Dutch Disease in Latin American countries: De-industrialization, how it happens, crisis, and the role of China

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June 2014

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Abstract

This study investigates if and how different episodes of large net inflows – export boom, remittances, FDIs, or aid – caused Dutch disease in Latin American countries. We investigate this disease – i.e. the decline of manufacturing output – with special reference to the channels through which it works, to the crisis period and to the role of China for LAC. The study conducts analyses at the 3-digit International Standard Industrial Classification level for manufacturing industries. Our results robustly suggest that export, aid and remittances booms may indeed have an adverse impact on the rate of growth of exportable industries. The exchange rate overvaluation has proven to be the channel through which these capital booms induced decline of manufacturing output growth, but only after the work monetary and fiscal policies is considered. The crisis likely softened the Dutch disease effects in LAC. We find China exporting manufactures to some of the LAC does not significantly affect the manufacturing growth of other fellow LAC, but depending on the type of manufacture industry and country considered China may play a negative or positive role for LAC's manufacturing through the work on third-market competition: Mexican manufacturing suffering significant negative impacts while for the rest of Latin American countries studied the effect of China may be positive.

Keywords: Dutch disease, manufacturing value added, excess appreciation, Latin America.
JEL classification: O14, N66.

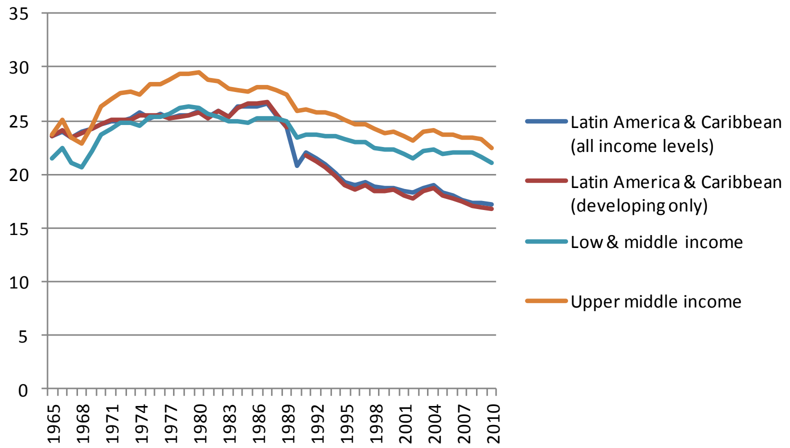
Acknowledgement: This research is one of the studies selected by the IDB Call for Research Proposals: Macroeconomic and Financial Challenges Facing Latin America and the Caribbean after the Crisis. Financial support from IDB is gratefully acknowledged. We thank comments received at the IDB kick-off workshop. Thanks also an anonymous referee for many insightful comments, and to Ketty Rivera for proficient research assistance.

1. Introduction

Countries that have grown rapidly in the past thirty (East Asia and the Pacific) have done so developing their manufacturing industries and having an export-oriented production, while in the past few years (1995-2007) in Latin American countries (hereafter LAC) manufacturing de-industrialized and reached just a modest per capita GDP growth– despite policy efforts to protect and develop these industries (See UNIDO 2013, chapter 1, and UN WIDER 2013).

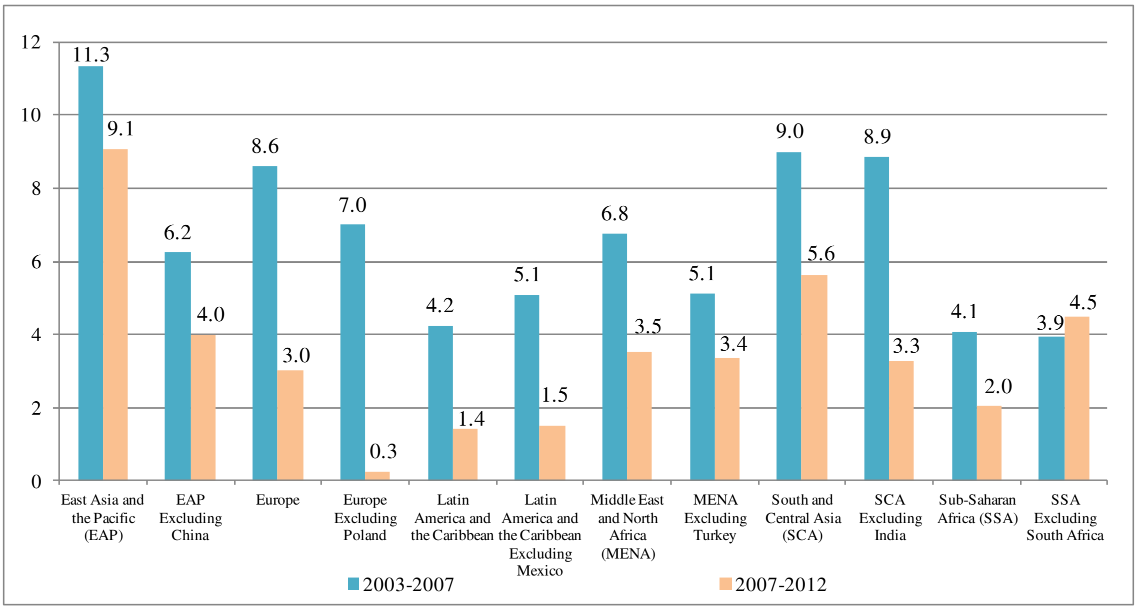
Indeed, as Figure 1 suggests, the decline of LAC manufacturing has been likely faster than that of the remaining developing world: since mid-1980s, the share of manufacturing value added in GDP in LAC fell by about a third, compared to a decline of less than 10% in the remaining developing world; and, in the last decade, the average growth rate in manufacturing value added in LAC decelerated from 4.3 percent (in the period 2003-2007) to 1.4 percent (2007-2012), more than in any other region of the world (See Figure 2). Although the 2008 world economic crisis may explain the reduction in growth around the world in late 2000s, there seems to be more on the story for LAC.

Figure 1 – Manufacturing, value added (% of GDP) in LAC



Source: World Development Indicators

Figure 2 - Manufacturing value added growth rate, by region, 2007–2012



Source: UNIDO, Industrial Development Report 2013, Sustaining Employment Growth: The Role of Manufacturing and Structural Change, p. 179, table 10.6.

At the same time, in the last two decades, several Latin American countries experienced episodes of large net foreign inflows either through oil/mineral export boom, other commodities export booms, remittances, FDIs, or aid.[1] Table 1 shows that in the last twenty years exports represent a considerable and increasing share of GDP. For instance, for Argentina, export share in GDP increases from 6.7 percent (1990-1995) to 22.7 (2002-2007) to 18.8 (2008-2011) percent, or for Bolivia in the same periods, from 16.6 to 27.7 and to 37.8 percent, respectively. In almost all of these countries the top-ten export products explain most of these shares. Among the top-ten exports products are commodities.

[1] Some LACs have been on and off recipients of other types of inflows, namely, portfolio inflows (equity and debt). But we do not consider those inflows as they are rather volatile and tied to short-run issues. Here the concern is with medium-/long-run issues of manufacturing growth.

Table 1 - Net Inflows in LAC, 1990-2011 (Share of GDP; average per 6-year period, %)

Exports

Period	AR	BO	BR	CH	CO	EC	MX	PN	PR	UR
1990-1995	6.70	16.64	7.77	22.72	13.78	17.02	14.38	7.11	10.06	12.93
1996-2001	9.00	16.20	7.51	21.57	11.99	20.18	27.73	6.53	11.48	10.54
2002-2007	22.65	27.72	12.94	32.53	14.03	22.52	25.13	6.30	19.99	18.76
2008-2012	18.79	37.81	10.35	32.38	15.32	27.10	28.62	n.a.	23.55	17.80

Source: Own calculations using data from UN (COMTRADE) and WB (WDI).
Notes: 1) n.a. = not available**. 2)** For Panama (2002-2005). **3)** Notice that the last period includes the 2008 world economic crisis that greatly affected exports around the world.

Exports (top 10)

Period	AR	BO	BR	CH	CO	EC	MX	PN	PR	UR
1990-1995	3.33	12.52	2.82	13.22	7.12	15.22	6.26	4.31	6.30	6.51
1996-2001	4.30	11.04	2.57	12.73	6.94	16.82	11.46	4.66	7.24	5.53
2002-2007	11.53	22.17	4.47	20.98	8.68	19.22	12.18	4.64	13.38	10.29
2008-2011	9.69	30.67	4.67	22.83	10.79	22.70	14.33	2.92	16.04	9.95

Source: Own calculations using data from CEPAL (CEPALSTAT).
Notes: 1) For Panama (2008-2009). For Uruguay (2008-2010). **2)** Notice that the last period includes the 2008 world economic crisis that impacted negatively commodity trade around the world.

Net Foreign Direct Investment (FDI)

Period	AR	BO	BR	CH	CO	EC	MX	PN	PR	UR
1990-1995	1.31	2.19	0.27	1.92	0.95	1.61	1.63	2.47	2.36	0.76
1996-2001	2.91	9.37	3.46	4.24	2.32	2.17	2.90	7.38	3.25	0.95
2002-2007	1.86	2.35	1.40	3.90	2.62	1.64	2.37	7.45	3.37	4.12
2008-2012	1.64	2.89	2.22	2.73	2.12	0.79	0.86	7.35	4.43	5.77

Source: Own calculations using data from CEPAL (CEPALSTAT).
Note: 1) For Panama (2008-2010). For Peru (2008-2011). For Uruguay (1993-1995).

Aid

Period	AR	BO	BR	CH	CO	EC	MX	PN	PR	UR
1990-1995	0.10	10.36	0.02	0.30	0.23	1.14	0.10	1.31	1.24	0.51
1996-2001	0.03	8.22	0.03	0.13	0.25	0.74	0.02	0.28	0.76	0.11
2002-2007	0.06	7.84	0.03	0.07	0.52	0.52	0.02	0.03	0.62	0.14
2008-2011	0.03	3.61	0.03	0.07	0.37	0.28	0.04	0.31	0.22	0.11

Source: Own calculations using data from WB, WDI.

