).

Figure 43
Annual increase in labour productivity, by sectors (%)

■ Agriculture ■ Mining ■ Manufacturing ■ Services
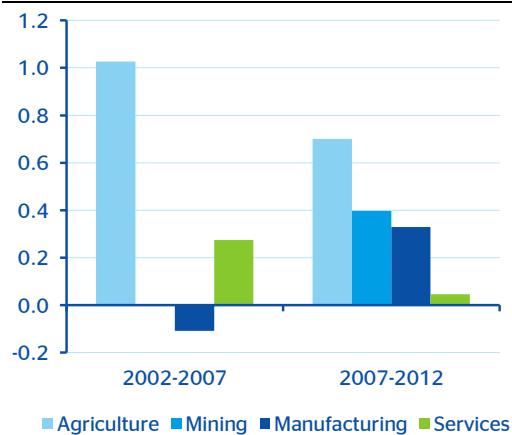
Source: OECD (2013) and BBVA Research.

Figure 44
Tradable and non-tradable inflation (% YoY)


— Tradable — Non-tradable
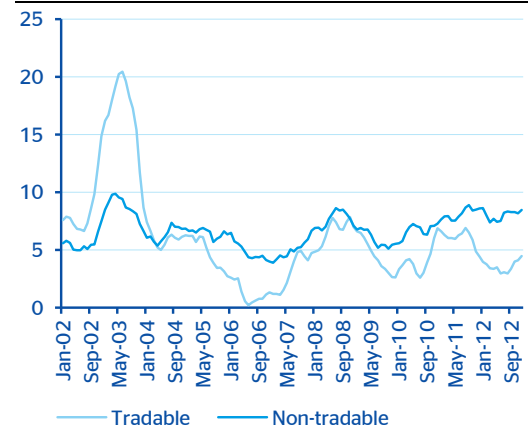
Source: BCB.

Progress in the institutional environment, in infrastructure and in other areas was limited and insufficient to counteract the elements impacting negatively on competitiveness

There are other factors which have the potential to impact on the economy's and the manufacturing sector's competitiveness: institutional environment, energy costs, tax burden, capital costs, logistics costs, access to markets, etc. In the case of Brazil, evidence available for the last decade suggests that there was little progress – none in some cases – in terms of support for competitiveness. In any event, one-off moves in the right direction were by no means enough to offset the general picture of loss of competitiveness in the manufacturing sector.

The performance of total factor productivity (TFP), which is a measure of an economy's overall productivity, was relatively modest between 2002 and 2012. To be precise, according to our estimates TFP contributed approximately 0.7pp to Brazil's GDP growth, just 20% of the economy's growth potential in the period (the remaining 80% came from the accumulation of production factors: work and physical capital). In other emerging economies the TFP contribution was much more significant: in Turkey, China and Peru, for example, TFP contributed 1.0pp, 3.7pp and 2.7pp, respectively, to the growth of these countries. In line with the data estimated by other institutions, TFP in Brazil was even less favourable than our estimates - see, for example, OECD (2013). Likewise, evidence available for the last few years suggests that manufacturing sector productivity was lower than that of the economy as a whole.

Despite some progress made in the institutional environment in the last few years, Brazil still performs very badly in terms of the ease of doing business. In 2012 starting a business took on average 108 days and 13 bureaucratic procedures (compared to 152 days and 17 procedures in 2004). Costs as high as these, amongst other factors, leave Brazil in a poor position — 126th out of 183 countries — in the World Bank's *Doing Business* ranking (see Figure 45).

Figure 45
Ease of Doing Business (positions in the 2012 ranking)
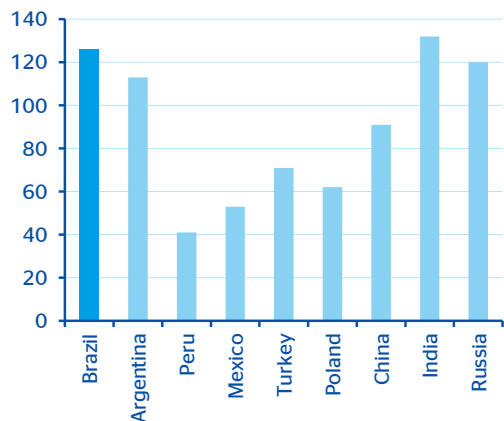
Source: Ease of Doing Business (2012).

Figure 46
Indicator of infrastructure quality (1:worst; 7:best)


■ 2006-07 ■ 2012-13
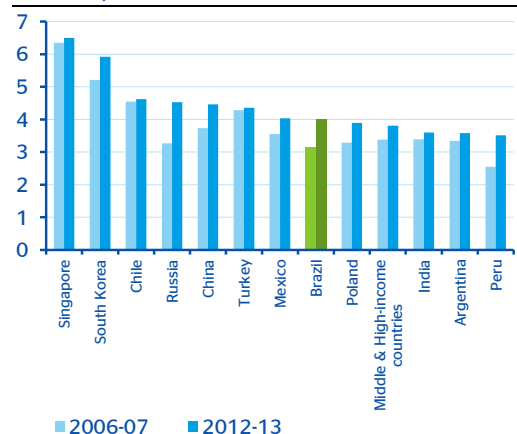
Source: World Economic Forum.

Recent efforts to improve infrastructure are reflected, for example, in an indicator published by the World Economic Forum, shown in Figure 46. However, this indicator also shows that the country is still far from achieving the levels of countries such as Singapore, South Korea and Chile. The data used in the National Confederation of Industry (CNI) competitiveness ranking put Brazilian infrastructure in the lower third of countries analysed. Despite the Brazilian government's introduction of a plan to encourage infrastructure investments (the Growth Acceleration Plan, PAC in the Portuguese acronym), its participation in GDP continues to be very low, an average of 2.32% between 2001 and 2012, much lower than that of countries like Chile, Peru, India, Vietnam, China and Thailand, and insufficient to drive a level of growth similar to that of South Korea and other East Asian industrialised countries or even to keep the existing per capita stock of capital - see Frischtak (2012).

Bearing in mind the weaknesses in the business environment, infrastructure problems and exchange rate appreciation, amongst other difficulties, it should not come as a great surprise that in 2012 Brazil occupied 27th place out of 188 countries in the cost ranking for exporting a container and was the country with the second biggest rise in this cost between 2005 and 2012 (see Figure 47).

Two other areas in which there are very well-documented problems and in which recent performance has been clearly unsatisfactory in supporting an improvement in competitiveness are the tax burden, which represented 35.9% of GDP in 2012, the same value as in 2002, and energy costs, which for the industrial sector have risen by around 57% in real terms between the beginning of 2003 and the end of 2012 (see Figures 48 and 49). The tax cuts and the reduction in electricity tariffs announced during 2013 are a step in the right direction, despite the problems in introducing them. In any event, they were not enough to change the negative situation marked by high energy costs and a very heavy tax burden.

Figure 47
Cost to export (USD per container)
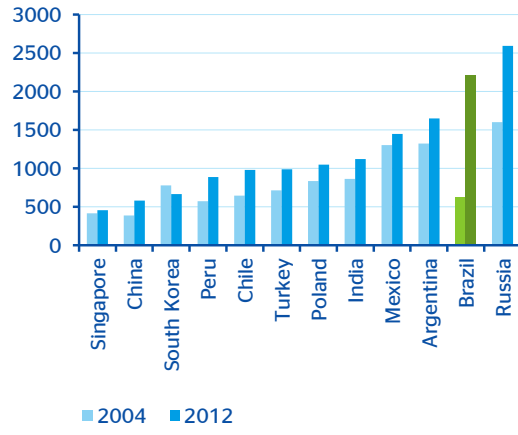
Source: World Bank.

Figure 48
**Business tax burden: total tax rate, 2012 (% of profits)**
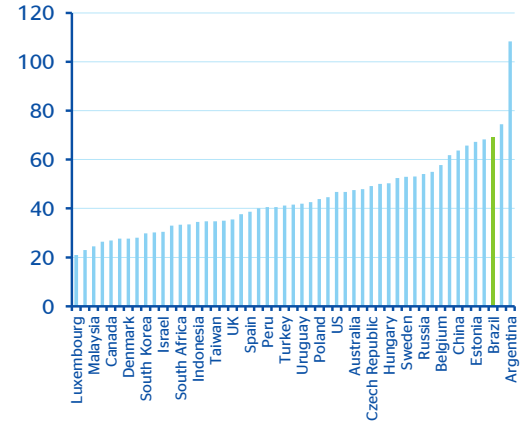
Source: OECD (2013), World Bank and PwC.

Neither has Brazil shown significant progress in the last few years in preferential access to other markets through trade agreements with other countries. In fact, the number of agreements signed by Brazil is lower than that of other countries in the region such as Chile, Colombia, Peru and Mexico and also than Asian countries such as China, South Korea, India and Indonesia — see BBVA Research (2013c).

Where there has been major progress is in access (and at lower costs) to finance, both using the banking system and capital markets, whether domestic or foreign — see Figure 50 and Dos Santos (2012).

Figure 49
Electricity tariff for the industrial sector (in BRL per MWh)
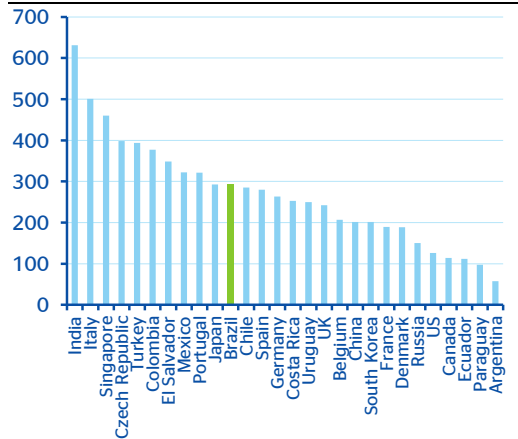
Source: Federation of Industries of Rio de Janeiro – FIRJAN.

Figure 50
Banking credit: average interest rate and volume (% of GDP)

Interest rates (lhs)
Credit (% GDP) (rhs)
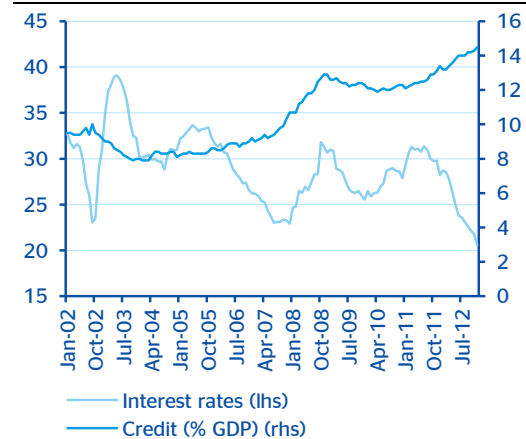
Source: BCB.

Finally, existing literature and the indicators show one-off improvements, although not enough of them, in areas such as education, innovation and technology (see CNI (2013), for example).

Conclusions

The second section of this article and this section focusing on Brazil reveal the increasing problems of competitiveness faced by the Brazilian manufacturing sector in the last few years, and in particular by the non-basic manufactured goods segment, that is, the least intensive in primary products.

After a relatively positive period, between 2002 and 2007, appreciation in the exchange rate, the increase in labour costs, the paltry increase in labour productivity and the lack of reforms significantly improving the institutional environment meant that the manufacturing sector suffered a visible loss of competitiveness in the 2007 to 2012 period.

Although this is not our purpose in this section, the evidence presented here shows symptoms of the Dutch disease.

The results presented in this paper reinforce the diagnosis that the manufacturing sector is facing a serious problem of competitiveness, and they also support the more general view that the country has a supply-side problem. This is backed up by a series of macroeconomic indicators, such as (low) growth, (high) inflation and (increasing) current account deficit, for example.

Likewise, this section of the paper presents data and analysis which may enrich the literature and public debate on the issue. With regard to the latter, apparently it has succeeded in making the government include competitiveness on its agenda. In this context, the government has recently announced measures which go in the right direction, such as reducing the electricity tariff and some taxes. However, not only the problems in introducing these measures, but also the lack of a more general and ambitious reform plan reduce hopes that productivity gains might improve competitiveness, which would be the most desirable outcome.

So, taking recent signs into account, the most likely outcome is that this lack of competitiveness is solved (or rather, mitigated) by an exchange rate depreciation and moderation in economic activity.

5. Chile: Increased costs and peso appreciation explain the loss of competitiveness in manufacturing exports in the last five years

In general terms, for the last five years Chilean industry has strayed from the upward path of competitiveness gains that it had been treading since 2002. This decline has resulted mainly from the appreciation of the Chilean peso – in an environment of multilateral dollar depreciation – and rising labour and energy costs. However, we view this as having been partially offset by lower financing costs – in particular foreign – and by an expansion of the currency-hedging market.

To gain a fuller understanding of how competitiveness has changed in Chile, we built indicators for the industry as a whole, and also for a range of industrial sub-sectors[20]. These are based on official figures from the unit value index of industrial exports — industrial IVUX measured in USD — the nominal exchange rate and our best estimate for an index of unit labour costs in the sector (see the next sub-section for more details).

Our indicators suggest in aggregate terms that industry traced an upward path of competitiveness gains between 2003 and 2007 (which we estimate at around 24.6%), before partially contracting again sometime in 2012 (there was a fall of 3.7% in the period). In this context, industry succeeded in improving competitiveness by close to 20% between 2003 and 2012 according to our indicator, despite the difficulties of the post-Lehman era. This is in striking contrast to the performance of the multilateral real exchange rate – used as a measure of the economy's aggregate competitiveness – which appreciated by 10% between 2003 and 2007 and another 4.2% to 2012, implying a fall of 13.8% in the period as a whole (see Figure 51).

In this context, the appreciation of the nominal exchange rate in recent years – because of the multilateral depreciation of the dollar - has been the key factor underlying the decline in competitiveness. In addition to the above, labour costs have risen steeply as a result of the change in the composition of local growth, which ended up putting pressure on the use of domestic resources. This change was due to a major expansion of domestic demand, driving sectors that are more intensive in their use of higher-skilled labour. Nevertheless, we should bear in mind that behind this change of growth composition, with its major expansion in investment and private consumption, there lies a wealth effect of more favourable terms of trade (as a result of high copper prices).

20: The indicator used to measure competitiveness is based on the construction of a real exchange rate for the different sub-industries based on the following definition used for the Competitiveness Index (CI):

$$CI_i(t) = \frac{E(t) * IVUX_i(t)}{ULC_{Industry}(t)}$$

Where E is the nominal exchange rate. Both industry IVUX and ULC use seasonally adjusted quarterly series.

Figure 51
Aggregate industrial competitiveness vs. multilateral RER (level, March 2003=100)
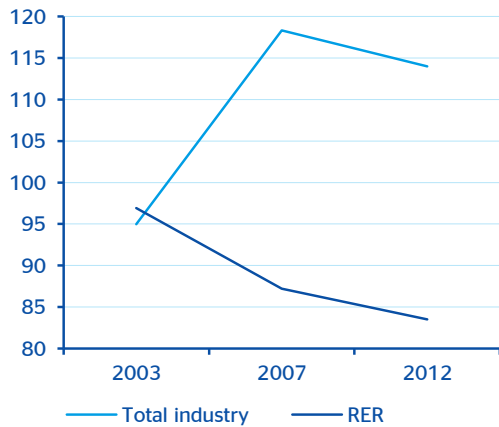
Source: INE, BCCh and BBVA Research.

Figure 52
Industry sub-sectors with similar change to the aggregate industrial competitiveness (level, March 2003=100)
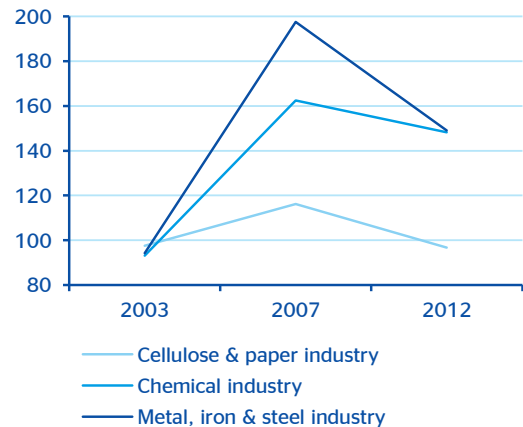
Source: INE, BCCh and BBVA Research.

Although these elements can be linked to transitory factors, there is also a structural issue which compromises the outlook for industrial competitiveness over the next few years. This, specifically, is the forecast change in energy costs. This sector has had difficulty in making its investments bear fruit in recent years, mainly as a consequence of environmental issues, as a result of which numerous new projects have run aground in the courts (see sub-sections below for more details).

Our observation of the changes in the Chilean manufacturing sector's competitiveness is in general terms borne out in the trade indicators analysed in the second section. Here, we see that the conclusions drawn from the revealed comparative advantage (RCA) index for the entire Chilean manufacturing sector between 2002 and 2012 coincide. These indicators show a 31.8% increase in the comparative advantages for this period; however, this loses momentum between 2007 and 2012, growing only 6.4% (for more details on RCA, see the discussion in section 2, Figure 4 and Table 1).

Meanwhile, indicators of growth orientation of markets (see Figures A.13 and A.14), which evaluate advantages relative to the industrial export destination breakdown, show that Chile had an advantage over the rest of the region between 2002 and 2007, mainly as a result of the implementation of free trade agreements with higher economic growth countries, such as China. However, more recently (2007 to 2012), these manufacturing export orientation advantages have been eroded, and we consider that this deterioration has to do with the difficulty of redirecting production post-Lehman, a period in which external demand has been less dynamic. Lastly, the figures in the second section show that in general Chilean manufactured products succeeded in increasing their share in international markets between 2002 and 2007, but could not prevent a reduction in their share of global trade over the last five years (see Figures 7 and A.4).

Changes in manufacturing competitiveness show variety between sub-sectors

On the other hand, there is a significant degree of variation between sub-sectors in terms of their changing competitiveness. In order to identify these sub-sectors, we have classified them into three groups.

In the first place, there are those which have behaved similarly to the aggregate industry indicator, showing a major impetus in competitiveness between 2003 and 2007, which then drops off towards the end of 2012 (see el Figure 52). This covers the cellulose and paper, chemicals and iron and steel industrial sub-sectors. We should point out that in the case of the first sub-sector, a point-to-point comparison of competitiveness levels shows a slight loss, which we believe is explained by lower international cellulose prices, in a context of structural change in paper demand, driven by the flood of new digital mass media and the resulting move in reading habits towards digital formats.

Secondly, we have identified a group of sub-sectors which have shown sustained rises in competitiveness in the last decade, among which the food, forestry and furniture industries play leading parts (see Figure 53). However, if we disaggregate the food industry's competitiveness, we see that this increase is partly explained by rises in international fish-meal prices. The salmon processing industry's performance, on the other hand, replicates the change in competitiveness seen in the first group of industries we analysed (see Figure 54).