Net Remittances

Period	AR	BO	BR	CH	CO	EC	MX	PN	PR	UR
1990-1995	-0.05	-0.08	0.30	-0.02	1.09	0.81	1.11	1.32	0.53	-
1996-2001	-0.05	0.81	0.21	-0.02	1.07	4.25	1.45	0.32	1.00	0.20
2002-2007	0.07	3.18	0.35	0.00	2.50	5.56	2.46	0.27	1.51	0.42
2008-2011	-0.06	4.98	0.12	0.00	1.58	4.01	2.26	-0.26	1.67	0.28

Source: Own calculations using data from WB (WDI) and IMF (IFS).
Notes: 1) Net Remittances refers to personal remittances received minus personal remittances paid. Thus a negative number means a net outflow of remittances. **2)** For Chile personal remittances received were zero from 1991 to 1999. **3)** For Uruguay personal remittances paid were zero in 2002. From 1998 to 2001 data belongs to IMF (IFS) and refers to current transfers, credit (Excludes Exceptional Financing) minus current transfers, debit. The second sub-period covers 1998-2001. **4)** For Mexico refers to personal remittances received.

Table 1 also shows the share of net FDI in GDP. There have been important net FDI for Bolivia in particular for the 1996-2001 period when it reached 9.4 percent of GDP (similarly for Brazil, for the same period, net FDI reached 3.5 percent of GDP). Chile and Peru have been recipients of important net FDI throughout the 1996-2012 period (the former reaching its highest share in 1996-2001 with 4.2 percent). Uruguay has also attracted considerable net FDIs since 2002 (reaching 4.1 percent in 2002-2007 and 5.8 percent in 2008-2012).

As expected, aid is a less widespread important net inflow, and its importance has decreased over time, as the region has developed. This type of inflow has been very important for Bolivia with a peak of 10.3 percent of GDP in the early 1990s (1990-1995) and 8.2 percent in 1996-2001, with lower shares in the rest of the period. Aid used to be important for Ecuador (1.1 percent), Panama (1.3), and Peru (1.2) in the 1990-1995 period.

Net remittances are important inflows for some LAC, and with growing importance from the early 1990s to the 2000s, but less so in the late 2000s due to the economic crises in developed countries. This has been the case for Bolivia, Colombia, Ecuador, Mexico, Paraguay, and Peru. For instance, for Paraguay the peak was reached in the period 1996-2001, with remittances representing 3.2 percent of GDP. For Mexico, the share of remittances in GDP increased from 1.1 percent in 1990-1995 to 2.5 percent in 2002-2007. For Ecuador, the peak periods have been 1996-2001 and 2002-2007 with 4.3 and 5.6 percent of GDP, respectively.[2]

[2] Table 2 summarizes the rates of growth for all these types of net inflows, complementing the data on GDP share. From Tables 1 and 2 it can be seen that we include aid and remittances for the sake of completeness given that these net inflows have been important for some of the countries in some of the periods under study. Aid is important for Bolivia, and used to be important for other LAC in the early 1990s. Remittances are important for Bolivia, Colombia, Ecuador, Mexico, and Peru.

Table 2 - Net Inflows in LAC, 1990-2011 (Average rate of growth (%), per 6-year period)

Exports

Period	AR	BO	BR	CH	CO	EC	MX	PN	PR	UR
1990-1995	11.89	6.46	8.27	14.34	8.99	10.35	26.81	11.57	11.35	4.68
1996-2001	4.46	2.63	4.10	3.15	3.44	1.70	12.56	6.98	4.46	0.36
2002-2007	13.41	24.55	18.72	25.39	16.54	20.23	9.58	3.22	27.09	14.74
2008-2012	9.41	22.38	10.80	4.30	16.57	14.14	7.83	n.a.	11.77	15.02

Source: Own calculations using data from UN (COMTRADE).
Notes: 1) n.a. = not available. **2)** For Panama (2002-2005). **3)** Notice that the last period includes the 2008 world economic crisis that greatly affected exports around the world.

Exports (top 10)

Period	AR	BO	BR	CH	CO	EC	MX	PN	PR	UR
1990-1995	8.87	4.02	5.78	14.32	5.87	8.32	17.46	14.66	9.87	4.16
1996-2001	7.64	2.77	4.60	2.17	2.12	0.94	15.27	5.75	5.37	-0.38
2002-2007	14.33	27.58	19.42	30.24	17.12	21.66	10.86	6.20	28.42	14.97
2008-2011	13.69	22.81	25.77	7.73	27.07	15.84	8.78	-20.55	15.01	18.38

Source: Own calculations using data from CEPAL (CEPALSTAT).
Notes: 1) For Panama (2008-2009). For Uruguay (2008-2010). **2)** Notice that the last period includes the 2008 world economic crisis that impacted negatively commodity trade around the world.

Net Foreign Direct Investment (FDI)

Period	AR	BO	BR	CH	CO	EC	MX	PN	PR	UR
1990-1995	22.61	83.56	431.1	41.16	17.51	40.91	43.08	24.58	31.73	26.79
1996-2001	39.21	13.36	56.45	43.48	57.35	-409.2	19.23	35.31	-5.98	13.56
2002-2007	52.69	-125.9	-101.0	24.80	53.21	-10.29	2.11	136.2	39.71	48.05
2008-2012	19.72	14.16	23.88	-8.42	583.61	122.6	-39.02	15.65	13.59	22.44

Source: Own calculations using data from CEPAL (CEPALSTAT).
Note: 1) For Uruguay (1993-1995).

Aid

Period	AR	BO	BR	CH	CO	EC	MX	PN	PR	UR
1990-1995	1.29	7.16	-79.28	9.67	36.93	8.70	23.07	-5.88	5.91	10.40
1996-2001	14.99	3.40	5.14	-6.18	24.91	-0.45	-108.1	1.79	4.51	-19.98
2002-2007	-2.42	-2.91	25.87	-206.9	19.23	5.53	8.46	-84.33	-4.97	26.11
2008-2011	-2.35	12.12	33.34	27.11	10.56	-5.82	78.50	22.54	-111.5	-8.50

Source: Own calculations using data from WB (WDI).

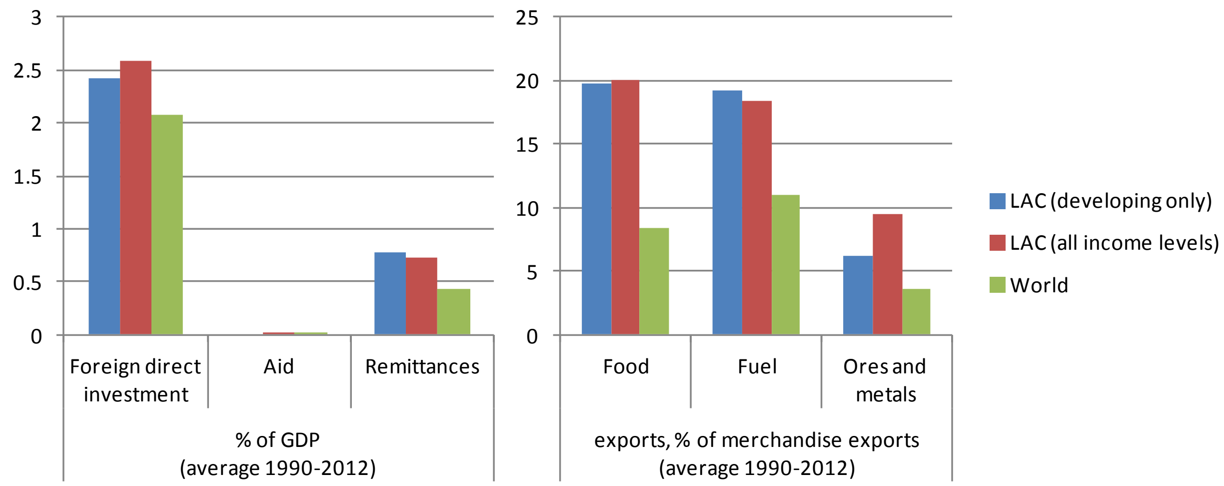
Net Remittances

Period	AR	BO	BR	CH	CO	EC	MX	PN	PR	UR
1990-1995	14.80[2]	0.74[2]	50.45	13.69[2]	21.67	59.65	7.40	1.00	148.43	-
1996-2001	-4.89[2]	2,903	-13.92	0.77[2]	20.91	24.74	15.48	-146.3	1.69	-10.00
2002-2007	15.49	52.88	22.02	-2.69[2]	16.03	15.28	18.57	1.61	23.46	22.43
2008-2011	91.02 [2]	-1.02	-7.76	-22.86[2]	-1.58	-5.95	-2.87	2,661[2]	6.81	0.52

Source: Own calculations using data from WB (WDI) and IMF (IFS).
Notes: 1) Net Remittances refers to personal remittances received minus personal remittances paid, unless otherwise noted. **2)** For these periods and countries, net remittances paid (that is, those are actually outflows of remittances). **3)** For Chile personal remittances received were zero from 1991 to 1999. **4)** For Mexico refers to personal remittances received. **5)** For Uruguay personal remittances, paid was zero in 2002. From 1998 to 2001 data belongs to IMF (IFS) and refers to current transfers, credit (Excludes Exceptional Financing) minus current transfers, debit. **6)** For Argentina (2003-2007, 2010-2011). For Bolivia (1997-2001). For Panama (2009-2011). For Uruguay (1998-2001).

Moreover, as Figure 3 suggests, LAC's inflows in all of those categories has been (well) above the world average. These episodes have likely prompted concerns about the short- and medium-run impacts of those inflows on resource allocation and growth, in particular, about the negative impacts of such inflows on manufacturing development in the region.

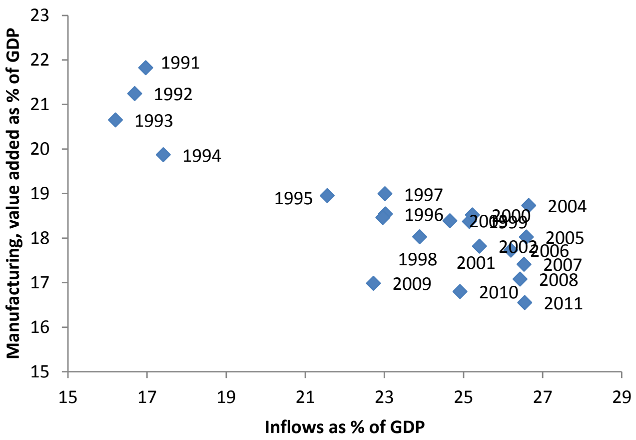
Figure 3 – Inflows in LAC versus the world

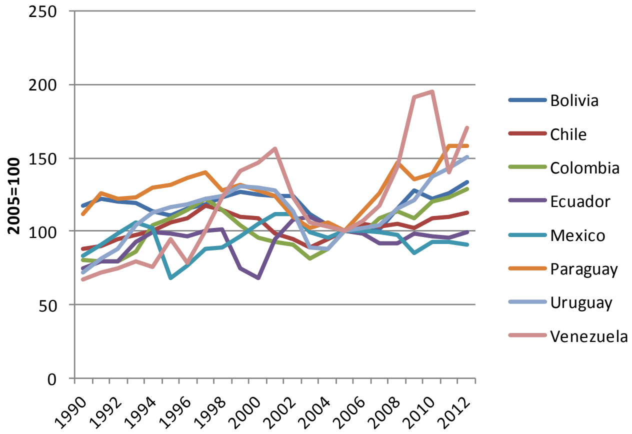


Source: World Development Indicators

The literature has recognized this problem as the "Dutch disease" (hereafter DD)– the apparent relationship between the increase in exploitation of natural resources and a decline in the manufacturing sector, mainly affecting the latter's decline through real exchange rate (RER) appreciation. Subsequent contributions (see, e.g. Corden and Neary, 1982; Ebrahim-zadeh, 2003; Rajan and Subramanian, 2011) relate the Dutch disease to any development that results in a large inflow of foreign currency, including a sharp surge in natural resource prices, foreign assistance, remittances, and foreign direct investment. Figure 4 (left) is drafted to capture this phenomenon: over time (1991-2011), the significance of inflows in LAC increased (sliding from left to right on the scatter), which was likely associated with "crowding out" of the manufacturing sector. That the real exchange rate appreciation may have a role to play for the 'Dutch disease' can be observed on Figure 4 (right), whereby for selected LAC countries an appreciating trend is apparent throughout the entire observed period, but in particular in late 1990s and late 2000s.