Figure 53
Industrial sub-sectors showing sustained rises in competitiveness
(level, March 2003=100)

Food industry
Forest & furtniture industry
Metals, electricity & transport industry
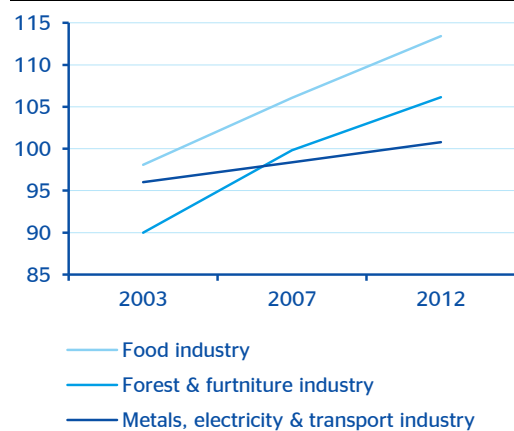
Source: INE, BCCh and BBVA Research

Figure 54
Food industry competitiveness
(level, March 2003=100)


Food Industry Fishmeal Salmon
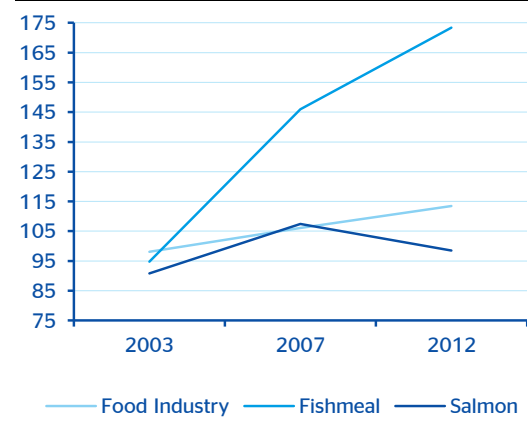
Source: INE, BCCh and BBVA Research

Here we should mention that, between 2007 and 2012, the salmon export industry had to deal with major cost increases as a result of more demanding environmental regulations – amongst them, implementing more sophisticated fish-farming rotation systems and more exacting regulations for the entire country's fish farms, measures taken after the ISA virus broke out – and it was also affected by the peso's appreciation and by falls in international prices due to a major increase in the sector's installed capacity. All these factors led to a noticeable fall in the competitiveness achieved between 2003 and 2007.

Finally, forming the third group of industries, we identified those which showed a sustained loss of competitiveness in the last decade, among which wine plays a big part, given its large share of industrial exports (see Figure 55). The outlook for this sector is more complex, showing a loss of competitiveness which it has been suffering since before the sub-prime crisis. We believe that this phenomenon is largely due to the dollar's global depreciation cycle and the rise in labour costs, which it has been impossible to transfer to international prices in a context of depressed foreign demand.

Figure 55
Industrial sub-sectors showing sustained loss of competitiveness (level, March 2003=100)

Wine industry ——— Other industry (textile, metallurgical, among others)
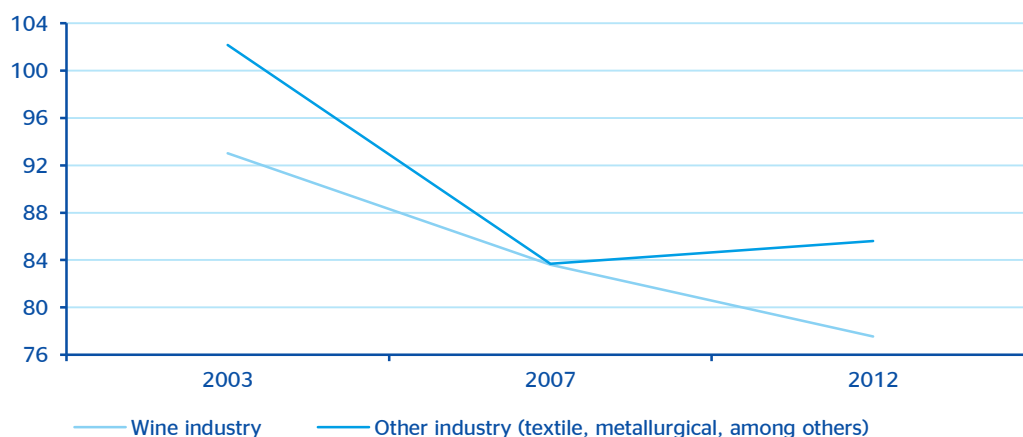
Source: INE, BCCh and BBVA Research

In conclusion, over the last five years Chilean industry has reversed its previously positive progress in competitiveness gains since 2002. This drop-back is due to peso appreciation — in a context of the dollar's multilateral depreciation and high terms of trade — and an increase in labour and energy costs. However, as we will see in more depth below, we have noticed that this has been partially offset by lower financing costs — especially foreign ones — and by a greater deepening of the currency-hedging market.

On this subject, it is important to highlight that during the dollar's global depreciation cycle, the effect of emerging currency appreciation prevailed over the rise in international industrial goods prices. Thus industrial exports were redirected from developed markets to Asia, although this process was only partial (see the previous analysis on the growth orientation of markets). So we saw a pass-through of low inflation from developed economies to emerging ones in the form of lower tradable prices.

Finally, the reallocation of resources from the non-copper tradable sector to the non-tradable sector caused by the Chilean peso's real appreciation exerted considerable pressure on wages, a factor that we will analyse in depth in the next section. In this environment, it was difficult for several export sectors to offset the loss of competitiveness, resulting from the dollar's global depreciation, by reducing real wages. This was further reinforced by an expansive activity cycle, led by internal demand, and by a strong increase in labour demand in the services sector. In short, export sectors were obliged to absorb wage rises to the detriment of their competitiveness (see the next section for more details).

## Growth in industrial labour productivity has been lower than in the rest of the economy

The improvement in average productivity in industrial labour has been systematically less than the improvements in the economy's aggregate labour productivity. So the major expansion in services sectors' average productivity has not been accompanied by a similar expansion in industry (see Figure 56). This is reflected in an average growth in industrial labour productivity of just 5.4% YoY between 2002 and 2013, contrasting with an average 7.8% YoY for the economy as a whole. In this context, the industrial sector has a strong relative lag in terms of labour productivity which has been secular since 2002 (see Figure 57).

Figure 56
Average labour productivity (% change YoY)*

Total average labour productivity
Industrial average labour productivity
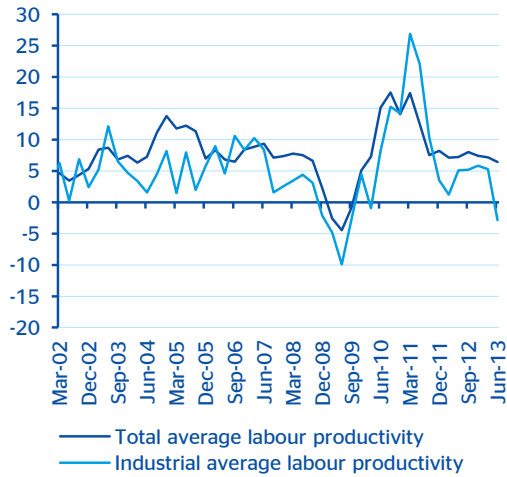
*Growth rates based on seasonally-adjusted series.
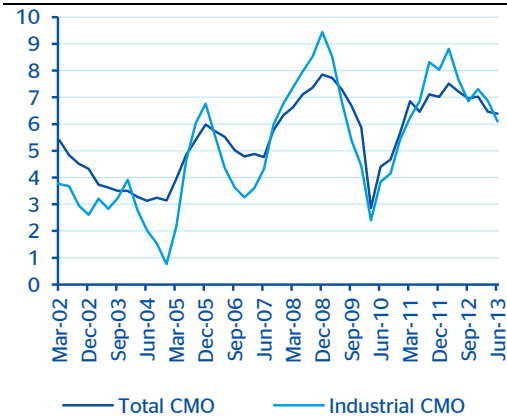Source: INE, BCCh and BBVA Research

Figure 57
Ratio between industrial and total average labour productivity (seasonally-adjusted index)
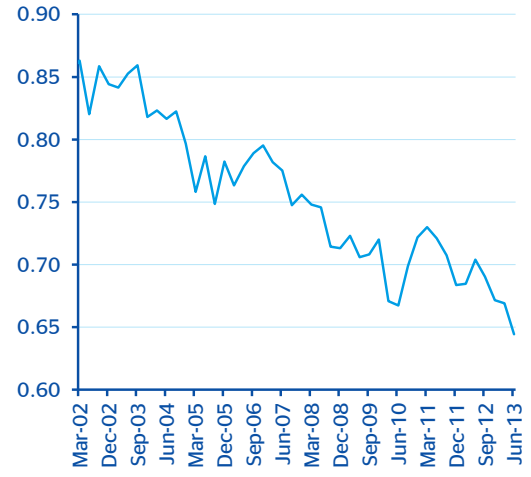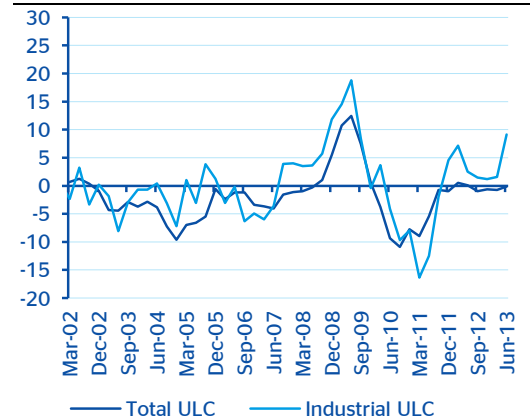

Source: INE, BCCh and BBVA Research

Furthermore, labour costs have not adjusted to offset the gap in labour productivity suffered by the industry relative to the average for all sectors of the economy. So, labour costs in industry have increased at the same rate as in the economy as a whole (Figure 58). Tough competition for Chile's productive resources, in particular labour, has meant that industry has had to absorb these increments without being able to offset them by similar increases in productivity.

Figure 58
Aggregate and industrial labour costs (% Var. YoY)

Total CMO   Industrial CMO

Source: INE, BCCh and BBVA Research

Figure 59
Aggregate & industrial unit labour costs (% Var. YoY)*


Total ULC   Industrial ULC

*Seasonally-adjusted series.
Source: INE, BCCh and BBVA Research

The above statement is well illustrated in Figure 59. According to our calculations, industrial unit labour costs (ULC) have fallen on average less than the aggregate ULC for the economy, in the 10 years between 2002 and 2012 of our analysis. What is more, given that an increasing number of services sectors have been incorporated into the national accounts, the economy's aggregate ULC shows an average fall of 2.1% YoY (the mining and services sectors have included, which have been very productive in the last few decades), while industry figures show a slight increase, averaging out at 0.01% YoY, and have significantly increased in the last two years compared to other sectors.

Energy costs increase because of high oil dependence and lags in investments in search of greater efficiency

Energy costs have risen sharply, which compares unfavourably with other OECD economies. The increase has been particularly high in the industrial sector (see Figures 60 and 61). Chile's energy infrastructure grid presents major challenges to bringing in cheaper energy, and the time lag in getting these projects completed has had consequences of the first order on industrial costs in the last few years. Difficulties in materialising investment in this sector can be attributed to environmental issues, which have meant that a large number of projects have run aground in the courts.

Figure 60
**Energy price in Chile
(compared to the OECD average, in PPP USD, 2003 index =100)**
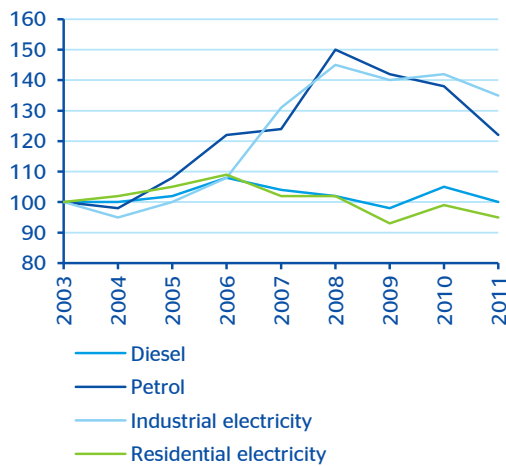
Source: OECD and BBVA Research

Figure 61
**Energy price in Chile
(in USD at market ER, average OECD price index =100)**
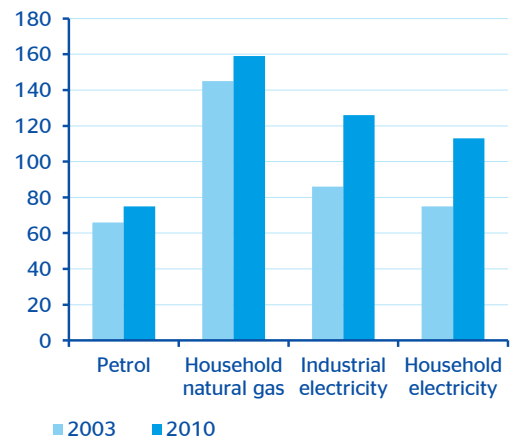
Source: International Energy Agency and BBVA Research

With major investment in port and road infrastructure, hikes in logistics costs have been contained

According to the World Bank, Chile's logistics performance improved between 2010 and 2012. However, one should not forget that there has been an absolute loss in logistics competitiveness since 2007, caused mainly by investment lags in those sectors covered in the indicator (Table 2). Not only is there an improvement in the absolute indicator towards pre-Lehman levels, but also an improvement in the position relative to Latin America as a whole, as well as to the countries which we believe will be the main competitors for Chilean manufacturing exports, with the exception of Mexico.

Table 2
Logistics performance, main competitors in industrial exports (scored from 1 to 5)

	2007		2010		2012	
	Index	Ranking	Index	Ranking	Index	Ranking
Chile	3.25	31	3.09	48	3.17	38
Mexico	2.87	54	3.05	49	3.06	46
Argentina	2.98	44	3.10	47	3.05	48
Peru	2.77	58	2.80	66	2.94	59
Colombia	2.50	80	2.77	71	2.87	63
Latin America *	2.65		2.84		2.83	
South Africa	3.53	23	3.46	27	3.67	23
Canada	3.92	10	3.87	14	3.85	13
Australia	3.79	17	3.84	17	3.73	18
Norway	3.81	16	3.93	10	3.68	21
New Zealand	3.75	19	3.65	20	3.42	30
World	2.74		2.87		2.87	

*Latin America is taken as a simple average of Argentina, Bolivia, Brazil, Colombia, Ecuador, Mexico, Paraguay, Peru, Uruguay and Venezuela.
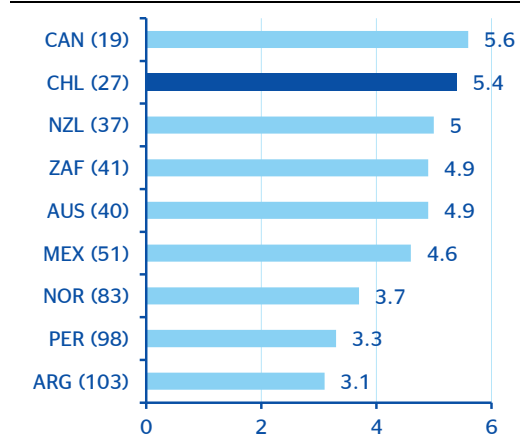Note: The scoring of the Logistics Performance Index reflects the logistics perceptions of a country based on border clearance efficiency, the quality of trade- and transport-related infrastructure, the ease of agreeing shipments at competitive rates, the quality of logistics services, the ability to follow up and track dispatches and the frequency with which shipments reach the consignee within the time programmed. The index has a 1 to 5 range: the higher the number, the better the performance. The data come from Logistics Performance Index surveys carried out by the World Bank, in association with academic and international institutions, private companies and individuals involved in international logistics.
Source: World Bank and BBVA Research

Some initiatives are underway to bring the export process more up to date. These include infrastructure investment policies with proper planning for medium and long-term needs, integrating the various means of transport in a unified logistics perspective, all of which means smart design for motorways, railway lines and transport hubs within an integrated system, so that users can choose from several alternatives, weighing up the pros and cons of each. Similarly, the process of adapting the regulatory framework to international best practices and requirements has begun, which will enable the country to carry on making progress in the international arena in this sector, which requires higher service standards. Then again, introducing intermodal transport, which is the system most commonly used in international freight transport, connects air, sea, rail and land transport. Finally, upskilling the labour force to produce the professionals and qualified personnel needed in this sector.
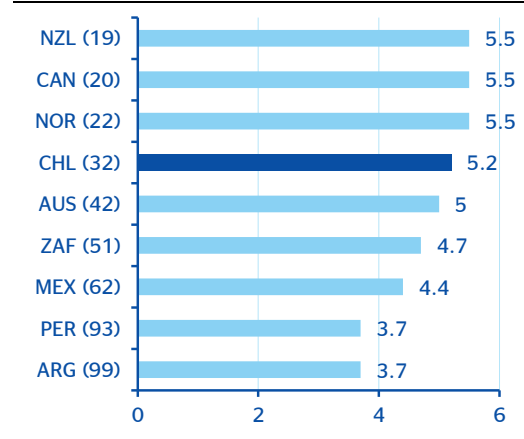
Thanks to the projects listed above, Chile has a stronger position than its main competitors in a range of logistics infrastructure quality rankings, mainly in road and port infrastructure (see Figures 62 and 63).
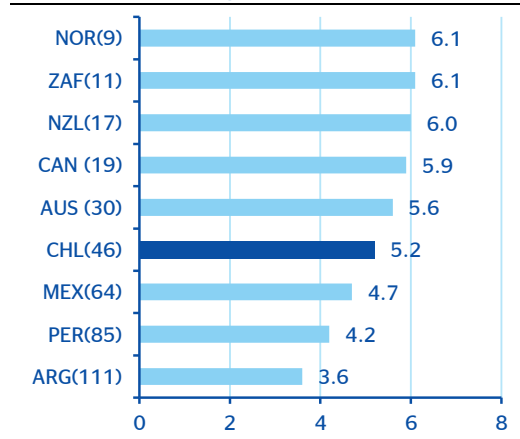
Figure 62
Road infrastructure quality ranking 2012-13: Chile vs. main competitors (148 country ranking, 7= max; 0= min.)

CAN (19)	5.6
CHL (27)	5.4
NZL (37)	5
ZAF (41)	4.9
AUS (40)	4.9
MEX (51)	4.6
NOR (83)	3.7
PER (98)	3.3
ARG (103)	3.1

Source: World Economic Forum and BBVA Research

Figure 63
Port infrastructure quality ranking 2012-13: Chile vs. main competitors (148 country ranking, 7= max; 0= min.)

NZL (19)	5.5
CAN (20)	5.5
NOR (22)	5.5
CHL (32)	5.2
AUS (42)	5
ZAF (51)	4.7
MEX (62)	4.4
PER (93)	3.7
ARG (99)	3.7

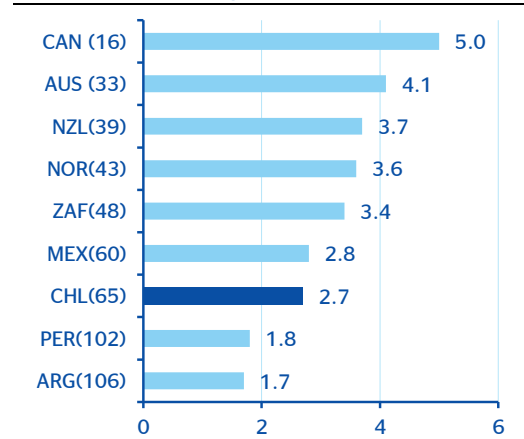Source: World Economic Forum and BBVA Research

However, there are challenges on the horizon in terms of investing to improve airport and railroad transport, which are somewhat behind the standards of Chilean manufacturing's main competitors (see Figures 64 and 65).

Figure 64
Airport infrastructure quality ranking 2012-13: Chile vs. main competitors (148 country ranking, 7= max; 0= min.)

NOR(9)	6.1
ZAF(11)	6.1
NZL(17)	6.0
CAN (19)	5.9
AUS (30)	5.6
CHL(46)	5.2
MEX(64)	4.7
PER(85)	4.2
ARG(111)	3.6

Source: World Economic Forum and BBVA Research

Figure 65
Rail infrastructure quality ranking 2012-13: Chile vs. main competitors (148 country ranking, 7= max; 0= min.)

|	
CAN (16)	5.0
AUS (33)	4.1
NZL(39)	3.7
NOR(43)	3.6
ZAF(48)	3.4
MEX(60)	2.8
CHL(65)	2.7
PER(102)	1.8
ARG(106)	1.7

Source: World Economic Forum and BBVA Research

However, we have seen a heavy increase in transport costs, which have gone up 23% since 2010 (Figure 66). Going by INE statistics, the main reason for this rise comes from the increase in fuel prices – with an impact of +15.5% — a situation which is entirely subject to the international market. However, the hike in both labour costs and maintenance service costs has had a knock-on effect of nearly 7% on the total increase in transport costs over the last four years (see Figure 67).
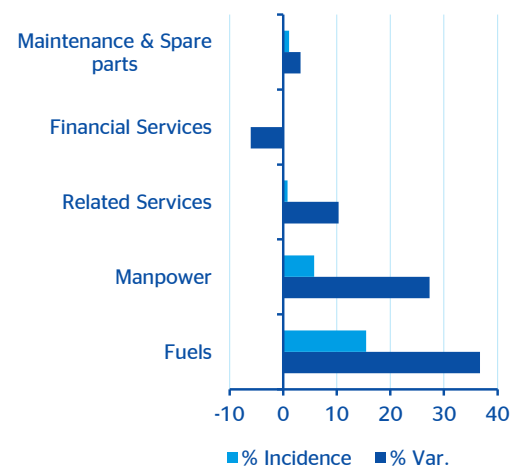
Figure 66
Changes in transport costs and their components (index, 2009=100)
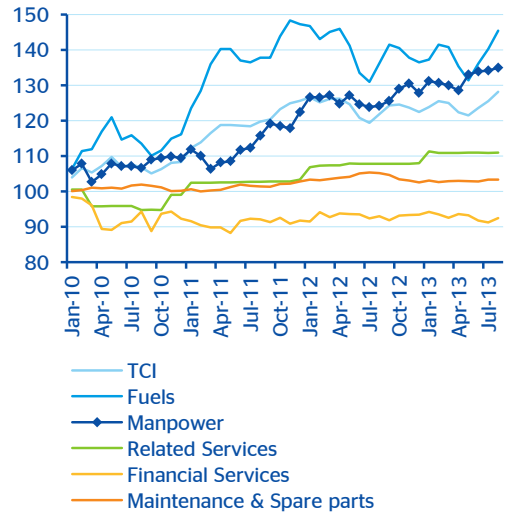
Source: National Statistics Institute and BBVA Research

Figure 67
**Variation and incidents in transport costs between 2010 and 2013 (%)**

Source: National Statistics Institute and BBVA Research

Better access to foreign funding and expansion of the currency-hedging markets offset the loss of competitiveness as a result of the dollar's global depreciation over the last five years

Although Chile is in a middling position in terms of financial development when compared with its main competitors (see Figures 68 and 69), we feel that the increasing financial deepening over the last few years would have helped to mitigate the negative effects on industrial export competitiveness resulting from the dollar's global depreciation, in a context of greater wage pressure.

Figure 68
Ranking of availability of financial services 2012-13: Chile vs. main competitors (148 country ranking, 7= max; 0= min.)
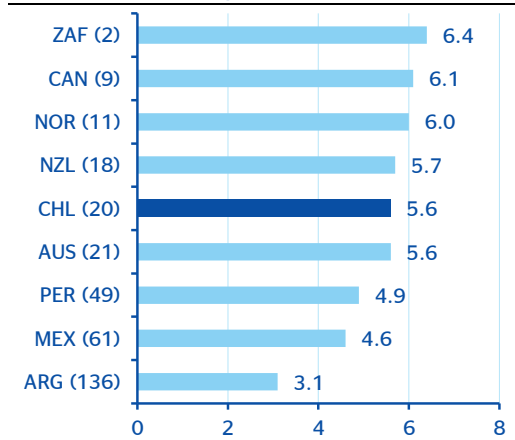
Source: World Economic Forum and BBVA Research

Figure 69
Ranking of financial services costs 2012-13: Chile vs. main competitors (148 country ranking, 7= max; 0= min.)
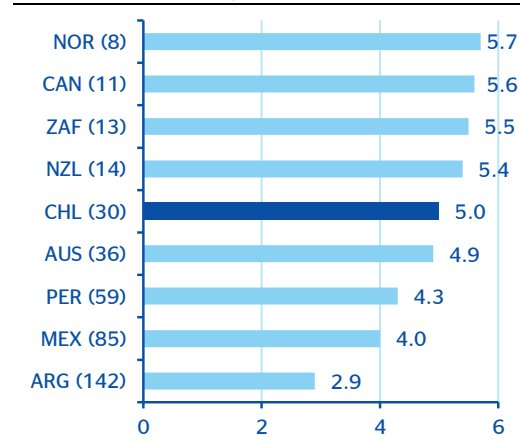
Source: World Economic Forum and BBVA Research .

We know that an important part of the volatility in industrial export competitiveness comes from fluctuations in the nominal rate of exchange. In this context, expansion of currency-hedging markets would have allowed industries to ride out the real exchange rate's excessive volatility. So, the disruption in industrial export competitiveness in the last five years suggested

by our indicators may be somewhat overstated since it does not factor in the competitiveness advantages associated with the development of the financial market.

In particular, we have identified two elements which have helped the country to cope better with exchange rate volatility and competitiveness: better and more access to funding from abroad and the growth of the hedge derivatives market over the last few years.

On the one hand, the percentage of foreign currency deposits in the Chilean financial system has gone up considerably from an average of 9% in the 2003-07 period to an average of 12.5% in the 2008-13 period. This reflects more access to dollar funding by the non-financial corporate sector in a context of lower external funding costs, attributable to a change of monetary policy on the part of developed economies (see Figures 70 and 71).

Figure 70
Foreign exchange deposits in the Chilean banking system (% of total)
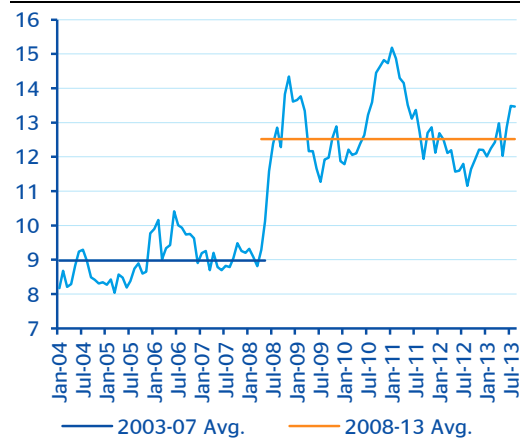
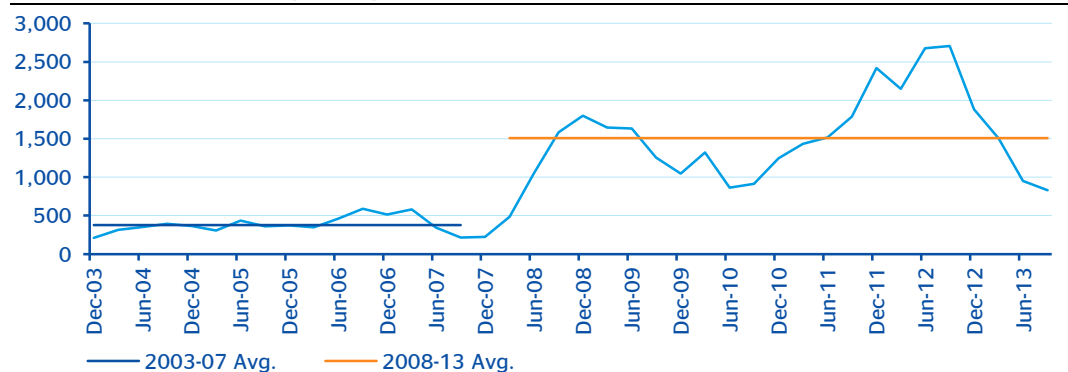Source: Central Bank of Chile and BBVA Research

Figure 71
Corporate bond issuance abroad (USD mn)
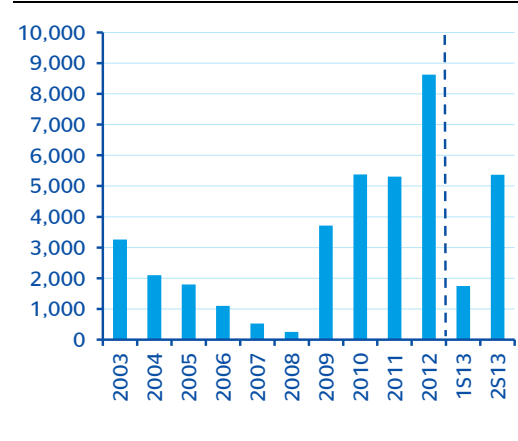
Source: Central Bank of Chile and BBVA Research

Similarly, the figures from the balance of payments' account show us that absolute flows of net derivative transactions record a change of system similar to the banking sector's funding template, where transactions in derivatives — with an important currency hedging component — have gone up from an average of USD375mn between 2003 and 2007 to USD1.509bn between 2008 and 2013 (see Figure 72).

Figure 72
Absolute flows of net derivatives from the financial account (USD mn, quarterly moving averages)

Source: Central Bank of Chile and BBVA Research

Conclusions

Over the last five years Chilean industry has lost ground in its previously upward journey of competitiveness gains since 2002. This decline has involved peso appreciation in a context of multilateral dollar depreciation and rising labour and energy costs. However, we see this as having been partially offset by lower funding costs – in particular foreign – and by a deepening of the currency hedging market.

While these factors can be related to transitory externalities, there is a structural element which compromises the outlook for industrial competitiveness over the next few years, and this is the expected change in energy costs. This sector has had difficulty in materialising investment as a consequence of environmental issues which have meant that a large number of new projects have run aground in the courts.

An alternative conclusion attributes a large amount of the loss of competitiveness to reasons connected to the bonanza in raw material prices, which led to a very positive cyclical position for the economy – high terms of trade — with an appreciation of the peso and heavy investment and labour demand in mining, passing on the hike in labour costs to other non-traditional export sectors. However, we forecast that this phenomenon, the so-called *Dutch disease*, is now coming to an end.

Finally, and whatever the cause - global dollar depreciation because of the US monetary cycle, Chilean peso appreciation, raw materials supercycle – we believe that as the Chilean peso's loss of value becomes established and the investment cycle in mining reaches maturity, we can expect investors to start looking at those lagging sectors. We believe that the Chilean economy not only requires a relatively more depreciated peso, but also an exchange rate with a greater degree of continuity. So, a major part of the recent loss of competitiveness may be clawed back and the challenges that remain will be in reducing energy costs and, to a lesser extent, in improving logistics infrastructure.

6. Colombia: industrial competitiveness has gone down since 2008

The manufacturing sector's productivity reached its peak in 2008, fell as a result of the international crisis and still hasn't recovered

Colombia's average labour product has increased, but showing some variety. Since 2002 average product grew 21.5% throughout the economy, at a real annual rate of 2.0%. Up to 2008 the main sources of the growth were the energy, construction and industry sectors, with annual growth rates of 5.6%, 5.0% and 4.4%, respectively. However, from 2008 onwards, mining was the sector whose average product grew most (+19.5% YoY), while industry (-2.8% YoY) and the economy as a whole (-0.7% YoY) lost productivity, even falling to a negative variation rate. Since 2011 there has been a slight upturn but productivity has not recovered the heights it reached before 2008 (see Figure 73). The structural change is mainly accounted for by smaller foreign penetration on the part of tradable sectors other than mining, exchange rate appreciation, the crisis in a neighbouring country and lower demand in developed countries.

Figure 73
Total productivity* and by economic sectors (2002 index=100)

Non-tradables   Agro & industry
Mines   Totals
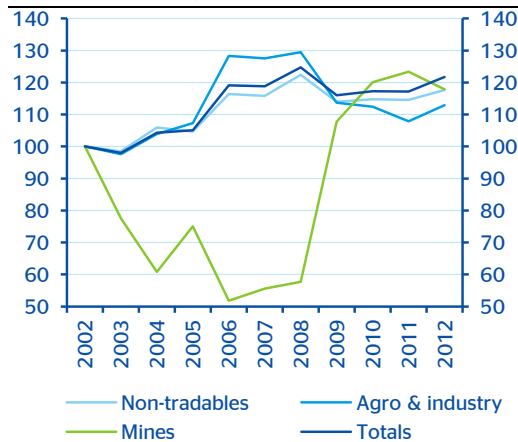
*Productivity is measured as the average labour product.
Source: DANE and BBVA Research.

Figure 74
Productivity* by industry hours (2002 index=100)

Real production per total hours
Real production per ordinary hour
Real production per extra hour
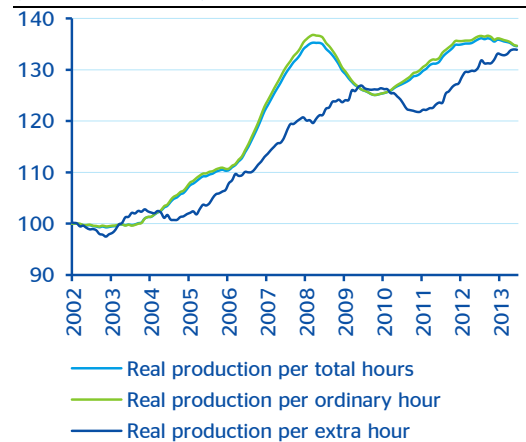
*Average product per hour worked.
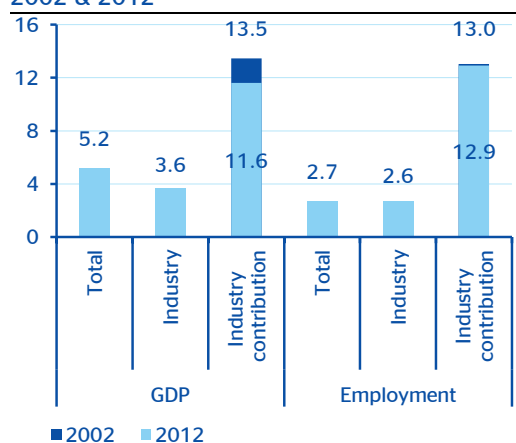Source: DANE and BBVA Research.

When we take a look at the manufacturing sector, Figure 74 shows real average production by hour hired. This index grew constantly from the start of the previous decade until 2008, when it reached a peak. After the international crisis that year, average product went down sharply and since then recovery has not been sufficiently strong to get back to that level. Part of the explanation lies in the non-substitution of the declining market in Venezuela, which accounted for 36% of industrial exports in 2008, but only represented 14.3% by 2012. Progress in markets like Ecuador, Peru and Mexico did not manage to offset this substantial reduction and, furthermore, affected a narrower base of companies, with their main focus on vehicles and chemicals. What is more, the appreciation of the peso, as we will see below, limited industry's capacity to compete with imports and with other countries on the international markets.

The direct participation of manufactured goods in GDP and employment gradually fell over the decade we are looking at (see Figure 75), although it is mainly accounted for by a vertical disintegration of the industrial chain, according to Carranza & Moreno (2013). In other words, some ancillary services which were carried out directly by industrialists are now subcontracted

out to the tertiary sector and the importance of the industry fell. This study shows that Colombia's industrial production chain (which includes direct production and ancillary services such as transport) represented around 35% of the economy in 2011. Between 1990 and 2000 this production chain stopped growing, but since 2000 it has grown consistently and has not lost its share of the economy's total production, despite its relative lack of dynamism recently. However, the distribution of the two groups of products within the chain (manufactured goods and services) was favourable to tertiary services, with a resulting reduction in the aggregate value of manufactured production.

A further way of verifying sector behaviour consists of interpreting businesses' profits. We took as a reference the proportion between companies' operational profits and their labour payments. In this case, with data from 2012, we see that the trade sector has the greatest return on wages (where revenues are on average 153 times the wages paid and profits are 5.3 times), followed by construction (see Figure 76). Here, unlike earlier measurements, industry has a higher return than the economy's average, reflecting the fact that the sector has been able to generate profits that keep it at healthy solvency levels, despite low productivity growth.

Figure 75
Average YoY growth in GDP and employment (total and industry) between 2002 and 2012 and industrial share in GDP and employment in 2002 & 2012

Source: DANE and BBVA Research calculations

Figure 76
Average labour productivity* measured by business profits (median)
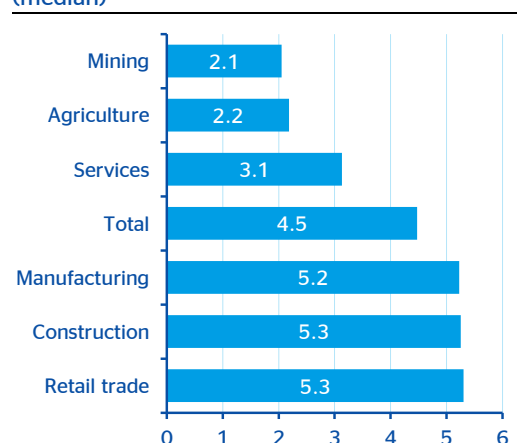
*Measured as the ratio between operational profits and liabilities.
Source: SuperSociedades and BBVA Research calculations

The currency's real appreciation limits the foreign competitiveness of manufactured goods and improves wages in the services sector

Industry achieved strong growth between 2002 and 2008 despite the currency's real appreciation (see Figure 77) in a context of high prices for raw materials. This was thanks to the rise in foreign markets and consolidation in domestic demand, which offset occasional competitiveness problems and lower revenue from abroad as a result of the appreciation. Industry's share of exports was nearly equivalent to the contribution of foreign fuel sales and, what is more, the country reduced its exposure to the United States. But, from then on, foreign and domestic demand fell, growth in terms of trade speeded up (see Figure 78) and export capacity to the country's main trading partners slackened. What is more, the real exchange rate was, on average, higher between 2007 and 2012 than between 2002 and 2007.

At this moment, fuels represent two-thirds of the country's exports and manufactured goods are no more than 15% of the total. In consequence, the Herfindahl-Hirschman concentration index for exports more than quadrupled between 2007 and 2012 (see Figure 13) and the number of products sent abroad went down by 15% over the same period (see Figure A.20). Furthermore, the progress made between 2002 and 2007 in diversifying markets, when the Herfindahl-Hirschman market index was halved, was lost when it doubled again (see section 2 for a more detailed, *transverse* analysis of this data).

In general, the country's exports grew more quickly than the world total, but thanks to the dynamic performance of a few products: live plants, fuels, precious stones and cars (see Figure 8). In the remaining cases (most of them manufactured products) improvements in global market penetration were reversed between 2007 and 2012 (see Figure A.5).

As a result, exports continue to be concentrated on natural- and primary-resource based products (88% of the total) and the timid progress made by high tech products between 2002 and 2007 came to a halt (see Figure 15). So, even though the country's exports are now a greater proportion of global trade (0.17% vs. 0.10% in 2002. see Figure 2), they did not grow in sophistication (see Figure 16) and, to the contrary, exports focused on low value-added products, implying in some cases the closing of some markets which had been explored in the first half of the previous decade. Our interpretation of these results is that Colombia mainly grew in the intensive margin (expanding existing trade flows) rather than in the extensive margin - that is, the addition of new products and markets (see Figure A.21). Part of the explanation lies in the sharp increase in raw material prices, which at the same time caused the currency to appreciate and wages to rise in the services sectors.