Figure 4 – Relation between inflows and manufacturing value added and REER in LAC





Source: World Development Indicators.
Note: In the left figure, each dot represents specific year spanning 1991-2011 for the average inflows-to-GDP/manufacturing value added-to-GDP for all LAC countries. In right hand figure, an increase in the REER (real effective exchange rate) means appreciation.

What might explain these patterns? Assuming that services are less tradable than manufacturing (which is in the substance of a standard Balassa-Samuelson analysis), Figure 4 (left), in fact, suggests that capital inflows and the relative size of tradable sector in an economy are negatively correlated, while Figure 4 (right) that the channel through which this happens may be the real exchange rate overvaluation. However, these are simple correlations and do not necessarily imply causations.

Therefore, the objective of this paper is to provide more persuasive empirical evidence on the effects of different episodes of large net inflows – export boom, remittances, FDIs, or aid on exportable manufacturing output – in Latin America countries. In addition, the paper focuses on explaining if the channel through which this correlation works is the overvaluation of the recipient country's real exchange rate taking into account the role of both policies and China in the last decades.

The paper brings a few novelties compared to the existing literature. First, to our knowledge, the paper is a first empirical effort to investigate the different types of net capital inflows – export, FDIs, aid and remittances – in the context of Dutch disease. Second, the paper identifies the role of policies in the 1990s and 2000s in LACs that ameliorate the DD effects of those net inflows. Finally, the paper puts DD and net inflows relation in the context of the recent crisis and the growing role of China in world trade markets, hence offering evidence if and how their relationships have been affected by both the crisis and the rise of China.

This paper is structured as follows. In section 2, we provide some further insights into the theoretical background and a brief literature review. Section 3 outlines our empirical strategy. In section 4, we present the baseline results. Section 5 presents results on the potential transmission mechanism of the Dutch disease, policy responses, the relation in times of crisis, and the role of China. Section 6 concludes.

2. Theoretical foundations and brief literature survey

Several authors during the late 1970s and early 1980s presented the first theoretical frameworks to explain key developments in an economy undergoing oil, gas or mineral export booms.[3] These theories may also apply to other commodities export booms, and other sources of net transfers such as FDIs, remittances, or aid. One of those key developments is the ensuing fall in output and employment in non-oil tradable sectors, namely, manufacturing sectors –which has been termed the "Dutch disease"[4], the "tradables squeeze" (Corden 1981), or "de-industrialisation" (Corden and Neary 1982).[5]

In a nutshell, considering a small open economy (for simplicity, so world prices are taken as given), as a result of an export boom[6], in the booming sector there is an increase in the marginal product of the mobile factor employed which draws resources out of other sectors – the resource movement effect. The higher real income coming from the boom results in extra spending and to the extent that this extra spending falls also in nontradables there is an increase in their prices (real exchange rate appreciation) which in turn leads to further adjustments–the spending effect (Corden and Neary, 1982). Depending on the assumptions about factor mobility, Corden and Neary (1982) show that both effects, or one of them, may lead to a fall in the tradable (exportable) sector output (assumed all manufacturing) or, a process of de-industrialization. However, under a Heckscher-Ohlin setting (with intersectoral mobility of more than one factor) these authors also show that de-industrialization may not be inevitable.

The analysis of Corden and Neary makes other simplifying assumptions such as no monetary considerations, no government spending, full employment, etc. However, other studies do take into account those and other developments (monetary policy, fiscal policies, unemployment, immigration, international capital mobility, terms of trade effects, static and dynamic effects, etc.) and present frameworks that also lead to the basic outcome of the DD, namely, a reduction in tradable sectors (manufacturing) and increase in nontradables (services,

[3] For a list of these early references see Corden (1984).
[4] According to Corden (1984), the first printed reference to the term "Dutch disease" can be found in The Economist, November 26th 1977, pp. 82-3).
[5] For some countries the squeezed "tradables" may include agriculture.
[6] The framework could be applied to other sources of net foreign inflows.

construction, etc.) in periods of export booms or other international transfer booms (see for instance, Neary 1982, Corden 1984, Cuddington 1989, just to name a few early references).

Concerns about the potentially negative effects of large net foreign exchange inflows on output, prices, wages and growth may be granted. However, to the extent that adjustment in the non-booming tradable and the non-tradable sectors respond to changes in relative prices in the absence of distortions, those great amounts of net inflows need not be considered a disease (Corden and Neary 1982, Van Wijnberger 1984a, Harberger 1987). That is, the long-run outcome of a smaller manufacturing sector and larger nontradable sector (than without inflows) may be an equilibrium outcome.

But, to the extent that manufacturing sector represents a key government objective–for various reasons such as growth, employment generation, reduced volatility, learning-by-doing and the like (Mesquita Moreira 2007, Van Wijnberger 1984b, Krugman 1987), we need to study output adjustments in manufacturing during those inflow episodes.

The empirical evidence on Dutch disease has focused on real exchange rate developments. RER is considered a key channel of transmission of short- and medium-run impacts of inflows on output, employment and wages in the non-booming tradable and non-tradable sectors. Many theoretical and empirical studies document the effects of inflows on the RER (see for instance, Edwards and Ahamed 1986, Harberger 1987, Saborowski 2009, Magud and Sosa 2010 and reference therein cited). Most of them use country level data. We shall focus on developments around the RER to the extent that these developments help explain impacts on manufacturing industry output growth.

While the lackluster growth performance of manufacture in LAC and the concomitant fall in the share of manufacturing value added in GDP has been attributed to endowment and geography, some authors supported the "natural resource curse" and (few) others rejected it. Mesquita Moreira (2007) provides not only a nice summary of these conflicting views but also compelling arguments as to why we must look beyond endowment and geography, and even pass beyond convergence and trade liberalization arguments to explain the lackluster manufacturing performance in LACs. This author emphasizes the role of policies (and government) in industrialization, and discusses the key disadvantages faced by LACs' manufacturing: lack of access to sufficient financing, lack of incentives to invest in human capital and technology, and "most importantly" that LACs have to face formidable competitors, particularly those from East Asia (such as China).

That is, in addition to net inflows booms and RER channel, there has been concerns in the literature that the growth of Chinese exports to the rest of the world may lead to de-industrialization in LAC (Blazquez-Lidoy et al. 2006, Lall and Weiss 2005, and Mesquita Moreira 2007), reinforcing thus the potential DD effects of the export boom in some LAC countries –export boom in turn originated in the great Chinese demand for commodities. [7]

Therefore, this study contributes to the literature providing evidence on the effects of competition from Chinese imports in third parties (as opposed to Chinese imports from LAC) on LAC manufacturing industries, trying to separate out any negative impact on exportable manufacturing from the effects of net inflows booms (the DD) in LAC. The focus on LAC exportable manufacturing is granted since China competes with LAC in the world markets mainly in manufacturing. The main idea is to account for the loss of market share by a LAC country to China in manufacturing products.

But the evidence on the impact of inflows on manufacturing sector developments in developing countries is not abundant, in particular if it uses *industry*- or firm-level data. Among the few studies that present empirical evidence on the decline in manufacturing output due to transfer inflows are Rajan and Subramanian (2008, 2011). These authors focus on aid inflows. Rajan and Subramanian (2008) use a cross country approach, while Rajan and Subramanian (2011) improve on this approach by using industry level data for several countries recipients of aid, thus avoiding the criticisms against country level studies, while dealing with problems that may plague industry level studies. Both document the shrinking effect of aid inflows on manufacturing output growth. Other studies have focused on the impacts of remittances' inflows on manufacturing and service growth. Using a panel data approach with country-level data, Lartey et al. (2008) conclude that the share of manufacturing in total output declines while the share of services increases. Ismail (2010) use a sample of oil exporting countries and industry data to test several implications of booms in oil exports one of which is the negative impacts on manufacturing output, and find that an increase in oil prices considered permanent do indeed have a negative impact on manufacturing output. Vaz and Baer (2014) investigate if over/undervaluation of LAC's currencies has a role to play for manufacturing growth and confirm this role is stronger in LAC than in the advanced economies, the openness and the sectoral import component likely being important elements in explaining this relationship. By using industry-level data our study contributes to this small, but growing number of studies

[7] Given that we study DD symptoms (i.e. negative impacts, or deindustrialization, on non-booming export-oriented manufacture) we focus on impacts on export-oriented manufacturing rather than on manufacture industry in general. According to the literature, the evidence on export growth of China is that trade between China and LAC (bilateral, not third party) is based on the exchange of manufactures and primary commodities between China and LAC respectively. Chinese manufacturing imports may have an impact on import competing manufactures in LAC that are beyond the scope of the present study. Moreover, the estimations shall focus on third-party trade, not bilateral trade between China and LAC.

that effectively seeks to explain manufacturing output developments and their transmission channels in LACs.

3. Methodology and data

3.1 Economic model

We use industry-level data to investigate if industries that typically export more grow slower than industries that typically export less in Latin American countries experiencing large net foreign inflows while accounting for other key economic developments and policies. By using industry-level data, the bias from omitted variables or model specification that plagues cross-country studies is hence diminished. In addition, by focusing on manufacturing industries only, the study can rule out factors that would keep manufacturing underdeveloped as those factors should not affect the differences between manufacturing industries (Rajan and Subramanian 2011, p. 100). The summary analysis of different types of episodes should elicit a classification of episodes and in doing so draw lessons for management of future episodes of Dutch disease.