Figure 77
Multilateral real exchange rate
(index 1994=100; decrease: real appreciation)*

RER_PPI (NT) — — — RER_CPI (NT)
RER_PPI (T) — RER_CPI (T)
IMF
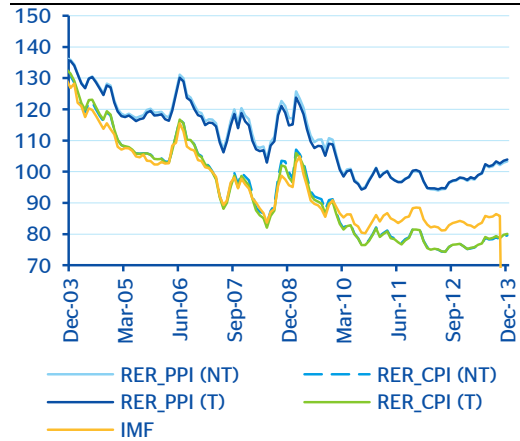
*Calculations based on CPI and PPI inflation for non-traditional (NT) and total (T) products.
Source: Bank of the Republic and BBVA Research

Figure 78
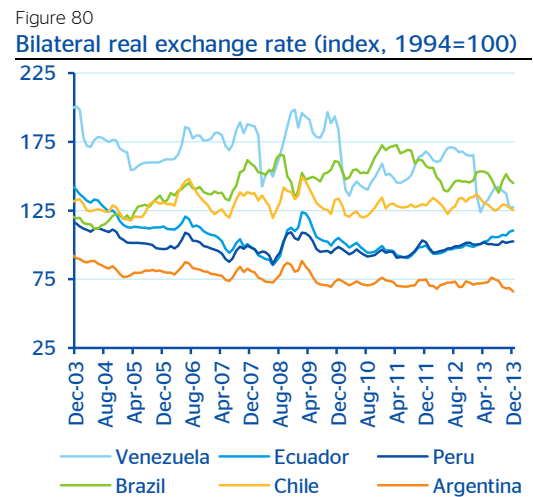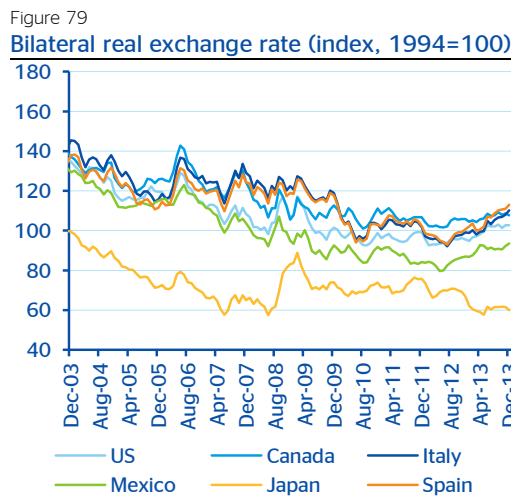**Terms of trade (index, 2002=100)**
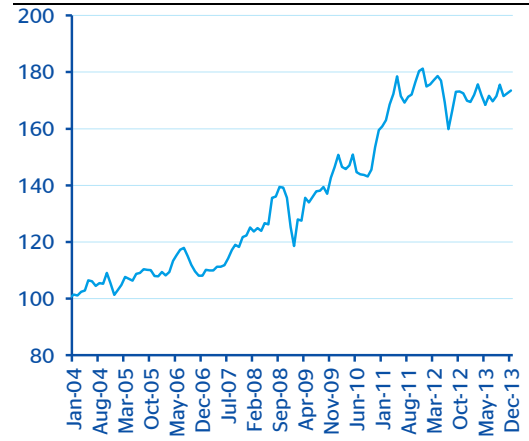
Source: Bank of the Republic and BBVA Research

Terms of trade grew by 72% between 2002 and 2013, at a YoY rate of 5.0% (see Figure 78). Between 2009 and 2013 they went up at a YoY rate of 6.5%. Part of this increase was a consequence of better results in the oil sector. For example, correcting for US inflation, the real price of oil grew an accumulated 410% between 2002 and 2013, a YoY average of 10.5% between 2002 and 2008 and an average of 14.6% a year between 2009 and 2013. In total, international price behaviour determined that between 2000 and 2011 the increase in exports was accounted for more by a price hike (+374% in the export value) than by greater production (+86% in the export volume index, as shown in Figure A.1).

In order to limit the negative effect of the peso's appreciation, the government speeded up the signing of commercial deals. The treaty with the United States came into force in May 2012 and the government has also recently signed commercial agreements with Canada, Chile, the

EFTA countries (Switzerland, Iceland, Norway, and Liechtenstein) and the Northern Triangle (Guatemala, Honduras and El Salvador). It is currently waiting for the agreement with the European Union to come into force, and negotiations have begun with South Korea, Turkey, Israel and Panama. As well as all these countries there are the treaties already signed in the past with Mexico, Mercosur (Argentina, Brazil, Paraguay and Uruguay) and the CAN group (Bolivia, Peru and Ecuador). However, there is a need to study the internal factors which damaged competitiveness and which may have caused a fall in average labour product, factors which come on top of lower foreign demand and currency appreciation, as we will discuss below.

In bilateral terms, the Colombian currency had the biggest appreciation against developed countries and Mexico (see Figure 79). In the case of the latter, real appreciation against the Mexican peso was 35% between 2002 and 2013. To the contrary, when compared with other countries in the region, the currency remains at narrow intervals above 100 (real devaluation), with the exception of the bilateral rate with Argentina which did show stronger real appreciations (see Figure 80).

Figure 79
Bilateral real exchange rate (index, 1994=100)

US, Canada, Italy, Mexico, Japan, Spain

Source: Bank of the Republic and BBVA Research

Figure 80
Bilateral real exchange rate (index, 1994=100)

Venezuela, Ecuador, Peru, Brazil, Chile, Argentina

Source: Bank of the Republic and BBVA Research

This period also saw major growth in mining sector wages in nominal terms, although when corrected by the mining deflator (which is also very dynamic) they stay in negative territory. The main beneficiaries, in terms of real wages, were the workers in the services sectors, such as transport, social services and retail trade, evidence which is common in the economic literature on energy price increases, currency appreciation and their consequences on other activities.

At the other end of the spectrum, wages in industry, construction, agriculture and energy were at the tail end of the breakdown (see Figure 81). Apart from construction, the fall in wages in all other sectors is accounted for by less dynamism in nominal payments, which may be a response to labour inflexibility, which caused an adjustment to prices in the labour market, or to the fact that companies associated the production reductions with temporary shocks. In construction, on the other hand, low real growth in remuneration is the result of a sharp increase in sector prices.

Some internal bottlenecks eroded industrial competitiveness, more so since 2008

Up to now we have seen that lower average labour product after 2007, the persistent appreciation of the exchange rate since 2002 (which accentuated between 2007 and 2012) and lower demand since 2008 for manufactured products limited industrial competitiveness. However, there are other internal factors, in the area of regulations and related to the

insufficient steps taken in the reform agenda, that have hampered competitiveness: the cost of energy, the quality of infrastructure, access to financial services and the costs associated with the payroll, amongst others.

As to the energy market, Colombia must deepen its reforms, since electricity prices still remain among the highest in the region despite the progress made and the high degree of competitiveness in the energy sector. In the Latin American context, according to Interame and ANDI data, Colombia is the country with the fourth-highest energy prices (see Figure 82, with data from 2010), whereas in 2003 it was in eighth place in the same sample of twelve countries. When adjusted for purchasing power parity, the values confirm that Colombia has one of the highest prices, in third place after Chile and Uruguay.

Figure 81
Real remuneration by sectors: Avg. YoY Var. 2002-11 (%)
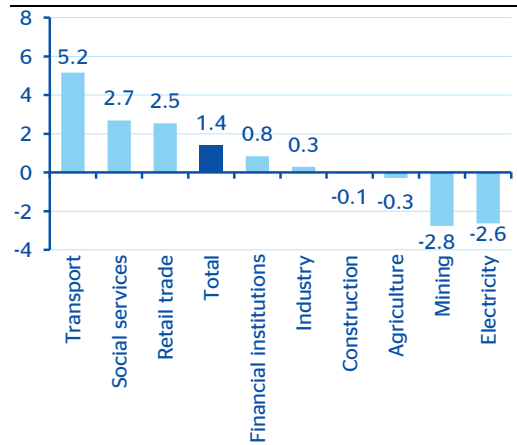
Source: DANE and BBVA Research calculations

Figure 82
Electricity prices in selected countries (CUSD/Kwh)
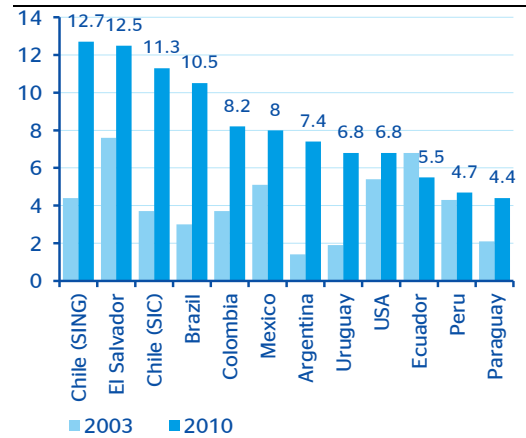
CUSD are US dollar cents, Kwh is kilowatt per hour. The price in Colombia does not consider the 20% social contribution. SING: Big North interconnected system. SIC: central interconnected system.
Source: Interame, ANDI and BBVA Research

The figures do not take into account the 20% social contribution paid in Colombia, which makes energy costs the highest in the region. This is a consequence of the sharp increase in energy transmission and commercialisation prices, with the result that between 2002 and 2012 the average annual CPI rise in the electricity price was 50% higher than total average annual CPI rise.

Paradoxically, the country significantly increased its energy capacity after the crisis it suffered in the early nineties, from 8.300 to 14,454 MW, with 63.4% of all capacity coming from hydropower (80% in 1990) and the rest mainly from natural gas power plants (21.2% of installed capacity) and coal (6.9% of installed capacity). In addition, the quality of power is better than in the average of the country's competitors in manufacturing markets (China, Mexico, Peru, Argentina and Brazil), only behind South Korea according to World Economic Forum classifications.

Even so, energy prices in Colombia went up by between 12.3% and 41.1% nominally (-8.6% and 14.9% in real terms) from 2008 onwards depending on voltage, with bigger increases in the medium voltage ranges, which are used by small and medium-sized companies, whereas the smallest increase was in the highest voltage segment and in stock exchange-negotiated energy, which supplies major industries (see Figure 83).

Energy, however, does not seem to be the factor which impacts most on competitiveness, since electricity represents only 2.0% of aggregate industrial costs, although in some sub-sectors such as cement, steel and chemicals the proportion is closer to 10%.

A second issue is its infrastructure. The main international comparisons rank Colombia very poorly in terms of transport quality, extent and costs (see Figure 84)[21]. Road infrastructure in Colombia is inferior to that of its regional peers and ranks in 130th place of 144 countries according to WEF data. Quality problems affect transport costs, and this is the reason why Colombia has the highest internal freight costs among its competitors in manufacturing markets (see Figure 85). Furthermore, unlike Korea, Chile, Mexico, China, Peru, and Brazil (the country's main competitors) its infrastructure rating did not improve in the 2006-13 period.

Figure 83
Energy prices in Colombia (COP/Kwh)
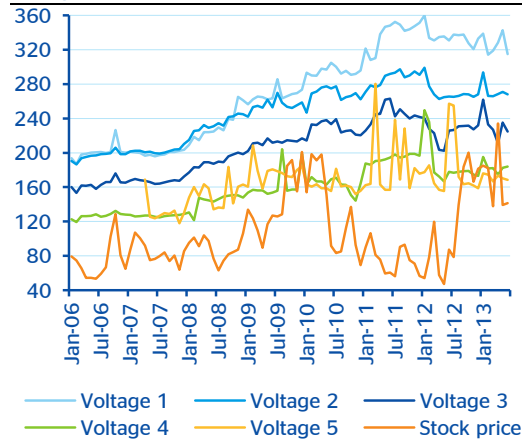
Voltage levels: 1 [<1 kV]; 2 [1 <= kV < 30]; 3 [30 <= kV < 57.5] ; 4 [57.5 <= kV < 220]; 5 STN [220 <= kV].
Source: XM, UPME and BBVA Research

Figure 84
Quality of road infrastructure in the region's countries (ranking of 144 countries, where 7= best and 0 = worst)
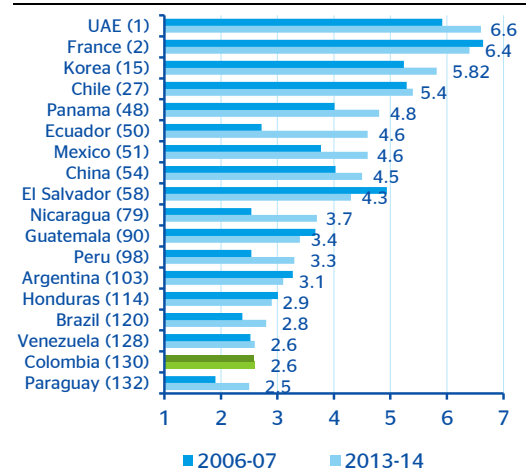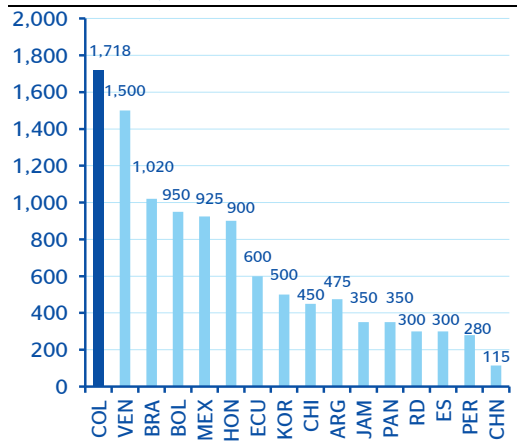

Source: WEF World Bank and BBVA Research

The average cost of laying a kilometre of motorway in Colombia over flat land (USD3mn) and in the Andes (USD10mn) is higher than in countries such as the US (USD2.25mn) or in Europe (USD2.6mn). Colombia is the most expensive country in the region for transporting a standard 20 TEU container (USD1,718, see Figure 85), whereas in other countries in the region and direct competitors in the international market the cost is much lower (USD1,200 in Venezuela, USD450 in Chile and USD115 in China). The distortion of those costs over the international trade model is similar to that made by import duties – see BBVA Research (2012a) – and generates an average cost premium of 7% per tonne exported/imported.

The delay in infrastructure development becomes evident when looking at the recent rise in Colombian foreign trade. Between 2006 and 2010 road freight transport (by tonnes) grew by 16.6%, whilst the number of kilometres of primary roads has only grown by 2.2%. To this we must add delays in ports, which increase freight transport times (see Figure 86).
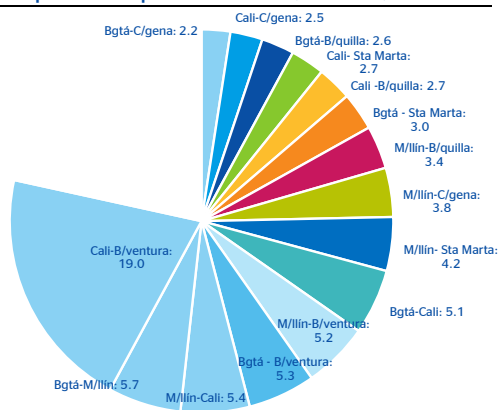
21: For more details, see: BBVA Research (2012b).

Figure 85
Internal transport cost in Latam (USD per 20 TEU container)

Source: WEF World Bank and BBVA Research

Figure 86
Transport time per kilometre (minutes)

*Includes waiting time in ports.
Source: 2012-2013 Annual Competitiveness Report and BBVA Research

Finally, financial inclusion in Colombia is growing, but it is still below that of comparable countries such as Chile and Brazil. According to international measurements, Colombia has a financial inclusion index of around 40% (see Figure 87). This is despite a significant increase in financial channels in recent years, from 46.5 channels for every 10,000 adults in 2008 to 86.3 channels currently. The biggest progress has been made in credit card terminals, as shown in Table 3.

Table 3
Financial channels per 10,000 inhabitants

Type of contact point	Dec-09	Dec-10	Dec-11	Dec-12
Offices	**3,7%**	**0.3%**	**0.8%**	**9,4%**
CB	15.1%	72.7%	71,9%	68,8%
ATMs	8,1%	9,2%	7,5%	12.8%
POS Credit Card Terminals	21,9%	13,7%	6,0%	31,8%
Total	19,9%	15.0%	9,4%	33,2%

Source: Superfinanciera and BBVA Research

There are currently half a million companies with access to the financial system, but only 162,000 of them take out commercial loans (see Table 4). This figure is particularly low if one bears in mind that Colombia is estimated to have over 2.2 billion companies (1.6 billion units in the 2005 census), that is, less than 10% of companies have access to the formal credit system.

Table 4
**Number of companies with financial products (by type of product)**

	Number of companies					
	2007	**2008**	**2009**	**2010**	**2011**	**2012**
Savings accounts	272,714	284,918	276,654	293,533	312,672	314,351
Current account	278,709	304,988	268,487	299,212	306,357	305,969
Commercial	96,119	110,935	124,818	138,475	150,238	162,367
Consumer	12,981	27,846	67,192	65,193	64,988	66,945
Micro-credits	1,978	4,501	6,697	7,349	8,464	8,934
Credit card	47,688	49,948	60,161	64,970	70,009	70,209

Source: Superfinanciera and BBVA Research

Corporate access to financing is restricted because of business informality, due, among other things, to the high costs of the formal economy, such as governmental procedures and non-wage costs. These latter costs generate cost premiums for companies in the order of 60% on top of the wage paid to the employee, significantly worsening companies' cost ratios and their competitiveness.

As a result of the above, the government reduced non-wage costs with the Formalisation and First Employment Law, passed in December 2011, which reduces non-wage costs for specific groups such as young people joining the job market and women over 40, among others. In addition, the recent tax reform eliminated a parafiscal premium of 13.5pp on employees declaring less than 10 minimum monthly wage packets a year. This came into force in May 2013 for the first 5.5 points and the rest were eliminated in January 2014 (see Figure 88).