The econometric approach is based on manufacturing *industry*-level data using the following regression form:

$$vag_{ijt} = \alpha_0 + \beta_1 ism_{ij} + \beta_2 infexp_{ijt} + \alpha_i + \alpha_j + \alpha_t + \varepsilon_{ijt} \quad (1)$$

The dependent variable (vag_{ijt}) is the annual average real rate of growth of value added in industry i in country j in time t. ism_{ij} is the industry i's share of manufacturing in country j in the initial period (hence no subscript t); β_1 is to control for convergence effects; $infexp_{ijt}$ stands for the interaction between the inflow boom to country j and the exportability in industry i in period t. α_i are the industry fixed effects; α_j are the country fixed effects; α_t are the time fixed effects. ε_{ij} is the error term which is assumed to be well-behaved.

As stated above, the dependent variable is the growth rate of value added of the manufacturing industries, in US dollars and is taken from UNIDO. According to the World Bank, manufacturing refers to industries in ISIC divisions 15-37. UNIDO follows this classification. Value added is output minus intermediate inputs. It does not include deductions for depreciation, nor does it include depletion and degradation of natural resources. The classification follows the International Standard Industrial Classification (ISIC), revision 3.

Value added is at the 3-digit ISIC classification, from 151 to 372. We transform value added to real data using the GDP deflator in US dollars.[8]

The inflow boom variable (*inf*) is defined, on a country basis, as a dummy variable taking a value of 1 if the observation in that particular year exceeds a linear country-specific trend, and zero otherwise. Inflow appears in four distinct forms: export, FDI, aid and remittances. While paralleling linear trend may seem naïve, it may actually reveal a capital boom other than the capital inflow developments determined by the long-run economic setting or fundamentals (as determined by the long-run path of the economy). By doing so, we disentangle the boom periods from the normal and bust periods. We believe this distinction is the main advantage of defining boom periods in this way as compared to taking logs or growth rates of the respective variables. Table A8-A11 in Appendix 5 suggest that this method reasonably well identifies those periods in LAC: the export booms are mainly concentrated during the mid-1990s and the pre-crisis 2000s; FDI booms are rather scattered; aid booms are pronounced in the early 1990s; while remittance booms over pre-crisis 2000s.

The exportability covariate (*exp*) tries to capture the export orientation of the industries under study. Under Dutch disease, industries with export orientation should be hurt, the more export oriented they are the more their value added should receive a negative impact in times of net inflows booms. We proxy exportability with a dummy that takes the value of 1 if the industry has the ratio of exports to value added (averaged across all countries in the sample) greater than the median across industries and zero otherwise. This dummy is in turn interacted with the net inflow boom variable of the country in the sample.[9]

Rajan and Subramanian (2011) propose another measure of exportability which is a dummy that takes the value of 1 if the industry is textile, clothing, leather, and footwear –which are industries associated with the growth of developing countries as they move out of agriculture.

β_2, the coefficient of the interaction between the inflow term and the exportability of industry *i*, then captures the effect (Dutch disease) under study: β_2 should be significant and negative to assert the hypothesis that countries that receive more inflows see a more negative impact in industrial sectors that are more sensitive to inflows. Obtaining separate β_2 coefficients

[8] A better alternative for deflator is the PPI (producer price index, total or better yet, for manufacture) but not all countries have the series and even if they do, the indices are not complete for the period under study.

[9] To calculate the ratio of exports to value added we need data on exports at the ISIC level, revision 3, because value added follows this classification. Export data, on the other hand, follows harmonized system (HS). We perform a series of homologations and construct the ratios, and based on the ratios construct the dummy. This dummy is in turn interacted with the net capital inflow variables of the country sample under study.

for the different forms of inflows will help in disentangling if and to what extent they differently affect the decline in manufacturing.

The baseline model (1) is then upgraded to investigate if the effect of capital inflows onto sectoral growth is channeled through currency overvaluation or to provide alternative explanations; to investigate the relationships during the recent crisis; and to investigate China's role for LAC.

3.2 Estimation method

To estimate (1), we start by utilizing the panel fixed effects estimator. However, this may be a naïve approach imperiled to identification problems: the relationship between manufacturing growth and overvaluation may be endogenous, due to both unobserved factors and/or simultaneity (Baltagi, 2008). The relationship between overvaluation and manufacturing growth could be, in fact, a product of the work of a third unobservable factor. For example, consider a country with a reputation of a strong manufacturing base: it is more likely that it has strong currency also. Other factors, like the level of financial intermediation, the work of monetary or fiscal policy, could be factors affecting both manufacturing growth and exchange rate simultaneously. It could also be that industry growth causes some appreciation pressures over those determined by the overall GDP, i.e. over the Balassa-Samuelson effect, especially if industry had a higher growth than the overall economy, in which case an uncontrolled reverse causation would render results biased. Hence, we will make use of the generalized method of moments (GMM) whereby lags of the suspected for endogeneity variables are used to correct for it, as a fairly standard way in the literature to identify the causal relationship overvaluation – manufacturing growth.[10]

3.3 Data

Annual data are used over the period that runs from the early 1990s to the late 2000s to estimate the model set in section 3.1. However, note that the panel is unbalanced, i.e. the value added variable (the dependent variable) is not available for some industries in some countries, for some years. The variables we use in this analysis are collected from the following sources: United Nations Industrial Development Organization (UNIDO) database INDSTAT4 2013

[10] Note that we do not opt to use a dynamic model due to the nature of the dependent variable: it is the growth rate of the value added, which by definition cannot be a persistent variable. As such, it is not suitable for a dynamic model.

which contains value added at the 3-digit level ISIC, rev. 3; ECLAStat database; World Development Indicators of the World Bank; COMTRADE; and, IFS database of the International Monetary Fund. A basic summary statistics of all variables used throughout this analysis is given in Table A12 in Appendix 6.

The countries included are Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Panama, Peru, and Uruguay[11]. Table A13 in Appendix 6 describes the panel used in detail. The restriction that determines the periods for each country is the availability of value added data. On average we have 12 years of data for each country. The data starts in early-mid 1990s (except for Colombia and Panama), and goes until early 2000s for four countries (Argentina, Bolivia, Panama) and late 2000s (2008 or 2010) for the rest of countries (Brazil, Chile, Colombia, Ecuador, Mexico, Peru, and Uruguay). Table A14 describes the panel used, with number of ISIC sectors for each country. In Table A14, the number of times an ISIC sector or industry appears represents the number of years in which the sector appears in the database. For instance, for Brazil most industries (on average 58, out of 61 possible) appear throughout the 15 years of the data available for this country (1996-2010).

4. Results

We present the baseline results in Table 3. The dependent variable is the annual growth in value added in industry *i* in country *j*. We estimate the coefficient of the interaction between the particular type of capital inflow and exportability. Each pair of columns presents the results per inflow type, for exportability index 1 and 2, respectively. In general, majority of the results suggest that value added in exportable industries grows relatively more slowly than for other industries in the countries that receive more capital inflows.

[11] Paraguay has only two years of manufacturing industry value added data. Given that our concern in on growth we do not use Paraguay data in our sample.

Table 3. Impact of capital inflows on manufacturing growth: Core specification

Dependent variable is annual rate of growth of value added in industry i in country j								
	Export boom		**FDI boom**		**Aid boom**		**Remittances boom**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Initial share	-0.926	-0.951	-0.934	-0.935	-0.870	-0.921	-0.913	-0.935
Inflow boom*Exportability1	-24.42***		-4.186		-21.98***		-10.99***	
Inflow boom*Exportability2		-6.742*		2.966		-16.31***		3.672
Constant	-6.4510	-4.2100	-4.5690	-3.9500	-10.4600	-6.1770	-0.9360	-4.3630
Observations	4,995	4,995	4,995	4,995	4,995	4,995	4,995	4,995
R-squared	0.036	0.021	0.021	0.021	0.022	0.021	0.021	0.021

Source: Authors' calculations.

Note: Estimates are based on the OLS procedure. Standard errors are robust. ***, **, and * denote significance at 1, 5, and 10 percent, respectively. All equations include country and industry fixed effects. Initial industry share (ij) refers to the share of industry i in country j as a share of total manufacturing sector value added in country j at the beginning of the sample period. Inflow boom1 (j) refers to the value of total export / foreign direct investment / aid / remittances received in country j exceeding the linear trend. Exportability1 index is a dummy that takes the value of 1 if the industry has the ratio of exports to value added (averaged across all countries in the sample) greater than the median across industries, and zero otherwise. Exportability2 index is a dummy that takes on a value of 1 for ISIC sectors 171-192, and 0 otherwise.

In particular, results suggest that export, aid and remittances' booms cause the Dutch disease in LAC, but not FDIs. In addition, the remittances boom effect is found only under exportability index 1. Coefficients suggest that in an inflow boom period (i.e. the period when the observation has been above the trend), exportable industries grew slower by between 6.7 and 24.4 percentage points per year than compared to non-exportable industries.

5. Further analysis and discussion

5.1 Transmission mechanism

We would like to go beyond the finding that booms of export, aid and remittances in LAC caused a 'Dutch disease', i.e. negatively affected the sectoral growth, the effect being the largest when export was booming, while FDIs were found not to have played any role. A more important question is the underlying mechanism of this finding, i.e. the transmission channel. It could be that these excess inflows caused currency appreciation, hence hurting sectoral growth.

To isolate the potential Balassa-Samuelson channel (i.e. that appreciation is due to rising economy), we calculate an excess appreciation, i.e. the one over the Balassa-Samuelson-type of currency appreciation. We define excess appreciation following Johnson, Ostry and Subramanian (2007) who estimate overvaluation as the difference between a predicted RER (estimated from a Balassa-Samuelson-like regression) and the actual RER. The predicted RER, which according to Johnson et al. constitutes a sort of equilibrium real exchange rate, is estimated running a regression of the log of the ratio of country's price level to that of the US on the log of country's real per capita GDP in PPP terms (the Balassa-Samuelson effect in cross-section, as indicated in Johnson et al.: the richer the country the more appreciated should the RER be). The actual RER should be alternatively: (1) the ratio of a country's CPI for that of the US in a sample of all LAC and OECD countries, or (2) a trade-weighted bilateral real exchange rate where bilateral partners are the five main trade partners of each country, and the price ratio is still the ratio of a country's CPI to that of the US using the sample of 11 LAC countries (See Annex 2 for more details on the excess appreciation estimation). If the real-exchange-rate-excess-appreciation channel is in operation, then the estimated coefficient should be significant and negative, suggesting that excess appreciation, caused by inflow booms, reduces the annual average growth of the exportable sectors.