Figure 87
Financial inclusion: percentage of the adult population
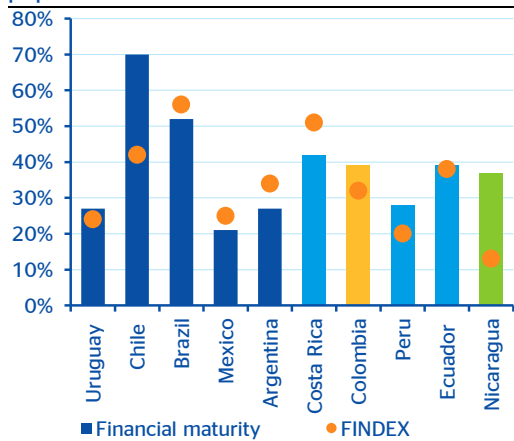
Countries in dark blue: income per capita between USD9,001 and USD15,000. Light blue: between USD4,001 and USD9,000. Green: between USD 1.000 and USD4,000.
Source: WEF and BBVA Research

Figure 88
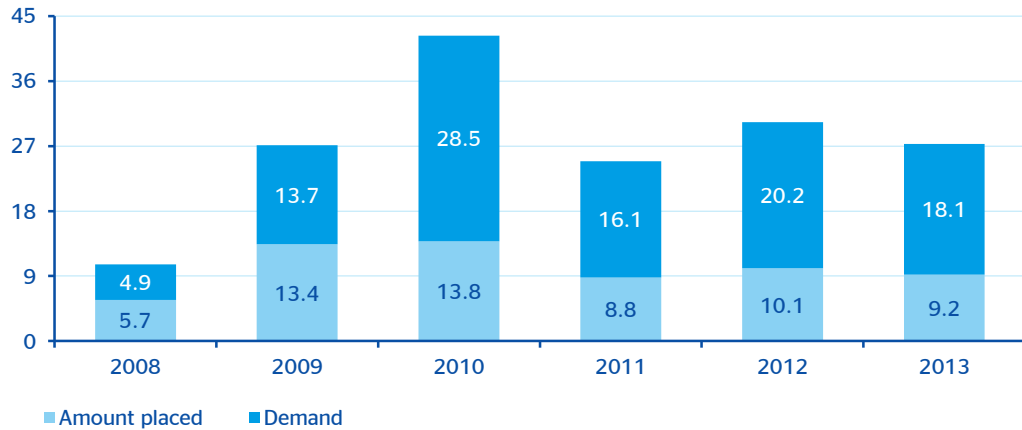**Non-wage costs for employers: percentage of wage**
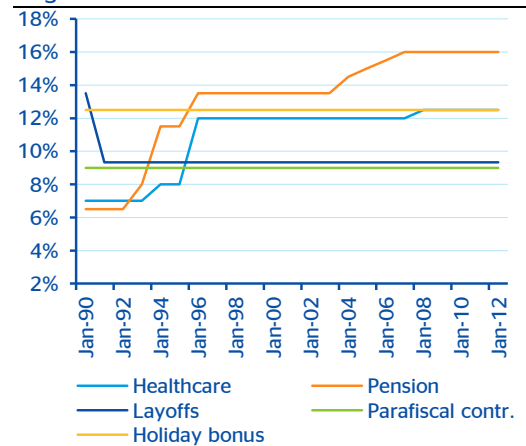
Source: BBVA Research

Lastly, the capital market has only been an efficient source of funding for the biggest companies, while the task of extending cover to medium-sized industries remains unfinished business (see Figure 89).

Figure 89
Bond issuance in Colombia (COP trn)

Source: BVC and BBVA Research

Conclusions

Industry increased its competitiveness between 2002 and 2007. After that year, competitiveness took a sharp fall and did not manage to recover the maximum export levels it had reached at the end of the first five-year period.

This conclusion is supported by: average labour product, which has fallen since 2008 and showed a timid recovery only recently; the share of high tech products in exports, which has fallen since 2007, and the dynamics of industrial exports (except vehicles) which grew less than the world aggregate, among other indicators presented in section 2.

Furthermore, in the second subsection of this section on Colombia, we pointed out the main bottle-necks facing the country. Achieving greater industrial competitiveness will depend on solving these bottle-necks, in a context in which the real exchange rate should return to levels that drive export activity, thanks to lower global liquidity and stable terms of trade.

7. Mexico: non-basic manufactured goods gain competitiveness, driven by the automotive sector

The foreign trade data for several Latin American countries analysed in the second section indicate that Mexico has gained competitiveness in most of its manufactured goods exports over the 2002-2012 period and, to a lesser degree, in the final years of the 2007-2012 period. As mentioned in that chapter, of the economies analysed, Mexico's is the only one which shows a revealed comparative advantage in non-basic manufactured exports as well as an increase in its share of GDP throughout that decade. We will discuss below two economic factors which may be behind this competitiveness gain in Mexican manufactured goods exports during both periods, as well as the different areas of opportunity for increasing this competitiveness in years to come.

Manufacturing labour productivity improved between 2007 and 2012 but more recently momentum weakened
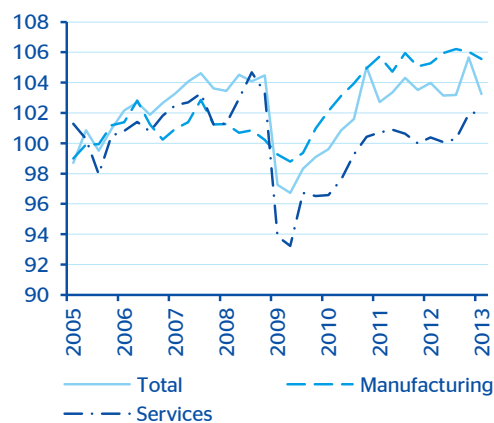
Manufacturing labour productivity indicators showed accumulated increases during the 2007-12 period. The indicator based on hours worked went up by 3.2% over this time while the figure based on the number of people employed grew 4.7%[22]. Likewise, the process of increasing labour productivity in the manufacturing sector is prior to 2007: between 2005 and 2012 the indicators based on hours worked and number of people in work went up by 4.4% and 4.8% respectively. However, more recently these indicators have run out of steam. On the one hand, in more recent years labour productivity in the services sector has started making up the lag it suffered compared to manufacturing labour productivity (see Figures 90 and 91).

Figure 90
Labour productivity (index 2005=100, seasonally-adjusted, based on hours worked)
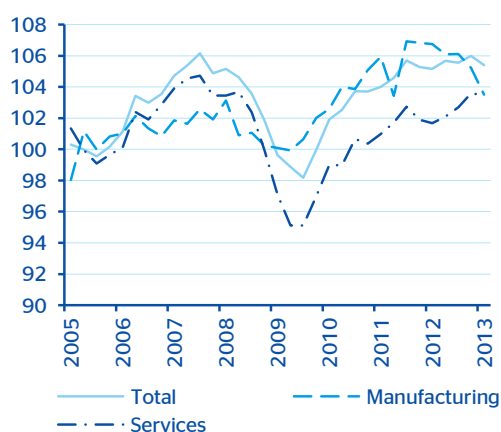
Figure 91
Labour productivity (index 2005=100, seasonally-adjusted, based on number of people employed)

Source: BBVA Research based on INEGI data.

Source: BBVA Research based on INEGI data.

22: The determinants for labour productivity may be similar to those for total factor productivity (TFP). In a study for the Mexican manufacturing sector, Salgado-Banda and Bernal-Verdugo (2007) explore determinant factors for TFP and labour productivity and find that technological take-up and human capital have a significantly positive effect on both types of productivity.

Positive wealth effect on terms of trade, with a sectorial impact which is relatively more favourable for manufacturing between 2002 and 2012

Terms of trade showed an accumulated growth of 12.7% between 2002 and 2012 (see Figure 92)[23]. Given the high relative contribution of oil to Mexico's tax revenues, this increase necessarily involved a positive wealth effect for the entire economy[24]. However, this effect may have been distributed differently in the manufacturing and tertiary sectors. The former was reflected in different economic behaviour within these sectors in terms of employment creation and real wage rises. To establish whether this was the case, the perception of manufacturing producers was compared with those of services suppliers in terms of the behaviour of real wages throughout the economy in said period. To do this, the annual average wage of those making their contribution to the Mexican social security institute, the IMSS, was adapted using the price indexes for manufacturing and tertiary production. In addition, an index for consumer perception of these wages was built using the NCPI deflator.

As Figure 93 illustrates, for the period 2002 to 2012, both consumers and services providers perceived an increase in the real wage while the opposite occurred with manufacturing producers. Manufacturers, when they saw a fall in real wages, came off better than service providers because of the wealth effect over this period. In other words, the relatively higher level of manufacturing prices propitiated this sector becoming more competitive, since it had relatively more room for manoeuvre to absorb the cost pressures coming from the input market for production.

Figure 92
Terms of trade (index, 2002=100)

Source: BBVA Research based on Banxico data

Figure 93
Average annual real wage (index, 2002=100)

Manufacturing production deflator
Tertiary sector deflator
Consumer price deflator
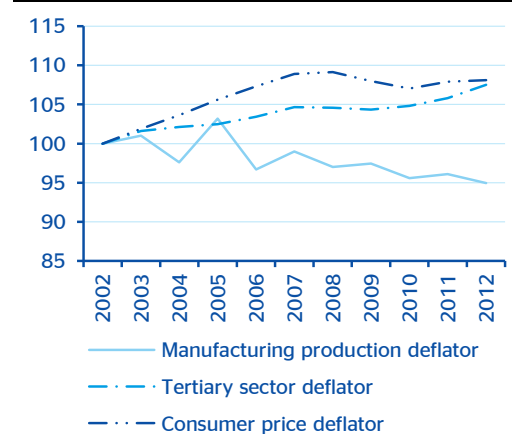
Source: BBVA Research based on STPS and INEGI data

23: The global economic recession in 2008-2009 led terms of trade to collapse to levels not seen since 1999. This was because of the abrupt falls, both in international trading of durable goods and in the oil price. Nevertheless, the recovery of global activity in subsequent years allowed these terms to show growth to even higher levels than those accumulated between 2002 and 2012.
24: Between 2002 and 2012 average oil revenue from the Mexican public sector represented 34.3% of total fiscal revenue.

Decreasing unit labour costs and containment in real wages: two factors which helped manufacturing competitiveness between 2007 and 2012

The manufacturing industry's unit labour costs showed an accumulated drop between 2007 and 2012. The most important contribution to this fall occurred during the period after the 2008-09 global economic recession (see Figure 94). Using information up to the second quarter of 2012, these costs have shown an accumulated drop of 4.4% since the fourth quarter of 2009. This positive effect on manufacturing production has reinforced the impact on the latter of the positive wealth effect mentioned in the section above.

Over the last three years, despite greater labour productivity, the average real wage in manufacturing industry has stagnated. This apparently contradictory situation is explained by the breakdown (1) below, which relates the real compensation for the work factor to labour productivity:

$$\frac{Y_L}{P_C L} \equiv \frac{Y}{P_Y L} \frac{Y_L}{Y} \frac{P_Y}{P_C} \qquad (1)$$

where Y_L is total nominal labour compensation; P_C are consumer prices measured using a consumption deflator; L are the hours worked; Y is nominal production; and P_Y is the production deflator. So, the three fractions on the right hand side in (1) denote, respectively, labour productivity, the share of the labour factor in production and the ratio of production prices to consumer prices[25].

The results suggest that the share of the work factor showed an accumulated drop of 3.8% from 2008 to 2012 (see Figure 95). Given that the relative prices of production to consumption have stayed fairly stable over the same period, the lower share of the work factor has probably insulated the positive effect on the real wage of the increase in labour productivity. Although this statement should be treated with caution since the wage is only one part of total labour compensation, greater labour productivity associated to a stable average real wage would suggest a more competitive manufacturing industry in the 2007-2012 period.

Figure 94
Unit labour costs in manufacturing (2008 index=100. seasonally adjusted)

— Unit Labour Costs (ULC)

Source: BBVA Research based on INEGI data

Figure 95
Average YoY real wage in the manufacturing industry (2005 index=100)

— Production deflator/CPI (NCPI)
- - - Labour productivity
- · - Average real wage
- · · - Share inferred from the work factor
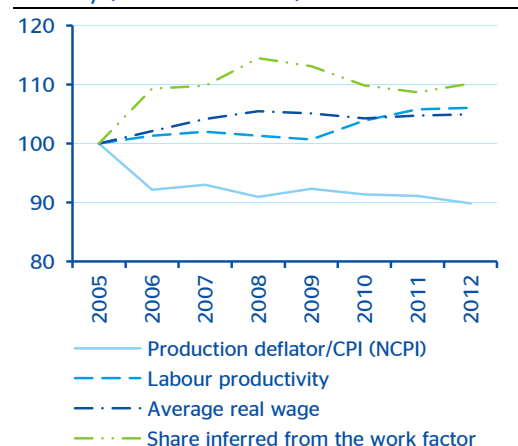
Source: BBVA Research based on STPS and INEGI data

25: Sharpe, Arsenault and Harrison (2008) discuss the importance of the share of the labour factor in production and of the ratio of production prices on consumer prices in order to understand the relationship between labour productivity and compensation for this production factor. Similarly, we should point out that wage data was used instead of total labour compensation when breakdown (1) was applied to manufacturing industry.

Depreciation of the effective real exchange rate up to 2010

Although the effective real exchange rate fell over the last decade, from 2010 it has shown a more erratic behaviour, with no clear tendency to continue depreciating (see Figure 96). This is probably influencing the recent events in manufacturing production since it is not helped by the trend seen in earlier years. Without a change in the effective real exchange rate towards a new cycle of depreciation, manufacturing production competitiveness will be more affected by factors such as labour productivity and real wages.

Bigger share in US manufacturing imports

The share of Mexican manufacturing exports[26] in US imports of these products was 12.3% in 2012. This figure is higher than the shares in 2002 and 2007, which were 11.6% and 10.6%, respectively. This market share indicator suggests that the competitiveness of Mexican manufacturing exports has experienced gains both in the 2002-12 period and between 2007 and 2012, which is consistent with the evidence presented in the second section. Likewise, in both periods, all Mexico's principal manufacturing competitors, with the exception of China, reduced their market share in US imports of these products (see Figure 97).

Figure 96
Effective real exchange rate (2010 index=100. Based on consumer price indexes)

Real effective exchange rate

Source: BBVA Research based on BIS data

Figure 97
Share of US manufacturing imports (% of total value)

China — Canada — Mexico — Japan — Malaysia
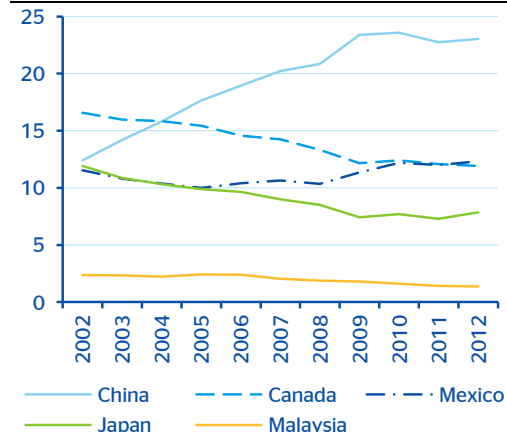
Source: BBVA Research based on USITC data

Gains in the automotive industry, key for the country's growth

The automotive industry has been pivotal for Mexico's economic growth in the last few years. In particular, the production of cars has boomed, going from around 1.8 million units in 2002 to 2.0 million units in 2007, and reaching 2.9 million units by 2012. The importance of this industry for the Mexican economy is indisputable: it contributed 2.6% and 15.4% to GDP and manufacturing production in 2012 respectively. These figures in 2008 were 2.0% and 11.9% respectively. Similarly, automotive exports made up 29.3% of the country's manufacturing exports in 2012 compared to 24.1% en 2008.

Although automotive exports have gained ground in manufacturing exports as a whole, it would be an interesting exercise to analyse the performance of auto imports in order to have an alternative measure for domestic competitiveness. In particular, the proportion of imported cars in national automotive consumption has shown a negative trend since 2005, which has been accentuated after the worldwide restructuring of automotive production in the years following the 2008-09 global economic recession (see Figure 98). The above suggests that this alternative competitiveness measure showed gains for the 2003-11 and 2007-11 periods.

26: The classification of manufacturing exports in this section has used the North American Industrial Classification System.

The diagnosis of significant progress in the automotive industry's competitiveness over the course of the last decade is strongly backed up by the international trade data used in the second section, in particular by the RCA indicator for the segment, which grew from 1.6 in 2002 to 2.4 ten years later, and by the gain in share of Mexican vehicle exports in world trade (see the discussion on the subject in that section, Table 1 and Figures 9 and A.6).

Figure 98
Share of imports in national automotive consumption (%)

—— Purchase of import vehicles
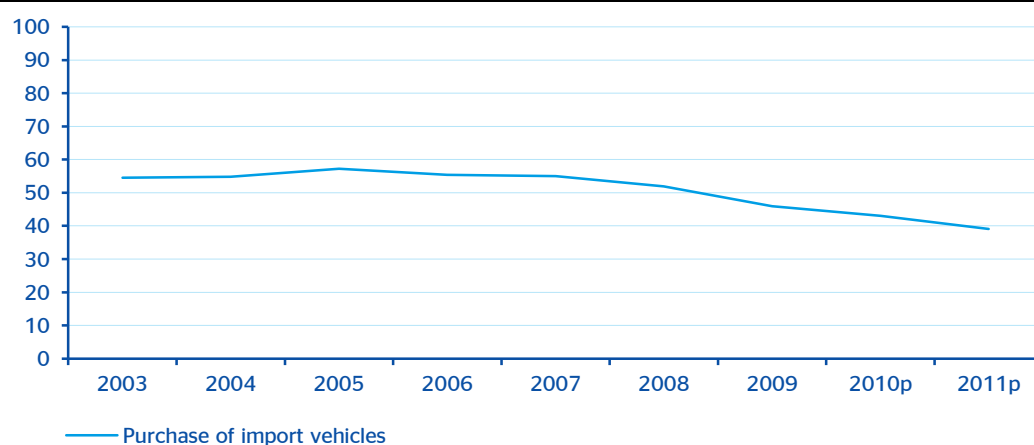
P: provisional data.
Source: BBVA Research with INEGI data

Small improvements in logistics and in the Global Competitiveness Report, although still behind its main manufacturing competitors

The World Bank's 2012 Logistics Performance Index indicates that Mexico comes 47th out of 155 countries, having moved up three places from 2010. However, its principal manufacturing competitors, such as Japan, Canada, China and Malaysia, were 8th, 14th, 26th and 29th respectively[27]. An analysis of the six components of the index for Mexico reveals that the classification for each one of them is lower than any of the competing countries mentioned above. The classification is particularly lower in absolute terms, but also in relative terms, in the efficiency of the customs clearance process.

The World Economic Forum's 2013-14 Global Competitiveness Report mentions that commercial facilitation and other measures that reduce transaction costs are key factors in positioning production as part of a global vertically integrated system. In this area, Mexico is at a competitive disadvantage to the majority of its main competitors. As an example, the cost of using containers for dispatching Mexican exports was USD1,450 in 2012, much higher than the costs in Japan, China and Malaysia (see Figure 99).

The above-mentioned global competitiveness report ranks Mexico 55th out of 150 economies, compared to its 2008-09 position of 60th. One of the components of the Global Competitiveness Index which most helped the country to move up the ranking was innovation (see Table 5). For their part, competing countries like Japan, Canada, Malaysia and China came in respectively at 9th, 14th, 24th and 29th.

An analysis of the performance of the index components for Mexico reveals the very poor position it occupies in the ranking under the heading of labour market efficiency (see Table 5). In this area, Mexico comes 113th, far behind Canada, Japan, Malaysia and China, which were 7th, 23rd, 25th and 34th. In our opinion, increases in labour productivity will

27: The Logistics Performance Index reflects the situation of a country's logistics status looking at factors such as: 1) customs efficiency; 2) the quality of trade and transport infrastructure; 3) the ease of arranging competitively priced shipments; 4) the quality of logistics services; 5) ability to track consignments; y 6) timeliness of shipments arriving within scheduled delivery times.

be marginal until efficiency has been improved in allocating workers around the various sectors of the Mexican economy, and wage rigidity reduced.

Another component in the Global Competitiveness Index we consider essential for Mexico to improve refers to the efficiency of the product market. In this category Mexico comes in 83rd position. The challenge is huge, bearing in mind that this improvement will only happen if greater domestic competition is encouraged. This will imply more competitive prices for transactional services which support international trade such as transport and telecommunications.