Table 4, contrary to these expectations, provides initial signs that the excess appreciation may not be the channel through which capital inflows affected sectoral growth. The table provides simple correlations between excess appreciation and capital inflow booms: while the correlations are statistically significant at the 1% level, they are of a very small magnitude and have an unexpected negative sign. On the other hand, we would expect that in countries with more capital inflows, currency will be appreciated more.

Table 4. Correlation between capital booms and excess appreciation

	Export boom	FDI boom	Aid boom	Remittances boom
Excess appreciation	-0.0266*	-0.0456**	-0.0683***	-0.1183***

Source: Authors' calculations

To further pursue this point, we estimate model (1) with an additional term: the product of the excess appreciation and the exportability index. The results of interest are presented in the middle of the Table 5 and show that the interaction term is positive and insignificant. This suggests that the exchange rate overvaluation does not exert influence on the growth of the value added of the exportable industries in LAC. That this is the case, it could be observed through the direct effect of inflow booms in the exportable industries on value added: in Table 5 they are quite similar as in Table 3. On the other hand, had the excess appreciation been the channel, we would have observed a reduction in the importance of the direct effect, as is the case in Rajan and Subramanian (2011).

Table 5. Impact of capital inflows on manufacturing growth: The role of excess appreciation

Dependent variable is annual rate of growth of value added in industry i in country j								
	Export boom		**FDI boom**		**Aid boom**		**Remittances boom**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Initial share	-0.94	-0.946	-0.955	-0.93	-0.883	-0.917	-0.926	-0.93
Inflow boom*Exportability1	-24.21***		-3.947		-21.77***		-10.60***	
Inflow boom*Exportability2		-6.664*		3.14		-16.25***		3.95
Excess appreciation*Exportability1	5.664		8.501		4.805		4.897	
Excess appreciation*Exportability2		3.938		4.598		3.449		4.889
Constant	-31.64***	-37.54***	-37.45***	-37.73***	-29.95***	-37.88***	-32.19***	-38.18***
Observations	4,995	4,995	4,995	4,995	4,995	4,995	4,995	4,995
R-squared	0.036	0.032	0.032	0.032	0.036	0.032	0.033	0.032

Source: Authors' calculations.

Note: Estimates are based on the OLS procedure. Standard errors are robust. ***, **, and * denote significance at 1, 5, and 10 percent, respectively. All equations include country and industry fixed effects. Initial industry share (ij) refers to the share of industry i in country j as a share of total manufacturing sector value added in country j at the beginning of the sample period. Inflow boom1 (j) refers to the value of total export / foreign direct investment / aid / remittances received in country j exceeding the linear trend. Exportability1 index is a dummy that takes the value of 1 if the industry has the ratio of exports to value added (averaged across all countries in the sample) greater than the median across industries, and zero otherwise. Exportability2 index is a dummy that takes on a value of 1 for ISIC sectors 171-192, and 0 otherwise. The measure of excess appreciation is based on departures from long-run PPP. For every year in the sample period, we regress over the cross-section of countries, the ratio of country's price level and US price level on its real GDP per capita (in PPP terms). The difference between the actual price ratio and the estimated price ratio is a measure of the country's excess appreciation.

The positive coefficients on the excess appreciation interaction term we observe in some cases in Table 5 may be puzzling, although insignificant. We may think in a couple of veins of how to justify these. *First*, the excess appreciation interaction term may be still capturing some remaining Balassa-Samuelson effects, i.e. that industry growth causes some appreciation pressures over those determined by the overall GDP, especially if industry had a higher growth than the overall economy. Indeed, in our sample, the average growth of the value added in LAC industries has been about 16% per year, while that of GDP per capita about four times lower, i.e. about 4%. This may lend some support to our claim. *Second*, and stemming from the first, the coefficient in front of the excess appreciation interaction may be suffering reverse causality, which is presently not captured. As the coefficient is positive, it may be actually reflecting the fact that the higher export and establishment of new factories through foreign investment appreciated the currency, but its potential negative effect for the industrial production was likely outweighed with the increased export production or with the production of the new factories; or that aid and remittances appreciate currency, but people having more money consume more, or establish small business out of these private transfers, hence manufacturing industry grows. *Third*, the coefficients may also reflect a cross-sectional dependence as the group of countries we are dealing with likely exhibit similar economic influences (for instance, on the RER see Fig. 3, right side). *Finally,* a positive and insignificant coefficient may be a reflection of policies pursued by policymakers to curb appreciation pressures and prevent them from adversely affecting the economy. If this was the case (i.e. policies subdues appreciation pressures and prevented potential manufacturing decline), then inflow booms likely affect the manufacturing growth through other channel.

To pursue the first and the second concern, Table 6 presents the results whereby the excess appreciation interaction term is suspected endogenous and instrumented with its own lags. The Hansen, under-identification and weak identification tests – given toward the bottom of the table - provide support that instruments are valid: the p-value of the under-identification test consistently suggests that the null of underidentified equation is rejected; the Cragg-Donald Wald F statistic of the weak identification test reports very high values, i.e. much higher than the Stock and Yogo (2002, 2005) values of the lowest percentage of the maximal IV size; the p-value of the Hansen J test also consistently suggests that the null of valid instruments is not rejected (the p-value is above 0.1 and does not approach 1, see further discussion on this in Petreski, 2010). The other coefficients remain robust to this change. The coefficients of interest (the excess appreciation interaction terms) remain insignificant, although now change sign under the exportability index 1. However, the main conclusion is that after any reverse causality has been accounted for in the model, the excess appreciation is confirmed not to be the channel through which capital booms affected manufacturing value added decline in LAC.

Table 6. Impact of capital inflows on manufacturing growth: The role of excess appreciation - instrumented

Dependent variable is annual rate of growth of value added in industry i in country j								
	Export boom		**FDI boom**		**Aid boom**		**Remittances boom**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Initial share	-1.686*	-1.699*	-1.644*	-1.683*	-1.598*	-1.666*	-1.626*	-1.681*
Inflow boom*Exportability1	-22.50***		-0.353		-13.27***		-6.814*	
Inflow boom*Exportability2		-10.28**		6.872		-11.97***		6.394
Excess appreciation*Exportability1	-32.41		-38.9		-40.54		-42.41	
Excess appreciation*Exportability2		4.172		1.602		2.954		2.668
Constant	10.44	10.92	16.91**	11.79	11.92	11.55	11.92	11.65
Underidentification test Chi-sq(2) P-val	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Weak identification test (Cragg-Donald Wald F statistic)	909	9,387	922	10,072	910	9,401	888	9,303
Hansen test Chi-sq(1) P-val	0.590	0.098	0.593	0.177	0.634	0.104	0.579	0.271
Observations	3,890	3,890	3,890	3,890	3,890	3,890	3,890	3,890
R-squared	0.059	0.051	0.051	0.051	0.053	0.051	0.051	0.051

Source: Authors' calculations.

Note: Estimates are based on the GMM procedure. Lags of the instrumented variable are used as instruments. Standard errors are robust. ***, **, and * denote significance at 1, 5, and 10 percent, respectively. Other notes as in Table 5.

We address the third concern – the one of the potential cross-sectional dependence – firstly by testing for its presence. This may imply a specification problem stemming from an unaccounted problem of cross-section dependence. As stated in Baltagi and Pesaran (2007), p.229, "*Cross section dependence can arise due to spatial or spillover effects, or could be due to unobserved (or unobservable) common factors*." We test for the presence of cross-sectional dependence in our measure of overvaluation of RERs, as suggested by De Hoyos and Sarafadis (2006), by applying the Pesaran (2004) CD test for cross-section dependence in panel time-series data. The p-value=0.001 suggests that the null of cross-section independence CD ~ N(0,1) is rejected. Hence, in Table 7 we report the Driscoll-Kraay robust standard errors to cross-sectional dependence (Hoechle, 2007). Note that due to technical limitation, we control for the fixed effects (industry in each country), but not for the industry and country effects separately. This drives the initial share coefficient larger than previously. However, the other results remain largely robust and comparable to that of Table 5, suggesting that despite present, the cross-sectional dependence does not impose problems in our specifications.

Table 7. Impact of capital inflows on manufacturing growth: Errors robust to cross-sectional dependence

Dependent variable is annual rate of growth of value added in industry i in country j								
	Export boom		**FDI boom**		**Aid boom**		**Remittances boom**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Initial share	-11.40**	-21.61***	-20.18***	-22.47***	-14.21***	-21.61***	-16.56***	-22.74***
Inflow boom*Exportability1	-32.90***		-3.378		-22.33***		-11.76*	
Inflow boom*Exportability2		-12.06**		2.876		-17.26***		3.294
Excess appreciation*Exportability1	14.96		19.63		14.86		14.87	
Excess appreciation*Exportability2		3.674		5.058		2.322		5.515
Observations	4,995	4,995	4,995	4,995	4,995	4,995	4,995	4,995
Source: Authors' calculations.								

Note: Estimates are based on the OLS procedure. Standard errors are based on the Driscoll-Kraay estimator, robust to cross-sectional dependence. ***, **, and * denote significance at 1, 5, and 10 percent, respectively. Other notes as in Table 5.

To pursue our fourth concern from above – that economic policies may have worked to counteract the potential appreciation due to capital inflows – we add to the basic specification six policy variables: (1) the log of the broad money, (2) the reference interest rate, (3) the log of the foreign exchange reserves; (4) the exchange-rate regime (Reinhart and Rogoff, 2004) – all four to capture the work of the monetary policy; (5) the government budget balance to GDP – to capture the work of the fiscal policy; and (6) the terms of trade – to capture the work of the foreign-trade policy. IMF (2011) reviews responses of countries to a surge of capital flows and, inter alia (p.7), suggests that so as to combat currency appreciation countries may purchase the excess foreign currency on the foreign exchange market and/or ease monetary policy to weaken the currency. In addition, we let the fiscal and foreign-trade policy to potentially play a role for easing the appreciation pressures. It could be that LAC countries were suffocating excess appreciation by managing capital flows, in which case the capital flows were not causing Dutch disease through this channel. An alternative reasoning is that our measure of excess appreciation is not capturing RER developments. This could be the case if the national price index (CPI) change used did not coincide exactly with exchange rate appreciation due to terms of trade effects (Corden 1981). The addition of the terms of trade should capture this effect as well.

Table 8 presents the results (Tables A2-A7 in Appendix 3 present the results variable by variable, for the sake of robustness testing). Results are appealing. They suggest that any appreciation pressures due to increased inflows from export have been suffocated by the central bank, as well by fiscal policy easing. While the excess appreciation variable becomes negative, it becomes significant only under the exportability index 1. It suggests that excess appreciation of the currency (over that determined by the Balassa-Samuelson effects) of one percentage point, on average results in a lower manufacturing growth by one percentage point. Policies themselves are found with the expected signs and part of them are significant.

The largest role to play is apparently for the monetary policy: eased monetary stance (more money in the economy and more reserves accumulated) provided space for higher growth of manufacturing industry, as suggested by the IMF's (2011) study.

Similarly, the more flexible the exchange rate regime in operation, the more negative the impact of the excess appreciation on the manufacturing growth: pressures for appreciation likely converted into actual appreciation under more flexible arrangements of the exchange rate, as compared to the case of a peg when the intervention of the central bank to combat those pressures has been likely more aggressive.

Interestingly, though, fiscal policy exerts positive role: any appreciation's negative impact on manufacturing growth has been also compensated by the government reducing the crowding-out effect. Namely, more prudent fiscal policy (reducing deficits or accumulating surpluses) is found to positively affect manufacturing growth as a provider of space for the private sector.

Hence, Table 8 gives the most important evidence that the exchange rate overvaluation is the channel through which capital inflows work to reduce manufacturing growth, but authorities design policies to combat these negative effects: they either supply more money on the market; or let excess domestic liquidity when there is excess foreign currency liquidity, or withdraw fiscal easing to let more space for the private sector; or do a combination of these. In addition, the pegs likely act as a strong buffer against appreciation, which may also be the reason of why some of these countries experienced episodes of high inflation rather than manufacturing decline. The finding that overvaluation is the channel in work for manufacturing decline in LAC is ultimately in line with the recent study of Vaz and Baer (2014).

Table 8. Impact of capital inflows on manufacturing growth: The role of policies

Dependent variable is annual rate of growth of value added in industry i in country j								
	Export boom		**FDI boom**		**Aid boom**		**Remittances boom**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Initial share	-1.714	-1.683	-1.681	-1.666	-1.66	-1.644	-1.669	-1.67
Inflow boom*Exportability1	-24.41***		-4.535		-16.74***		-7.171	
Inflow boom*Exportability2		-12.14**		2.394		-9.811**		6.667
Excess appreciation*Exportability1	-83.53		-98.25*		-94.59*		-99.86*	
Excess appreciation*Exportability2		-2.233		-9.36		-6.35		-8.469
Log of money	51.54***	24.73*	38.65**	23.30*	36.16*	23.05*	32.46*	24.29*
Interest rate	-0.319	0.154	-0.282	0.149	-0.309	0.151	-0.253	0.142
Log of foreign reserves	12.45	26.73***	15.54	26.29***	12.33	26.33***	15.58	26.05***
Exchange rate regime	-6.001**	-4.735*	-8.951***	-4.897*	-7.224***	-4.752*	-8.871***	-4.957*
Terms of trade	-0.01	-0.06	-0.22	-0.08	-0.21	-0.08	-0.339*	-0.07
Budget balance to GDP	3.270*	3.264*	4.338**	3.294*	4.415**	3.335*	4.643**	3.244*
Constant	-1,648***	-1,295***	-1,356***	-1,244***	-1,212**	-1,239***	-1,174**	-1,267***
Underidentification test Chi-sq(2) P-val	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Weak identification test (Cragg-Donald Wald F statistic)	415.4	6,522.0	418.0	7,614.0	418.0	6,746.0	407.2	6,771.0
Hansen test Chi-sq(1) P-val	0.925	0.244	0.945	0.457	0.945	0.352	0.883	0.661
Observations	3,434	3,434	3,434	3,434	3,434	3,434	3,434	3,434
R-squared	0.064	0.058	0.055	0.058	0.059	0.058	0.055	0.058

Source: Authors' calculations.

Note: Estimates are based on the GMM procedure. Lags of the instrumented variable are used as instruments. Standard errors are robust. ***, **, and * denote significance at 1, 5, and 10 percent, respectively. Other notes as in Table 5.

Finally, for the sake of completeness of our initial argumentation, we investigate another channel through which capital inflows may have caused a DD. One alternative explanation is that export industries with a high need of capital grow relatively slower as the country receives more capital inflows. Rajan and Subramanian (2011) argue the opposite of this holds for aid: the government reduces its borrowing from the banking system in response to aid received (or remittances received relieving the pressure on the current account), and hence makes more credit available to the private sector. However, think about exports: if the economy receives more proceeds from exports, then facing increased need by exportable industries over the need satisfied with the export proceeds may actually harm their growth. In such industries where growth should be fed by more capital, larger unsatisfied need may be associated with slower growth of the value added. Table 9 presents the results of adding the interaction between boom periods, the Rajan and Zingales's (1998) measure of the dependence of a particular industry on external resources to finance investment and the exportability variable. Results suggest that in the period under study the capital channel is not the one explaining manufacturing decline in LAC.

Table 9. Impact of capital inflows on manufacturing growth: The role of capital channel

Dependent variable is annual rate of growth of value added in industry i in country j								
	Export boom		**FDI boom**		**Aid boom**		**Remittances boom**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Initial share	-0.924	-0.954	-0.934	-0.935	-0.869	-0.921	-0.914	-0.935
Inflow boom*Exportability1	-24.48***		-4.217		-21.78***		-11.13***	
Inflow boom*Exportability2		-9.172**		4.496		-16.04***		4.263
Inflow boom*External dependence*Exportability1	0.0801		0.0235		-0.145		0.125	
Inflow boom* External dependence*Exportability2		0.154		-0.0963		-0.0171		-0.0373
Constant	-32.49***	-37.56***	-38.75***	-37.77***	-30.66***	-37.89***	-32.80***	-38.18***
Observations	4,995	4,995	4,995	4,995	4,995	4,995	4,995	4,995
R-squared	0.036	0.032	0.032	0.032	0.036	0.032	0.033	0.032

Source: Authors' calculations.

Note: Estimates are based on the OLS procedure. Standard errors are robust. ***, **, and * denote significance at 1, 5, and 10 percent, respectively. Other notes as in Table 5.

5.2 Crisis effects

In this section, we account for the 2008 world economic crisis by adding a dummy taking the value of one for year 2008 and onwards and zero otherwise. We would like to measure if and to what extent has the crisis affected the relationship between manufacturing and inflows.[12]

[12] This is a tentative and exploratory analysis subject to many caveats. For one, only 3 countries have data for 2008-2010; and only 2 for 2008. In total 5, which is half the sample. While the crisis started unfolding in 2008, it may actually be that we should start in 2009, which reduces the crisis sample further. In addition, we may need a more formal test to see whether the crisis period should start in 2008 or 2009, but the lack of data prevent us to do so. Even if the start is resolved, the crisis further unfolded beyond 2010 and the effects on manufacturing could be seen actually with some lag, i.e. after 2010. On the other hand, it has been said in the literature that the recovery was fast for LAC, and that by 2010 everything was back to normal. In the literature there is also a notion that the impact on LAC of the crisis was not as important as in other regions or as in other times it would have been. Thus, it may not matter to study the crisis developments anyway, in particular, not for growth. However, like we said, we introduce this section as an exploratory analysis, and leave it to the donors whether to include it or not.

This has not been investigated in the literature so far, but the intuition suggests a potentially positive and significant coefficient. Table 10 presents the results, which remain largely robust to this change. Note, that the coefficients in front of the boom-exportability interaction and the boom-exportability-crisis interaction should be observed in conjunction: given that countries experiencing inflow booms were found to see a more negative impact in industrial sectors that are more sensitive to export, then positive coefficient on the crisis interaction would mean that the negative effect of inflows on manufacturing is reduced.

Results, however, suggest something else: the manufacturing decline under the inflow booms has been happening before the crisis and likely stopped during the crisis, as we obtain insignificant coefficients. Interestingly though, the insignificant coefficients for FDIs we documented for the overall case (Table 5) become significant during the crisis, also suggesting that under large FDI inflows, manufacturing growth has been lower for exportable industries. However, the practical meaning of this finding may be limited, as the incidence of the FDI booms has been before not during the crisis.[13]

Table 10. Impact of capital inflows on manufacturing growth: The relationship in times of crisis

Dependent variable is annual rate of growth of value added in industry i in country j								
	Export boom		**FDI boom**		**Aid boom**		**Remittances boom**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Initial share	-0.929	-0.940	-0.927	-0.926	-0.864	-0.921	-0.902	-0.932
Inflow boom*Exportability1	-26.35***		0.572		-25.57***		-9.121**	
Inflow boom*Exportability2		-5.431		6.262		-15.79***		4.587
Inflow boom*Exportability1*Crisis	8.112		-29.45***		17.49*		-14.090	
Inflow boom*Exportability2*Crisis		-6.49		-15.62**		-2.241		-6.738
Constant	-6.379	-4.302	-4.954	-3.982	-10.770	-6.144	-1.947	-4.475
Observations	4,995	4,995	4,995	4,995	4,995	4,995	4,995	4,995
R-squared	0.036	0.032	0.033	0.032	0.036	0.032	0.033	0.032

Source: Authors' calculations.

Note: Estimates are based on the OLS procedure. Standard errors are robust. ***, **, and * denote significance at 1, 5, and 10 percent, respectively. Other notes as in Table 3.

[13] During the crisis there was no excess appreciation –in fact several Latin American countries devalued (see Figure A1) which may have help reverse any RER overvaluation.

5.3 The role of China

Finally, we investigate the role of China for the economies of LAC looking into two relevant issues: bilateral trade (LAC-China) and, fundamentally, third-party trade. Notwithstanding production concerns, most of the literature addressing the effects of China's economic performance on Latin America has focused only on trade issues –both bilateral and in third markets–, rather than on the effects of competition on the domestic market production (Jenkins 2008a, see also Jenkins 2008b for a summary of previous studies on the impact of China exports to the rest of the world on LAC exports). In fact, trade (and other) inflows developments are related to production.[14]

Over the last twenty years, but in particular in the 2000s, China's trade has penetrated significantly not only in many countries across LAC, (and with it becoming the main trade partner for several LAC countries – displacing in some cases other fellow LAC countries), but also in main export markets of several LACs. One of the relevant issues is then how can the fact that China is exporting a lot (of manufactures) to some of the LAC countries affect the exports of other fellows LAC countries. At the same time, it is known that China imports mainly commodities from LAC. While some of the China's influence has been already captured through the inclusion of the real exchange rate (the excess appreciation), we specifically account for the import penetration of China in the LAC export markets of LAC countries for which this issue is relevant. Table 11 adds the annual growth rate of the share of imported manufactures from China in the total imported manufactures to investigate if an influx of manufacturing import from China in LAC replaces the domestic manufacturing production, hence negatively affecting the manufacturing industry growth and working in the same direction as the Dutch disease. We calculate that over time, China's export to LAC increased from about 4.7% in total LAC's manufacturing import in the 1990s to 13.8% in the 2000s. For a decade, this has been a nearly threefold increase which might have affected domestic manufacturing production. Results suggest a marginal negative influence, as the coefficient is significant only at the 10%. But, the economic significance is infinitesimally small, suggesting that such a threefold hastening of China's share in LAC's manufacturing imports decelerates domestic manufacturing growth by negligible 0.015 percentage point, on average. The remaining coefficients remain robust to this treatment.