Table 5
Mexico's position in the Global Competitiveness Index by different components

Global Competitiveness Index component	Ranking 2008-2009	Ranking 2013-2014
Institutions	97	96
Infrastructure	68	64
Macro-economic environment	48	49
Health & primary education	65	73
Higher education and training	74	85
Efficiency of the product market	73	83
Efficiency of the labour market	110	113
Development of the financial market	66	59
Technological readiness	71	74
Market size	11	11
Business sophistication	58	55
Innovation	90	61

Source: BBVA Research with data from WEF

Figure 99
Export costs (USD per container)
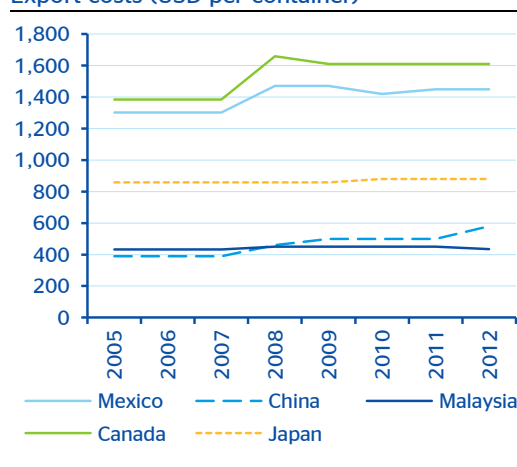
Source: BBVA Research with data from WB

Conclusions

Exports of most Mexican manufactured goods gained competitiveness according to the evidence of the indicators quoted in this section, as well as in section 2, in the 2002-12 period. This was also true, although to a lesser degree, for the last years of the second five-year period. Out of all manufactured goods exports, it is interesting to note that Mexico is the only country analysed where non-basic manufactured goods have a comparative advantage.

Economic information available for the entire 2002-12 period, which helps to explain the competitiveness gain in Mexican manufactured goods exports, identifies two possible underlying factors: accumulated depreciation in the effective real exchange rate and the manufacturing industry's greater margin for manoeuvre than the tertiary sector in terms of input procurement, as a result of having benefited from a greater positive wealth effect from the increase in terms of trade. Between 2007 and 2012, this gain may be considered a result of the behaviour of certain economic variables such as the market share in US manufacturing imports, labour productivity, real wages and unit labour costs in the manufacturing industry. However, the reduced momentum of manufacturing labour productivity and other supply-side factors (labour and product market) appear to be impeding this kind of gain since 2011.

8. Peru: gains in manufactured goods' competitiveness despite variations across sectors

The main competitiveness indicators built using trade data, and presented in section 2, do not indicate with total clarity whether Peruvian manufactured goods have gained or lost competitiveness in the last decade. This is probably because of the uneven performance of different manufacturing sectors, as well as the relatively low weight of manufactured goods, particularly the less primary-resource intensive ones, in total exports.

However, our combined reading of the Peruvian export performance indicators and of the detailed analysis of national idiosyncrasies — presented in this section — point to a competitiveness gain in the manufacturing sector in the last decade, despite the recent fall back.

Manufactured goods win share in world exports

Section 2 shows that Peru is the country with the biggest regional growth in terms of its export to GDP ratio in the decade between 2002 and 2012 (+10.1pp), although it dropped slightly in the second half of that period and it is also one of the few, together with Mexico and Chile, where the weight of manufactured goods exports in GDP has increased (+2.4pp), as Figure 1 shows.

Growth in Peru's manufacturing exports has been very solid in the last decade. The country won world share in its main non-basic manufactured products (wool and crochet textiles, plastic products, non-organic chemical products and woollen textiles), above all in the first half of the decade. However, cotton textiles have lost share. When it comes to non-basic manufactured goods, these have also won share in world exports in the last decade, despite the loss of dynamism in the second half and the relatively negative performance of sectors such as copper and its manufactured goods, food industry residuals and zinc and its manufactured goods (see Figures 10 and A.7).

Despite these gains in world shares, the weight of manufactured goods as a whole in total exports has dropped because of the steep increase in primary products (see Figure 15), which also helps to account for the drop in the RCA indicator, not only for the basic manufactured goods group and the non-basics as a whole, but also for specific sectors (see Figure 4, Table 1 and the argument in the second section).

Of the main Peruvian manufactured goods segments, the textile industry currently represents about 19% of non-traditional exports. This segment benefited when the ATPDEA (the law on Andean Trade Promotion & Drug Eradication) came into force in 2002; this improved conditions for entry onto the US market and was a boost in making the most of the country's comparative advantage in this sector, with an RCA of 1.8 (see Table 1). However, from 2005 onwards and particularly after 2006, the quotas imposed by the US on Chinese clothes were lifted and Peruvian products began to lose share in the US market. Likewise, as we mentioned above, some of the main textile sub-sectors achieved major expansion in foreign markets, even winning share on the world market (see Figure 10). In 2007 and 2008, textile exports began to turn to the Venezuelan market (because of a zero import duty, preferential exchange rate and high domestic demand in Venezuela), offsetting the loss in the North American market. From 2009 onwards, it has been struck by the international crisis affecting its main foreign markets, which helps to explain the loss of momentum during the second half of the period and the fall in the RCA indicator for the sector as a whole (see Figure A.7 and Table 1).

In terms of basic manufactured goods, some products have gained share in world exports (particularly zinc and its manufactured goods and vegetable preparations), while others have

lost share, with lead and wooden products the biggest losers. In the second half of the decade (2007-12) performance was generally worse than the first.

An important subsector, given the growth it has shown in the decade under analysis, is the agriculture of non-traditional products. Its main advantage was the lower costs it faced compared to competing countries, and its development has been driven by higher levels of private investment and the introduction of modern production techniques. Other advantages which have helped this sector's performance were favourable weather conditions, good yields and diversity of products. From 2007 onwards, this sector's labour costs in some parts of the country went up due to labour scarcity, with the result that workers' productivity and the increasing technical complexity of the processes have both become important factors, which will continue to be the case in the coming years.

Greater productivity and decreasing or stable labour costs

Between 2002 and 2012, the Peruvian economy showed average growth rates of 6.4%. According to data from the Ministry for the Economy, little more than 40% of the economic growth in the last few years is accounted for by productivity improvements (see Figure 100). In this period, productivity in Peru went up at a rate of around 2.6%, one of the biggest growth rates in Latam. In addition, between 2006 and 2011 growth in the country's labour productivity was greater than that of its main trading partners, with the exception of China (see Figure 101). Despite the favourable performance in the last few years, productivity in Peru is still low and only represents 16% of the US level, which indicates that there is still ample potential for achieving improvements with educational reforms, favourable conditions for formalising the economy, extending financial inclusion and greater trade openness, among other measures.

In the manufacturing sector, productivity improved (measured as real manufacturing GDP divided by urban employment in industry) in the 2002-12 period by around 25% (see Figure 102). Between 2002 and 2007, average YoY increase in productivity was 2.7%, similar to the 2008-12 period. The years with the greatest productivity gains were 2008 and 2010 (2009 was affected by the international crisis) with rates of 5.0% and 10.7% respectively. In the same years, non-primary manufacturing GDP registered YoY variations of 8.9% and 16.9% respectively (see Figure 103).
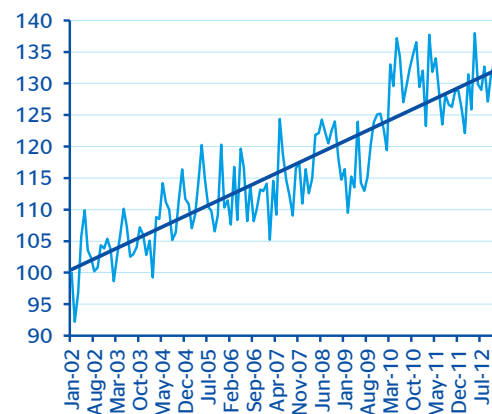
Figure 100
Contribution to growth of labour GDP
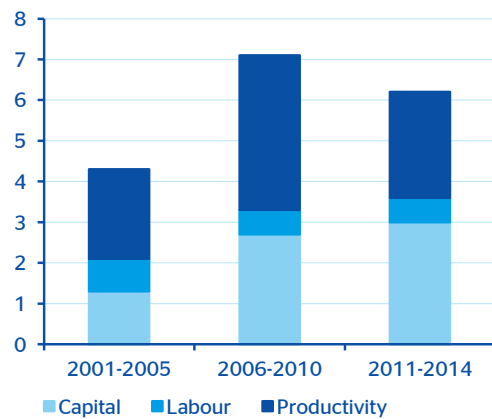
Source: MEF.

Figure 101
Productivity growth 2006-11 in Peru and its trading partners
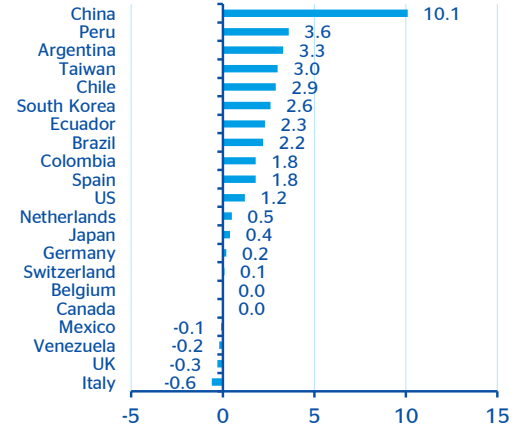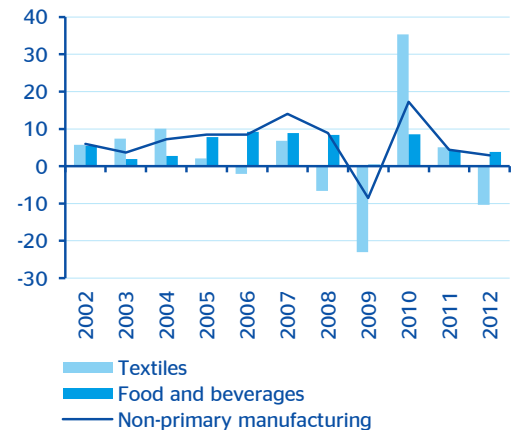

Source: The Conference Board 2012.

Figure 102
Productivity Index in manufactured goods

Source: BCRP, MTPE and BBVA Research.

Figure 103
Non-primary manufactured goods, textiles and food and beverages (% Var. YoY)

Source: BCRP.

In terms of unit labour costs, these showed a declining bias over the 2002-07 period and were then largely stable in subsequent years (see Figure 106). Productivity gains (shown above), together with lower or stable labour costs, strengthened the Peruvian export industry against its competitors. However, we should remember that labour cost behaviour differs from industry to industry. In fact, in the 2007-12 period, some regions and sections showed pressure to the upside, due to labour scarcity. For example, in the Ica region, greater demand for labour in the primary sectors of mining and harvesting of asparagus, grapes and other agricultural products, and in the industrial sector, for processing and packing fish and agro-industrial products for export, have enabled the region to enjoy full employment, with the corresponding difficulty in finding spare manpower.

Innovation in manufacturing industry

According to data from the 2012 Manufacturing Industry's National Innovation Survey, 65.5% of companies in this sector conducted at least one innovative activity in the 2009-11 period. In this period, industry invested PEN10.218bn (an average of PEN3.406bn a year), with the principal funding source being the company's own resources. By categories, Manufacturing of Food Products scores highest, with 97.4% of companies attaching greater importance to

developing activities pursuant to innovation (see Figure 104), followed by Pharmaceuticals (82.1%), Beverages (79,4%), Leather and Footwear (75.7%) and Metallurgy (75.5%).

Figure 104
Percentage of companies developing at least one innovative activity between 2009 and 2011
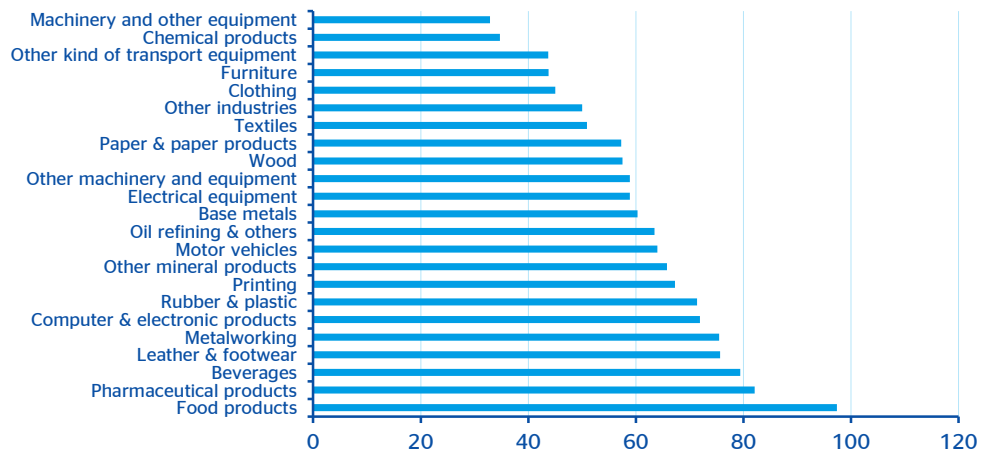

Source: Ministry for Production.

The innovative activity carried out by the biggest number of firms was the acquisition of capital goods (78.9%), representing 80% of the total invested in innovation, followed by training activities (48.7%). Despite this, industry needs higher levels of innovation which include not only capital goods investment, but also research and development, industrial design and engineering and training, amongst others. The main obstacles that companies encounter in introducing innovative activities are the high costs of the same, the lack of qualified personnel, the lack of financing from sources outside the company, the perception of excessive economic risk and market domination by established players, amongst others.

Terms of trade are playing out favourably

In the 2002-12 period, terms of trade have performed favourably for the Peruvian economy, with growth of 56%, and a swift recovery from the fall in the crisis year 2009 (see Figure 105). However, even though terms of trade have improved in the last 10 years, current levels are far off the record peaks that were reached in earlier decades. In the 2002-07 period, growth in terms of trade was 49.3%, whilst in 2008-12 growth was only 4.4%. Given the weight that mining has in Peruvian exports (especially copper and gold) higher metal prices in the period account for a large part of this favourable picture. Improvement in the terms of trade over these years translated into high domestic demand (particularly private investment) and an increase in fiscal resources.

Figure 105
Terms of trade index
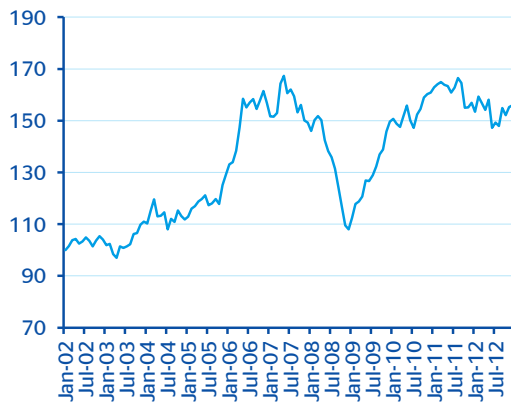
Source: BCR.

Figure 106
Unit labour cost index (real remunerations/productivity average)
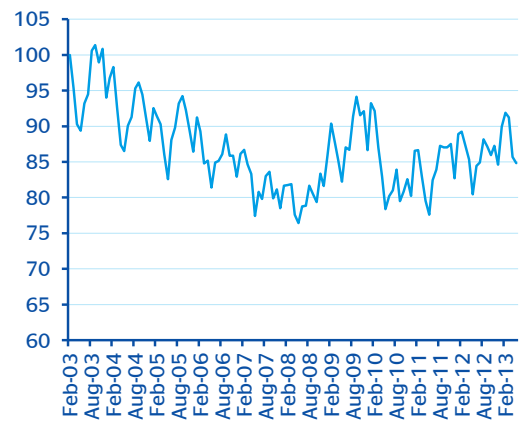
Source: MTPE, INEI and BBVA Research.

The multilateral real exchange rate index, published by the central bank, has shown a variation of -11.3% in the last five years and of -9.2% in the 2002-12 period (see Figure 107). However, over the same period, non-traditional exports grew by 33.9%. The behaviour of these variables may be a reflection of improved industrial productivity.

Figure 107
Multilateral real exchange rate (2009 index=100) and non-traditional exports (USDmn)

Non-traditional exports (lhs) — Multilateral real exchange rate (rhs)
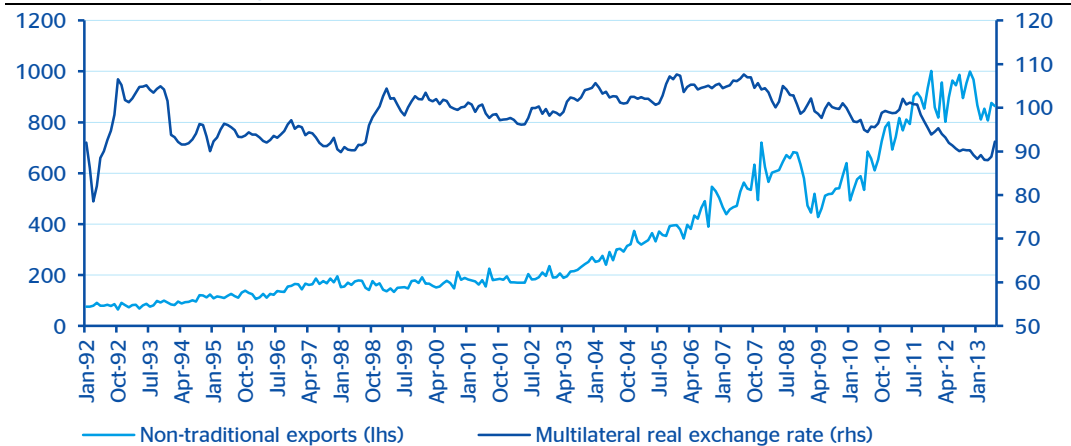
Source: BCRP.

Trade openness and access to new markets

In the last few years, Peru has developed a policy of trade openness which is exemplified by the trade deals it has signed with a number of countries and trading blocks, amongst them the World Trade Organisation, the Andean Community, Mercosur, the Asia-Pacific Cooperation Forum, Chile, Mexico, the US, China and Japan, amongst others. As well as signing commercial treaties, in 2007 it reformed its customs duties, eliminating the duty on around 70% of imports, generating lower costs for inputs and capital goods (see Figure 108).

Figure 108
Customs duties (%)

— Average nominal tariff
— Effective tariff
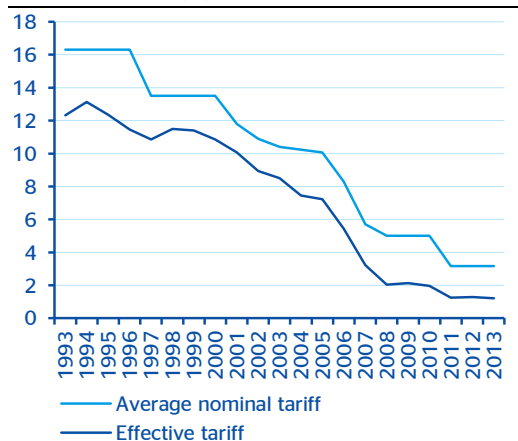
Source: MEF.

Figure 109
Global Competitiveness Index (positions)
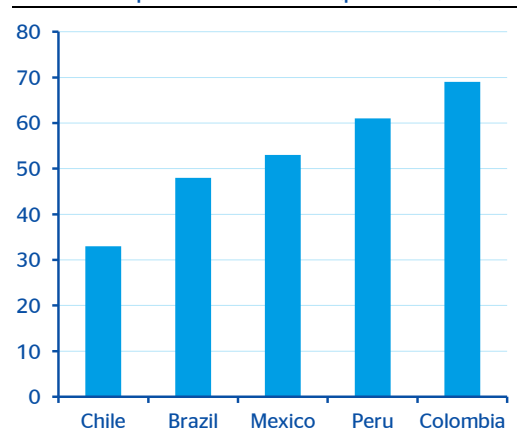
Source: WEF.