[14] Granted, not just manufacturing production, but production in general. Our focus here is on (exportable) manufacturing production.

Table 11. Impact of manufacturing imports from China

Dependent variable is annual rate of growth of value added in industry i in country j								
	Export boom		**FDI boom**		**Aid boom**		**Remittances boom**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Initial share	-1.684	-2.932**	-1.602	-2.916**	-1.546	-2.896**	-1.558	-2.918**
Inflow boom*Exportability1	-25.00***		-0.869		-14.52***		-10.42**	
Inflow boom*Exportability2		-11.45**		3.052		-16.11***		6.18
Excess appreciation*Exportability1	-41.58		-46.39		-49.410		-51.760	
Excess appreciation*Exportability2		-40.5		-67.37		-71.63		-53.45
Annual growth rate of the manufacturing imports from China / Total manufacturing imports	-1.50E-05	-4.43e-05*	-2.77E-05	-4.55e-05*	-2.23E-05	-4.48e-05*	-1.56E-05	-4.54e-05*
Constant	12.75	11.10	14.44*	10.52	20.90**	11.65	15.62*	11.10
Underidentification test Chi-sq(2) P-val	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Weak identification test (Cragg-Donald Wald F statistic)	704.8	354.0	713.1	393.1	699.8	316.5	687.3	308.9
Hansen test Chi-sq(1) P-val	0.602	0.831	0.599	0.977	0.639	0.747	0.574	0.846
Observations	3,529	2,772	3,529	2,772	3,529	2,772	3,529	2,772
R-squared	0.059	0.058	0.049	0.058	0.052	0.059	0.050	0.058

Source: Authors' calculations.

Note: Estimates are based on the GMM procedure. Lags of the instrumented variable are used as instruments. Standard errors are robust. ***, **, and * denote significance at 1, 5, and 10 percent, respectively. Other notes as in Table 5.

The other relevant issue is that of China displacing LAC manufacturing in third-party countries, i.e., China taking the place of LAC as a key provider of countries that used to be, and may be still are, the key trade partners for LAC, such as the USA. As pointed by Jenkins (2008a), it is LAC's exports of *manufactures* to third markets that face that strongest competition from China which in turn threatens manufacturing production in LAC.[15]

[15] There are other economic effects tied to China's formidable economic performance that may threaten manufacturing exports and production in LACs. Just to mention two key developments. First, the effects of FDI diversion from the region to China, which have been suggested to be negative for just a few countries in the region like Mexico and Colombia (García Herrero and Santabárbara 2005). Second, terms of trade effects, as increasing Chinese demand for commodities pushed prices of commodities exported by LAC up, but at the same time increasing Chinese manufacturing production and exports depresses prices of manufactures produced by LAC, – depending on the net export/import position of a LAC country in such goods TOT of a LAC may be affected negatively or not. When speaking of domestic impacts of trade, one has to distinguish between impacts on tradeable, nontradeable or exportable industries –as the channels through which the China performance may affect (if any) their production may be different. The focus of this section is only on the impacts of manufacturing growth of Chinese exports to third parties on LAC exportable manufacture, not on FDI or TOT impacts related to China

To account for this China effect on manufacturing we use trade data and a simple approach that has been recently followed by the literature that seeks to measure trade impacts of the rise of China[16]: we look at what happened to market shares of manufacturing exports (imports by a key trade partner) in the 1990s and 2000s. To do so we construct an Index of Competitive Threat (ICT) (see Jenkins 2008b) as follows:

$$ICT(1) = \sum x^t{}_{Hi} * k^t{}_{Ci} \quad (2)$$

where $x^t{}_{Hi} = X^t{}_{Hi}/M^t{}_H$ is the share of product i in total imports from country H by the destination market at time *t*, measuring the extent of competition faced by country H; and, $k^t{}_{Ci} = X^t{}_{Ci}/M^t{}_H$ is the share of China in total imports of product *i* by destination market at time *t*, measuring intensity of competition from China.

Country H is each of the LACs in our sample. The destination market is a key market for LACs exports. We choose the USA as it has been on the top-five export markets, if not the top market, for each of the LACs during the period of study.[17] We construct the indices for each country and year in our sample, by 3-digit ISIC.[18] In turn we insert the indices and run the regressions taking the indices as an interaction term with the inflow boom dummy. Then if de-industrialization is at work in the period under study due to China effect we would expect a reduction in the significant and negative coefficient of the interaction term made by the inflow boom variable and exportability along with a significant and negative coefficient of the interaction term between the inflow boom variable and the index of competitive threat.

Before presenting the results of the regressions on value added growth we must look at the ICT results for LACs. In general, indices of competitive threat from China grew over time, but not for all countries all the time. The only country for which the ICT has grown continuously in the last 20 years, and that at the same time having the highest value, is Mexico (reaching 14.5 percent in 2010, and an average of 10.5 from 2000-2010). For most of the other countries the indices are low (at less than 4 percent), the exception being Brazil with an average

effects. After all, as pointed by Jenkins 2008a (p. 246), bilateral FDIs are small relative to trade so that balance of payment impacts should likely be dominated by trade impacts. In another section we try to deal with TOT effects on manufacturing.

[16] As mentioned by Mesquita Moreira (2007), the assessment of trade impacts may be a rather complex issue that may involve general equilibrium considerations and may face problems such as aggregation bias and product differentiation, more so for manufactures. Notwithstanding these concerns we believe that a simple approach may provide still valuable insights.

[17] Brazil is in fact also a key export market for MERCOSUR members (Argentina, Uruguay, and Paraguay – the last not being in our sample). But, the USA is also an important trade market for these countries. For the sake of uniformity, we choose the USA for all LACs.

[18] Trade data is either in SITC or HS nomenclature. We do a mapping using UN correspondences to construct the ITC(1) by ISIC. We use 3-digit, revision 3, to map the ICT(1) to our Value added data.

of 7.9 percent in the 2000s. These figures are largely in line with the conclusions of other research that studies LAC losses to China in the world markets; see for instance Mesquita Moreira (2007). This author also highlights differences in losses by type of manufacturing product: the higher losses are in low-tech labor-intensive goods, and within these goods footwear and apparel explain a great deal of the losses.[19]

These four features of LAC market share losses to China in the past few years: (i) concentrated in Mexico, (ii) not widespread in the rest of LACs, (iii) concentrated in apparel and footwear, and (iv) greater in the 2000s, give us a lead as to what to expect in terms of the manufacturing industry growth impact of China in LACs.

The regression results (Tables 13-15) show precisely these four effects: (i) there is a negative and significant impact of China on LAC manufacturing value added growth for the case of export booms, but only in the case of textiles, clothing, leather and footwear (see Table 12, export boom, case 2, and compare with the same case in Table 6)[20]. For the rest of the inflow booms, the China effect is not significant or it is, but marginally (at the 10 percent), but with a positive sign. (ii) When including a dummy to capture the case of Mexico (Table 14), we find again the expected results. There is a significant negative impact on Mexican manufacturing growth due to competitive threat of China in both export boom cases: for all manufactures and more so for the low-tech manufactures, (iii) For the rest of LACs the China effect is actually positive, though smaller, during the export boom episodes, contributing thus to reduce the negative impact of the inflow booms on manufacturing value added growth (compare results in Table 13 and Table 6). (iv) Finally, if we look only at years 2000s (Table 14), we find that the China effect actually compounds the negative impacts on manufacturing value added growth of the net inflows and has even more negative and significant impacts for Mexico but remain positive for the rest of LAC in the case of export booms and remittances.

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[19] As Mesquita Moreira points, the market share losses in apparel and other low-tech trade could have been higher in periods were distortions such as the Agreement of Textiles and Clothing (ATC) and LAC's protection of its own in low-tech industries existed.

[20] We compare GMM regressions that use lags of the instrumented variable as instruments.

Table 12. Impact of China on LAC – third markets

Dependent variable is annual rate of growth of value added in industry i in country j								
	Export boom		**FDI boom**		**Aid boom**		**Remittances boom**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Initial share	-1.619	-2.781**	-1.629	-2.804**	-1.652	-3.035**	-1.558	-2.814**
Inflow boom*Exportability1	-22.73***		-2.797		-20.57***		-8.911**	
Inflow boom*Exportability2		-8.409*		3.887		-19.14***		7.302
Excess appreciation*Exportability1	-31.52		-37.89		-39.000		-41.550	
Excess appreciation*Exportability2		-38.08		-60.43		-53.77		-45.3
Inflow boom*Index of competitive threat	-592.3	-1,857**	509.8	-956.4	4,265*	4,159	10.44	-359.8
Constant	12.050	13.540	11.420	11.740	9.013	-3.410	13.280	11.250
Underidentification test Chi-sq(2) P-val	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Weak identification test (Cragg-Donald Wald F statistic)	874.3	351.1	873.6	390.0	869.8	316.6	846.6	307.0
Hansen test Chi-sq(1) P-val	0.350	0.917	0.352	0.996	0.406	0.721	0.325	0.768
Observations	3,575	2,814	3,575	2,814	3,575	2,814	3,575	2,814
R-squared	0.059	0.059	0.050	0.058	0.061	0.065	0.051	0.058

Source: Authors' calculations.