Improving the environment for doing business and the ease of starting

The 2012-13 Global Competitiveness Index put Peru in 61st place out of a total of 148 countries analysed for their competitiveness. Although this position is a major improvement on its scoring in 2007, when it was in 86th place out of a total of 131 countries, it is still below countries such as Chile, Brazil and Mexico (see Figure 109). Areas in which Peru scores most highly are: development of its financial markets, efficiency of the labour market, market size and macroeconomic environment. The factors showing the biggest improvement in the 2007-12 period are labour market efficiency and goods market efficiency.

In the 2012 measurement, the factor causing the most difficulties when doing business was corruption, followed by inefficient state bureaucracy and tax regulations. Both in the 2007 measurement and in 2012, Peru lags far behind in innovation, with poor levels of R&D spending and low quality scientific institutions. As the data presented in the second section of this paper show (see Figure 15), Peruvian high, medium and low tech export products are a residual percentage of total exports throughout the period analysed.

When it comes to the ease of starting a business in Peru, according to data from the *Doing Business* report, by 2012 it took only a third of the time it did at the beginning of the period in 2002 (see Figure 114), and the number of procedures was only five, less than those required in countries such as Mexico, Brazil, Argentina, Venezuela and Bolivia. Furthermore, the cost of starting a business as a percentage of per capita income is 11.9%, similar to that in Argentina, although higher than in Brazil (5.4%) and Mexico (11.2%).

Exporting is faster, but infrastructure is still lacking

According to the *Doing Business* report data, exporting a standard container of merchandise requires six documents, costs USD860 and takes 12 days, ten less than in 2005 (see Figure 110). Worldwide, Peru is 56th in the ranking of 183 in terms of the ease of doing cross-border trade.
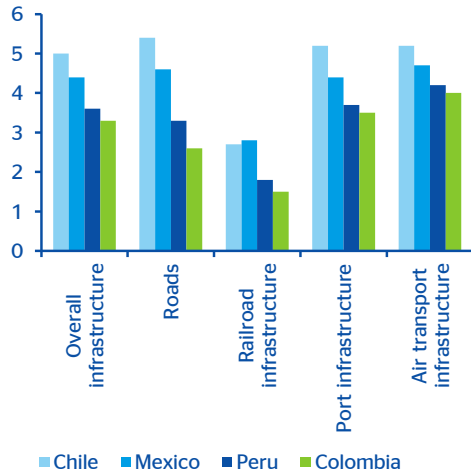
Figure 110
Time required for exporting and importing (days)
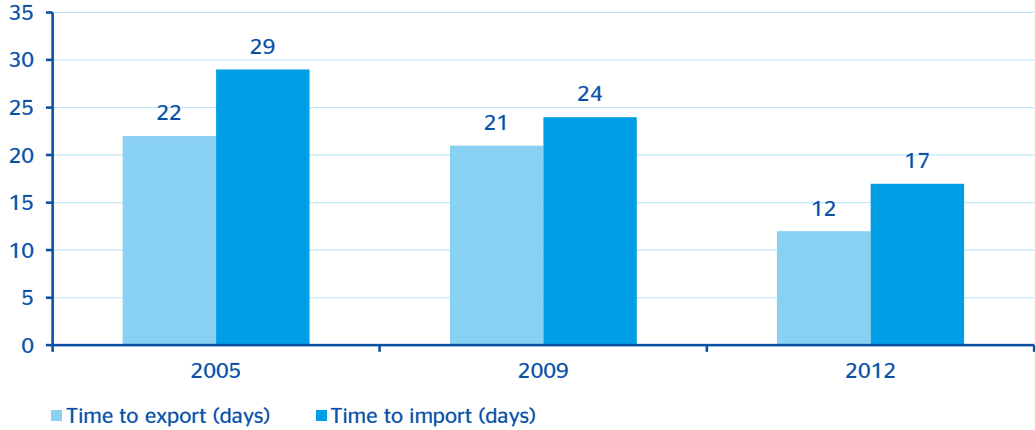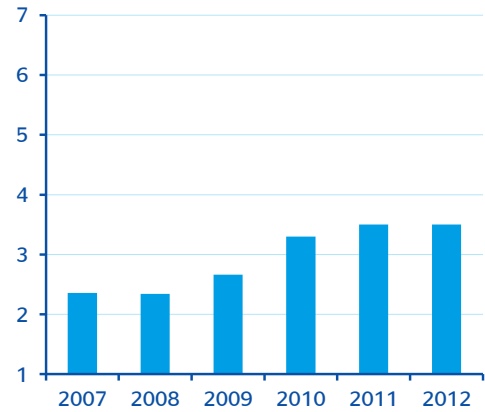

Source: World development indicators.

However, although infrastructure quality seems to have improved in the last few years (see Figure 112), it still cannot be compared to international standards of development and efficiency. Of the Pacific Alliance countries (Chile, Mexico, Colombia and Peru), it is second-to-last in terms of the quality of its infrastructure (see Figure 111). For example, only 14% of its trunk roads are asphalted, which, when added to the traffic problems caused by other road deficiencies, results in significant time losses and higher costs.

Figure 111
Infrastructure competitiveness (7=best)

Source: WEF.

Figure 112
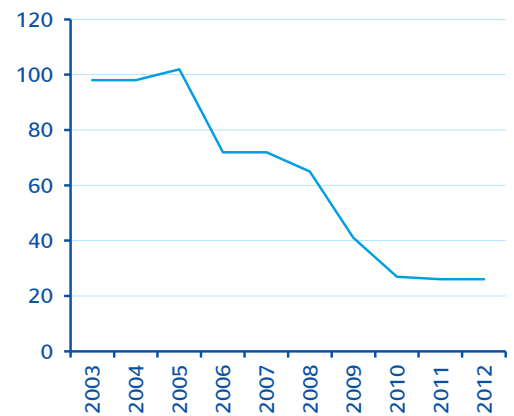**Port infrastructure quality and efficiency by international standards (1=very precarious; 7=well developed)**

Source: WEF.

Figure 113
Logistics performance index (1=lowest, 5=highest)

Source: WEF.

Figure 114
Time required to start a business (days)



Source: World development indicators.

# Companies have more access to banking credit and at a lower cost

Over the last ten years, the ratio of the banking system's credit as a percentage of GDP has gone up from 19% to 27%. In the case of companies, access to credit in the financial system is relatively easy for the bigger ones, whilst for the small and micro-companies it is more difficult to access banking loans, to a large degree because of the informal sector. The number of companies borrowing through the banking system has gone up by 160% in the 2002-12 period (see Figure 115) and, according to the corporate survey conducted by the BCR, the index for access to credit is in optimistic territory, particularly for companies in the agricultural, fishing and commercial sectors. Furthermore, the cost of financing as offered by banks to companies has gone down considerably in the 2002-12 decade, particularly in the first five years of that period (see Figure 116).

Figure 115
Number of companies with bank loans
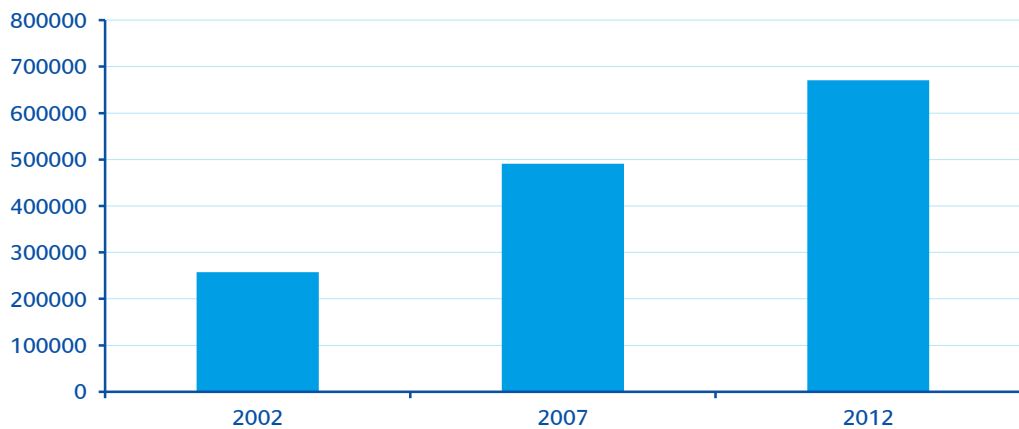
Source: SBS.

Figure 116
Banking system interest rates (%)

Interest rate for large companies

Interest rate for small and micro-companies
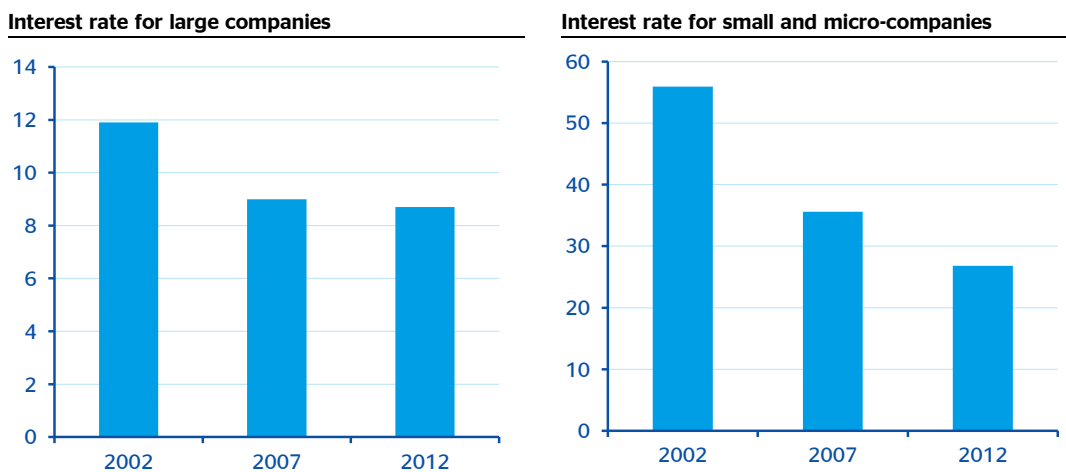
Source: BCR.

Conclusions

In our view, data on Peruvian export performance shown at the beginning of this paper and the analysis carried out in this section suggest that Peruvian manufacturing has gained competitiveness in the last decade, despite differences between sectors and the problems faced recently (appreciation of the exchange rate and higher labour costs, for example).

Likewise, factors such as productivity increases, favourable terms of trade, policies of commercial openness (including reduction of duties and free trade treaties with several countries) and an easier business environment, among others, explain the increase in the industry's competitiveness. However, despite the improvements in these indicators, there are still many areas left for development. Among the most important issues still pending in order to gain competitiveness are infrastructure improvements, strengthened institutions and better education.

9. Closing comments

After relatively favourable progress between 2002 and 2007, the manufacturing sector's competitiveness as shown by international trade data went down on the whole between 2007 and 2012 in Latin America. This recent deterioration, which has been more pronounced in countries like Brazil and Colombia, is linked to a continued higher exchange rate, labour cost pressures and not enough labour productivity gains.

The main exception to these regional trends is Mexico, where competitiveness gains in the manufacturing sector continued beyond 2007, partly because the exchange rate was more depreciated and both labour costs and labour productivity performed more favourably than in South American countries. Nevertheless, from 2011 the reversal of these trends has been making it difficult for the Mexican manufacturing sector to gain competitiveness.

This analysis shows that the exchange rate, labour costs and work productivity were the main determinants in the changes in manufacturing competitiveness in the last decade. In general, in the countries and periods where these variables performed well there has been market share gain in international trade and increased competitiveness. To the contrary, when the performance of these variables was poor, there was a loss of competitiveness of the goods manufactured.

We should notice how these variables move jointly. In general, but mainly in South America, exchange rate appreciation was accompanied by greater pressures from labour markets. This correlation may be linked to the increase in primary product prices and, consequently, in the terms of trade, in line with the Dutch disease theory.

Despite the role played by the exchange rate, labour costs and labour productivity, we should not reach the conclusion that the impact of the other variables affecting the manufacturing sector's competitiveness was unimportant. The countries which have succeeded in improving their institutional environment, and reduced or kept under control logistics and energy costs, were those which lost the least competitiveness in the last five years and which gained most in the 2002-07 period. This was the case of Chile and Peru.

Finally, the recovery of growth among developed countries, although gradual, and the withdrawal of monetary stimuli introduced in earlier years by the US Federal Reserve could put an end to (or at least considerably slow down) the processes of real exchange rate appreciation in the region's countries and of competitiveness loss in manufacturing sectors. In this environment, a better institutional framework, more and better infrastructure, appropriate tax burdens and increased human capital through education and healthcare, among other factors, will help to create margins for a new period of increasing industrial competitiveness.

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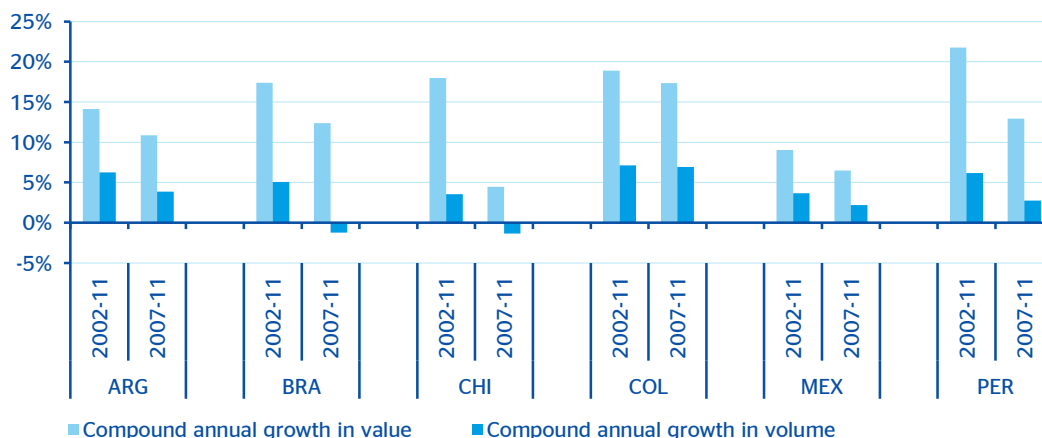
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Appendix

Gráfico A.1
Compound YoY growth of exports' value and volume

Source: WITS and BBVA Research

Tabla A.1
Sector share in total exports (%)

	Argentina			Brazil			Chile			Colombia			Mexico			Peru		
	2002	2007	2012	2002	2007	2012	2002	2007	2012	2002	2007	2012	2002	2007	2012	2002	2007	2012
Animal products	7,0	6,9	5,5	5,7	5,9	4.3	10.3	6,2	6,8	1,3	1,8	0.4	0.7	0.7	0.8	2.7	1,8	1,7
Vegetable products	24.5	30.8	28,2	10.8	10.6	14.8	14.9	7,6	9,5	20.7	15,7	10.3	2.4	2.7	3,1	11,1	7,5	10.8
Food products	15,0	16,9	18,7	12.9	10.2	11,6	8,7	4.8	5,1	4.3	3,8	1,8	2.2	2.4	2.4	16,9	7,8	8,2
Mineral products	1,8	2.6	3,0	7,9	13,7	20.0	12.0	24.9	26,2	0.9	0.7	0.2	0.4	0.8	1,6	18,9	36,7	36,5
Fuels	18,4	11,8	8,4	3,3	6,5	11,2	1,4	1,3	0.4	39,2	37,8	65,7	9,0	14.6	13,9	6,1	9,0	11,7
Chemical products	5,6	5,6	7,7	4.7	4.9	5,2	6,0	3,6	4.8	6,0	4.9	1,7	2.3	2.5	2.6	2.3	1,8	1,9
Plastics and rubber	3,2	2.7	2.4	2.5	3,1	2.3	1,3	0.8	1,0	3,2	4.4	2.2	1,6	2.1	2.3	1,1	1,1	1,2
Hides and skins	3,4	2.1	1,3	1,8	1,4	0.8	0.2	0.1	0.1	1,2	0.9	0.3	0.2	0.1	0.1	0.3	0.1	0.1
Wood products	1,9	1,7	1,0	7,4	5,8	4.0	13,3	7,7	6,9	2.4	2.8	0.5	0.8	0.8	0.6	2.4	1,3	0.9
Textiles	1,6	1,0	0.8	1,9	1,4	1,5	0.7	0.3	0.1	5,6	5,1	1,1	6,3	2.7	1,7	10.3	5,8	3.5
Footwear and headgear	0.1	0.1	0.1	2.8	1,3	0.5	0.1	0.1	0.0	0.2	0.3	0.0	0.2	0.1	0.2	0.1	0.1	0.1
Stone and glass	0.4	0.4	2.9	2.3	1,8	1,2	1,1	1,5	1,6	3,9	4.3	6,9	1,6	2.2	3,8	7,8	9,1	12.4
Metals	6,0	4.7	3.5	9,7	10.7	6,9	26,4	38,9	35,8	3,9	9,0	2.8	3,6	5,1	3,9	18,1	16,7	9,8
Machinery and electrical equipment	3,1	3,2	2.6	12.0	10.3	6,4	1,1	0.8	0.7	1,8	3,1	0.8	37,8	36,9	33,9	0.8	0.6	0.5
Transport equipment	6,0	8,6	12.9	11,0	9,9	6,4	1,1	0.6	0.3	1,7	2.7	2.7	19,1	16,6	19,8	0.1	0.0	0.1
Miscellaneous	1,5	0.8	0.4	2.0	1,3	0.9	0.6	0.2	0.1	0.9	1,1	0.4	8,2	6,9	7,0	0.5	0.3	0.2

Source: WITS and BBVA Research

Tabla A.2
Compound YoY growth of exports by sectors (%)

	Argentina		Brazil		Chile		Colombia		Mexico		Peru	
	'02-12	'07-12	'02-12	'07-12	'02-12	'07-12	'02-12	'07-12	'02-12	'07-12	'02-12	'07-12
Animal products	8,5	-0.6	11,7	-0.4	10.8	3,1	2.3	-19,5	10.5	10.7	14.5	5,6
Vegetable products	12.9	2.3	18,6	13,6	10.5	6,1	8,3	2.1	12.0	9,6	19,3	14.8
Food products	13,8	6,3	13,7	9,2	9,4	2.3	6,6	-3,8	10.4	6,9	11,3	7,8
Productos minerales	16,9	6,7	26,1	14.5	25,0	2.5	-2.4	-17,4	26,5	22.1	27,8	6,6
Mineral products	3,0	-2.7	29,8	18,4	1,2	-20.9	22.3	24.2	14.0	5,6	27,8	12.7
Fuels	14.9	11,0	15,9	7,5	13,2	7,5	2.2	-10.2	10.7	7,6	17,5	8,4
Chemical products	7,9	1,6	13,6	0.0	13,1	8,2	11,9	-3,1	13,2	8,5	20.0	8,3
Plastics and rubber	1,3	-4.8	5,7	-5,1	3,0	-4.9	1,5	-9,7	4.9	5,3	8,9	-0.1
Hides and skins	4.7	-5,9	8,0	-1,4	8,2	-0.9	-1,0	-21,9	6,1	1,2	7,7	-1,4
Wood products	4.4	-0.2	11,6	7,2	-1,5	-11,9	-1,1	-18,0	-4.1	-2.0	7,6	-3,4
Textiles	11,5	0.0	-3,4	-12.0	-1,1	-38,5	-3,7	-31,4	6,2	14.7	22.2	3,7
Footwear and headgear	34.7	51,9	8,2	-1,8	19,8	2.5	23,1	22.4	18,7	19,4	25,3	13,8
Stone and glass	5,6	-1,5	11,1	-2.5	19,1	-0.3	12.3	-12.1	9,9	1,2	12.6	-4.0
Metals	9,3	-0.2	8,0	-3,4	10.0	-2.4	6,7	-15,7	8,0	4.9	13,7	0.7
Machinery and electrical equipment	20.2	12.8	8,9	-2,6	1,8	-11,2	21,1	10.5	9,5	10.5	20.2	43,2
Transport equipment	-1,3	-7,8	5,7	-1,8	-0.5	-2.9	7,3	-9,2	7,5	7,0	9,1	-1,7

Source: WITS and BBVA Research

Gráfico A.2
Argentina: main exported products, YoY growth (%) between 2007 and 2012*
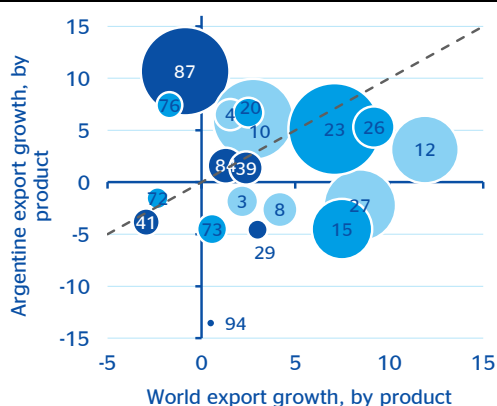
Gráfico A.3
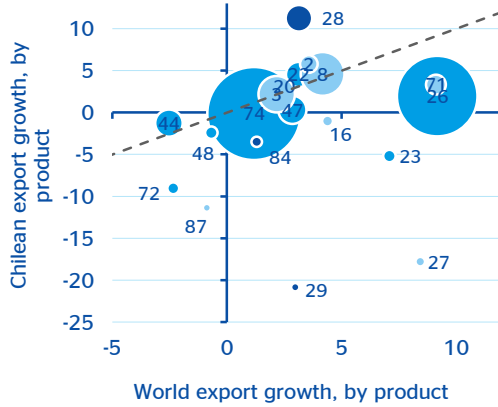## Brazil: main exported products, YoY growth (%) between 2007 and 2012*
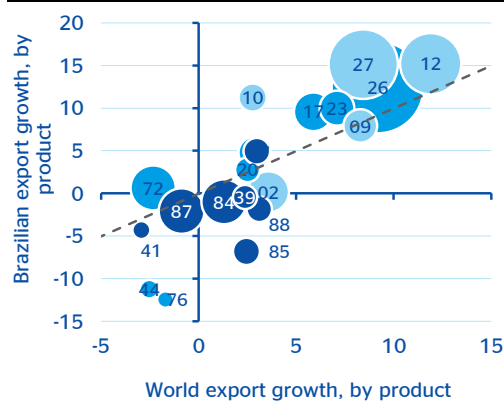
* The bubble size shows the product's share in the country's exports and colours classify the products by: ● Primary, ● Basic manufactured goods, ● Non-basic manufactured goods. In addition, each product is identified by two HS 2002 classification digits. Above the 45º line, product exports have grown more in the country than in the world, and as such the country has increased its share of world exports.

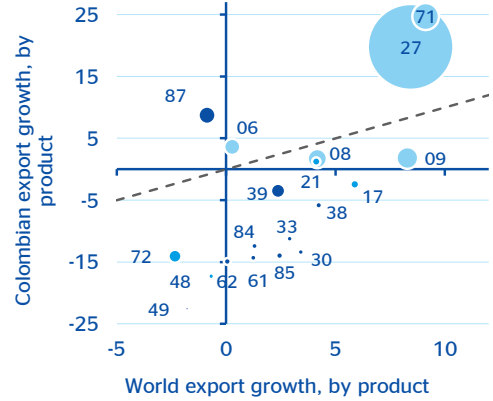Source: WITS and BBVA Research   Source: WITS and BBVA Research

Gráfico A.4
Chile: main exported products, YoY growth (%) between 2007 and 2012*
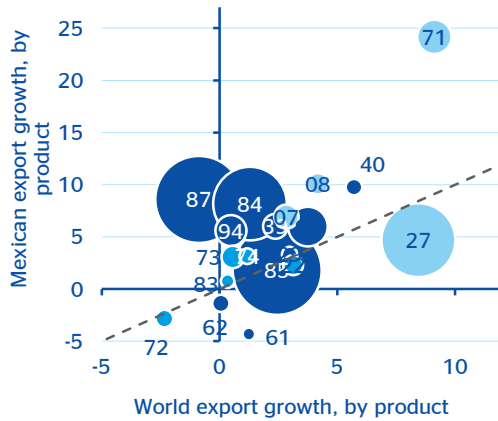
Gráfico A.5
Colombia: main exported products, YoY growth (%) between 2007 and 2012*

Gráfico A.6
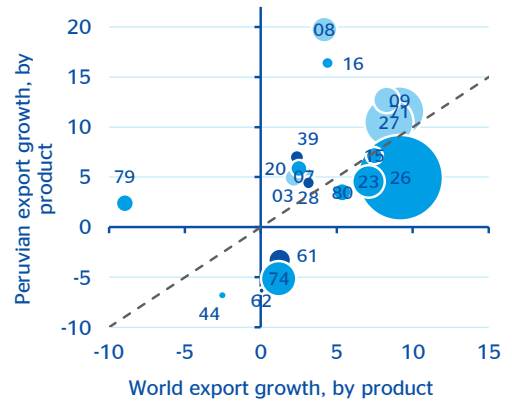### Mexico: main exported products, YoY growth (%) between 2007 and 2012*

Gráfico A.7
Peru: main exported products, YoY growth (%) between 2007 and 2012*

* The bubble size shows the product's share in the country's exports and colours classify the products by: ● Primary, ● Basic manufactured goods, ● Non-basic manufactured goods. In addition, each product is identified by two HS 2002 classification digits. Above the 45º line, product exports have grown more in the country than in the world, and as such the country has increased its share of world exports.

Gráfico A.8
Argentina: YoY growth (%), by export markets 2002-12*

● Country share in Argentine exports
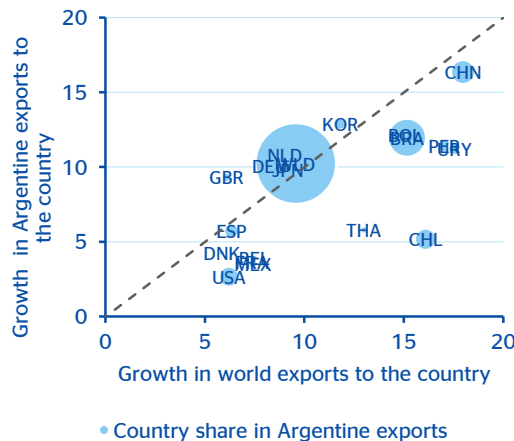
Gráfico A.9
Argentina: YoY growth (%), by export markets 2007-12*

● Country share in Argentine exports
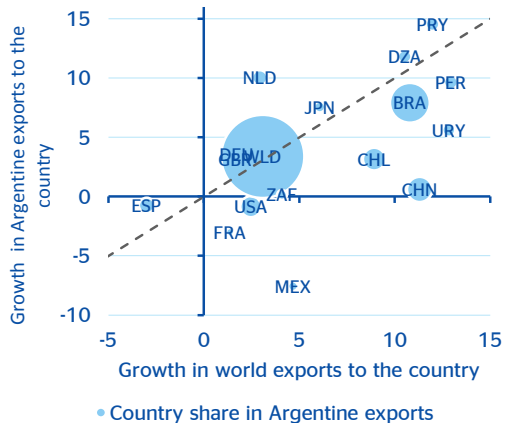
Gráfico A.10
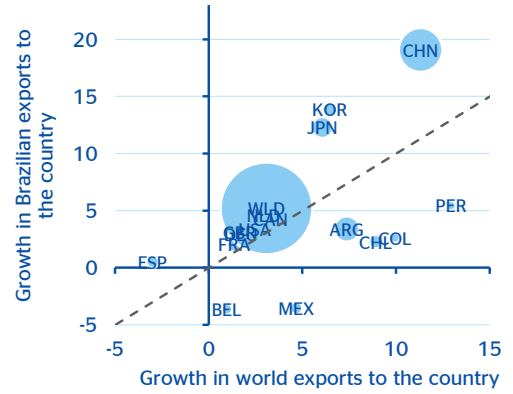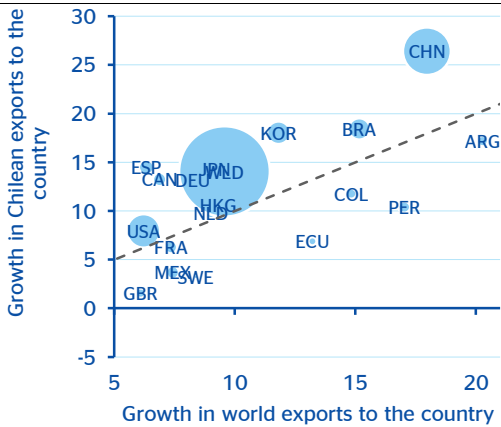**Brazil: YoY growth (%), by export markets 2002-12***
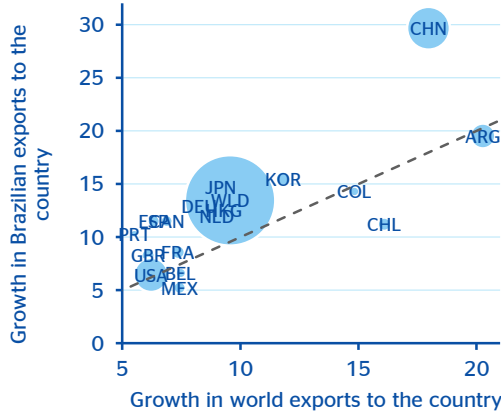
Source: WITS and BBVA Research

Gráfico A.11
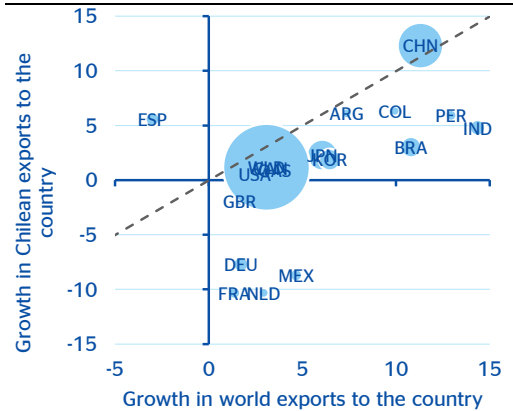**Brazil: YoY growth (%), by export markets 2007-12***
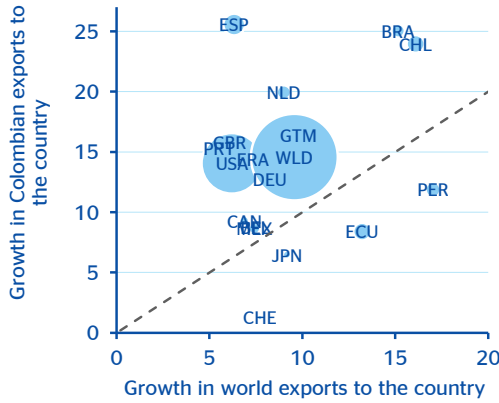

Source: WITS and BBVA Research

Gráfico A.12
Chile: YoY growth (%), by export markets 2002-12*

Gráfico A.13
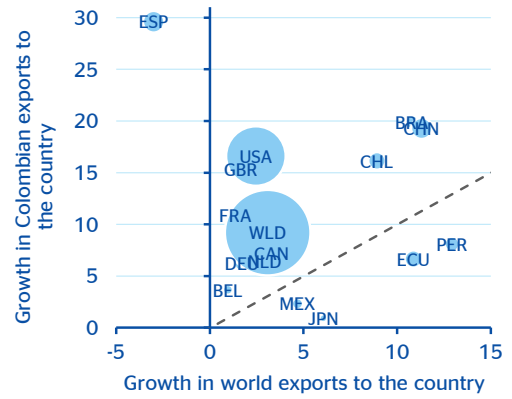**Chile: YoY growth (%), by export markets 2007-12***

* The bubble size shows the product's share in the country's exports. Above the 45º line, product exports have grown more in the country than in the world, and as such the country has increased its share of world exports.

Source: WITS and BBVA Research

Source: WITS and BBVA Research

Gráfico A.14
Colombia: YoY growth (%), by export markets 2002-12*
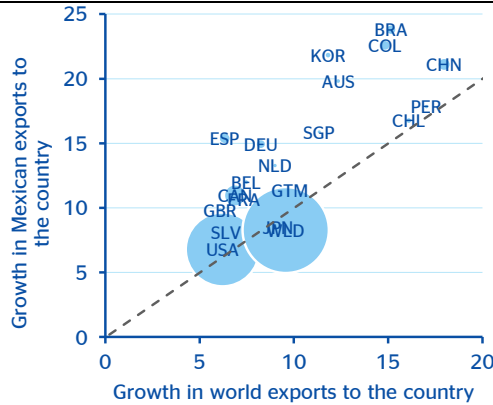

Source: WITS and BBVA Research

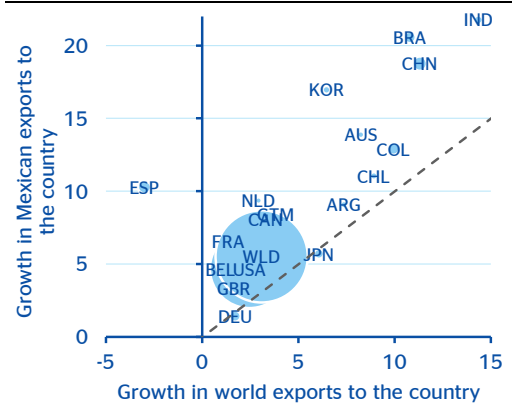Gráfico A.15
Colombia: YoY growth (%), by export markets 2007-12*

Source: WITS and BBVA Research

Gráfico A.16
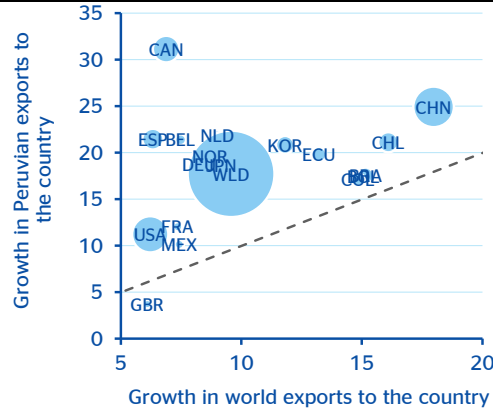**Mexico: YoY growth (%), by export markets 2002-12***

Source: WITS and BBVA Research

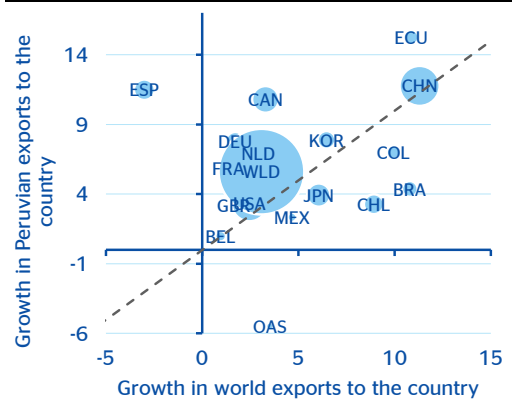Gráfico A.17
Mexico: YoY growth (%), by export markets 2007-12*

Source: WITS and BBVA Research

Gráfico A.18
Peru: YoY growth (%), by export markets 2007-12*

Source: WITS and BBVA Research

Gráfico A.19
Peru: YoY growth (%), by export markets 2007-12*

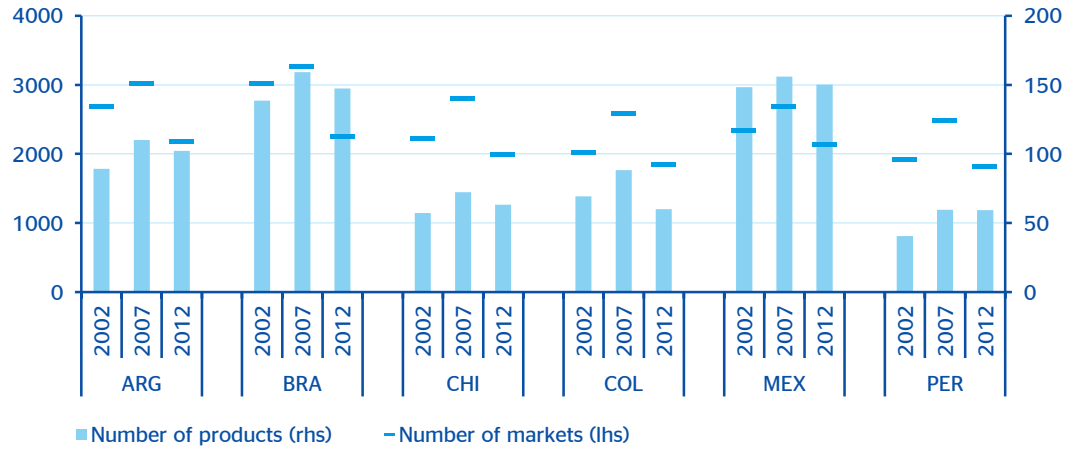.* The bubble size shows the product's share in the country's exports. Above the 45º line, product exports have grown more in the country than in the world, and as such the country has increased its share of world exports
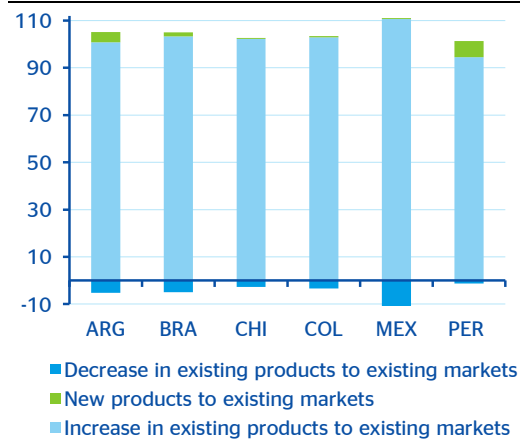
Source: WITS and BBVA Research

Gráfico A.20
Performance of the number of products and markets

■ Number of products (rhs)　− Number of markets (lhs)

Source: WITS and BBVA Research

Gráfico A.21
Breakdown of export growth in the intensive and extensive margins 2002-12

■ Decrease in existing products to existing markets
■ New products to existing markets
■ Increase in existing products to existing markets

Source: WITS and BBVA Research

Gráfico A.22
Breakdown of growth in export growth in the intensive and extensive margins 2007-12

■ Decrease in existing products to existing markets
■ New products to existing markets
■ Increase in existing products to existing markets
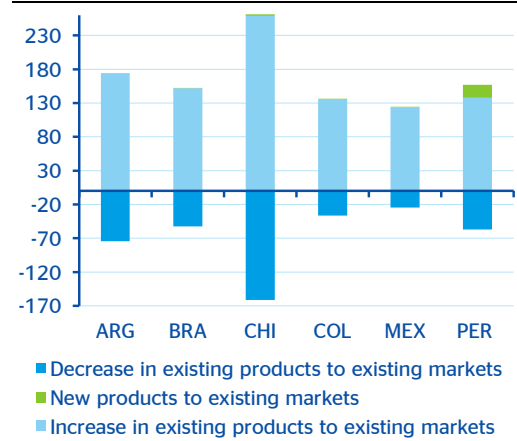
Source: WITS and BBVA Research

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