*Note: Estimates are based on the GMM procedure. Lags of the instrumented variable are used as instruments. Standard errors are robust. ***, **, and * denote significance at 1, 5, and 10 percent, respectively. Other notes as in Table 5.*

Table 13. Impact of China on LAC – third markets (controlling for Mexico)

Dependent variable is annual rate of growth of value added in industry i in country j								
	Export boom		**FDI boom**		**Aid boom**		**Remittances boom**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Initial share	-2.043*	-3.327**	-1.760	-2.974**	-1.194	-2.509*	-1.650	-2.990**
Inflow boom*Exportability1	-21.69***		-2.215		-21.84***		-8.647**	
Inflow boom*Exportability2		-11.52**		2.332		-14.27***		5.945
Excess appreciation*Exportability1	-30.79		-37.18		-40.2		-40.92	
Excess appreciation*Exportability2		-31.2		-56.51		-38.59		-46.69
Inflow boom*Index of competitive threat	2,539***	1,804***	1,228	230.9	448.3	-359	525.9	571.5
Inflow boom*Index of competitive threat*Mexico	-9,011***	-10,311***	-3,209	-3,469	12,252*	11,997*	-2,079	-3,403
Constant	4.108	3.953	10.120	8.915	8.931	0.297	12.680	9.807
Underidentification test Chi-sq(2) P-val	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Weak identification test (Cragg-Donald Wald F statistic)	874.0	350.8	873.2	389.4	869.5	317.6	847.0	307.3
Hansen test Chi-sq(1) P-val	0.350	0.945	0.339	0.947	0.463	0.801	0.316	0.758
Observations	3,575	2,814	3,575	2,814	3,575	2,814	3,575	2,814
R-squared	0.064	0.066	0.051	0.059	0.076	0.079	0.051	0.059

Source: Authors' calculations.

*Note: Estimates are based on the GMM procedure. Lags of the instrumented variable are used as instruments. Standard errors are robust. ***, **, and * denote significance at 1, 5, and 10 percent, respectively. Other notes as in Table 5.*

Table 14. Impact of China on LAC – third markets over 2000s (controlling for Mexico)

Dependent variable is annual rate of growth of value added in industry i in country j								
	Export boom		**FDI boom**		**Aid boom**		**Remittances boom**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Initial share	-3.010**	-3.006**	-2.743*	-2.738*	-2.152	-2.270	-2.758*	-2.775*
Inflow boom*Exportability1	-23.94***		-2.949		-19.87***		-6.38	
Inflow boom*Exportability2		-12.02**		1.244		-13.33**		5.506
Excess appreciation*Exportability1	-88.57		-30.64		-38.1		-33.47	
Excess appreciation*Exportability2		0.854		18.97		-0.267		32.4
Inflow boom*Index of competitive threat	2,722***	1,980***	905	766.50	1328.00	448.50	951.8**	670.5*
Inflow boom*Index of competitive threat*Mexico	-10,742***	-11,870***	-4,698*	-4,706*	10,842*	10604	-4,774**	-4,792**
Constant	-69.81***	-60.07***	-58.89***	-54.95***	-50.35***	-59.51***	-53.91***	-53.67***
Underidentification test Chi-sq(2) P-val	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Weak identification test (Cragg-Donald Wald F statistic)	758.7	4,239.0	787.9	4,153.0	784.0	3,814.0	807.2	3,719.0
Hansen test Chi-sq(1) P-val	0.079	0.290	0.258	0.722	0.464	0.793	0.210	0.955
Observations	2,515	2,515	2,515	2,515	2,515	2,515	2,515	2,515
R-squared	0.079	0.072	0.062	0.062	0.087	0.081	0.064	0.063
Source: Authors' calculations.								

*Note: Estimates are based on the GMM procedure. Lags of the instrumented variable are used as instruments. Standard errors are robust. ***, **, and * denote significance at 1, 5, and 10 percent, respectively. Other notes as in Table 5.*

6. Conclusions

The objective of this paper has been to investigate if and how different episodes of large net inflows – export boom, remittances, FDIs, or aid – caused Dutch disease in Latin American countries. We investigate this disease – i.e. the decline of manufacturing output – with special reference to the channel through which it works, to the crisis period and to the role of China for LAC. Our results robustly suggest that export, aid and remittances booms may indeed have an adverse impact on the relative growth of exportable industries.

The evidence suggests that the exchange rate overvaluation is the channel through which these inflow booms induced decline of manufacturing output, but only after the work of economic policies has been considered. Results suggest that it is likely that monetary policy counteracted any appreciation pressures on the foreign-exchange market by providing the needed domestic liquidity and accumulating reserves. This has been likely done to prevent the adverse effects excess appreciation may inflict onto the domestic economy, but also to sustain the rigid forms of the exchange rate where applicable. The crisis likely softened the Dutch disease effects in LAC, as the declining effect for manufacturing stopped after 2008. The latter has been even expected, given that at least in nominal terms, many LAC currencies depreciated or faced devaluations at the onset or during the crisis (see Figure A1 in Appendix 4). As for the role of China, we document that its manufacture exports to some of the LAC does not significantly affect the manufacturing growth of other fellow LAC, but China plays a positive role for LAC's manufacturing through the work on third-market competition once the effect of Mexico has been controlled for. On the contrary, the China effect for Mexican manufacturing industries is clearly negative during the inflow booms. We thus provide empirical evidence of a long suspected, but unaccounted for, impact of China in LAC manufactures.

The message from these findings is that LAC countries should likely maintain their eye on the exchange rates, in terms of the management of their overvaluation – e.g. by purchasing foreign exchange and/or easing monetary policy. At least in the context of manufacturing output, this proved important, as it likely softens the negative work of the exchange rate overvaluation for manufacturing. Also, keeping an eye on trade with China and the type of manufactures and markets LAC has to compete with China on third markets may actually bring benefits for LAC, or at least may preserve the current favorable position of some LAC (excluding Mexico) manufacturing industry performance.

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Annex 1 – Variables definitions and sources

Variable	Description	Source
VA growth	Annual average rate of growth of value added in industry *i* in country *j* over the relevant period.	UNIDO
Initial Industry Share	Industry *i's* share in country *j's* total manufacturing value added at the beginning of the decade.	Calculated based on VA growth
Inflow boom	Export, remittances, aid, FDIs.	Export data and FDI data from ECLAC, CEPALSTAT. Aid and Remittances from the World Bank, WDI. Boom is defined as a dummy variable taking a value of 1 if the observation in that particular year exceeds a linear trend, and zero otherwise.
Exportability index 1	A dummy that takes a value of 1 if industry *i* has a ratio of exports to value that exceeds the industry median value.	COMTRADE and UNIDO data (to estimate export shares by industry) and several correspondences between HS, SITC (which are the product classifications used in COMTRADE data) and ISIC (which is the industry classification used by UNIDO)
Exportability index 2	A dummy that takes a value of 1 if industry is textiles, clothing, leather or footwear.	UNIDO classification data
Crisis dummy	A dummy taking a value of 1 if after the crisis hit (with annual data after 2008).	Self-defined
Excess appreciation	Deviation of the actual relative price level from an estimated one (when regressing price level on real GDP per capita in PPP terms).	Authors' calculations based on WDI World Bank and ECLAC data (see Annex 2).
Financial dependence	The measure of external financial dependence for all firms in industry *i*.	Rajan and Zingales (1998), Table 1.
Ratio of manufacturing imports from China to total manufacturing import	Imports of manufactures in ISIC classification (according to correspondence between trade and industry data) from China divided by imports of manufactures from World (including China).	COMTRADE and UNIDO data (to estimate import ratios by industry) and several correspondences between HS, SITC (which are the product classifications used in COMTRADE data) and ISIC (which is the industry classification used by UNIDO)
Money	Logarithm of the broad money (money plus quasi-money).	IFS data from the IMF
Foreign reserves	Total Reserves excluding Gold (USD), in log terms	IFS data from the IMF
Interest rates	Money market interest rate, except for Chile, Panama, and Ecuador. For Chile is the policy relevant interest rate. For Panama is the lending interest rate, and for Ecuador is the discount rate.	IFS data from the IMF

Fiscal balance (deficit/surplus)	Central government operations, global result, as a percentage of GDP.	Data from ECLAC
Changes in terms of trade	Net barter terms of trade index is calculated as the percentage ratio of the export unit value indexes to the import unit value indexes, measured relative to the base year 2000.	The World Development Indicators
Exchange rate regime	1 = fixed (currency board, dollarization) 2 = conventional pegs 3 = managed float (and bands) 4 = free float	Data set from Ilzetzki, Reinhart and Rogoff (2008). http://www.carmenreinhart.com/data/browse-by-topic/topics/11/
Index of Competitive Threat (ICT)	The ICT accounts for the loss of market share by a LAC country to China in manufacturing products (See Jenkins 2008b).	Own calculations using data from COMTRADE.

Annex 2 - Measuring Overvaluation of the RER for LAC Countries

An excess appreciation of the real exchange rate (RER) could be a channel that might explain the negative impacts of episodes of booming exports, aid, or remittances, on tradable (exportable) manufacturing industries. How much, if at all, a RER is overvalued is an empirical question that many studies have addressed in different ways. A common step in all of them is to have a measure of an equilibrium exchange rate from which over (or under) valuation can be calculated as the difference between the actual RER and the equilibrium RER. Thus, the differences in estimated over or undervaluation of the RER lay essentially on how to measure the equilibrium RER from a given proposed measure of RER. The purpose of this annex is not to evaluate alternative measures of overvaluation (or undervaluation), nor is it to discuss about alternative measures of equilibrium RER. For this the reader is referred to the literature (see for instance Isard 2007 for an assessment of methodologies to estimate equilibrium RER).

For the purpose of having a measure of excess appreciation in our study of Dutch disease we propose to follow Johnson, Ostry and Subramanian (2007). These authors estimate overvaluation as the difference between the actual RER and a predicted RER (estimated from a Balassa-Samuelson-like cross-section regression). The predicted RER, which according to Johnson et al. constitutes a sort of equilibrium real exchange rate, is estimated running a regression of the log of the ratio of a country's price level (CPIs) to that of the US on the country's per capita GDP in PPP terms. Somewhat similar methodology of estimation is found in Frankel (2005), cited in turn in Johnson et al. (2007). Frankel uses the ratio of GDP deflators: GDP/GDP us. Other studies use PPI (producer price index). The idea being that these price ratios capture a concept of RER.

A key idea behind this methodology is to control for the Balassa-Samuelson hypothesis: the relatively fast growing countries experience relatively rapid productivity growth in the tradables sector accompanied by relatively large increases in the ratio of nontradables prices to tradable prices (thus the implied comparison between two countries). That is, the tendency is for a RER constructed from aggregate national prices to appreciate over time for relatively fast growing (richer) countries and depreciate for relatively slow growing countries; see Isard 2007. Isard points that the national indices should reflect the prices of both tradables and nontradables.

In our study the RER is obtained as the ratio of a country's CPI (from Latin American and the Caribbean and OECD, 60 in total) to the CPI of the United States, and we take the logarithm (natural) of this value and regress it against the log of the real per capita GDP in PPP terms (base year is 2005). We estimate a cross-section regression for every year in the period 1992-2010 for the sample of countries as follows:

$$ln\ RER_i = \alpha + \beta\ ln\ GDPpcPPP_i + e_i.$$

where *i* stands for country (the subscript for time has been omitted).

The measure of overvaluation or excess appreciation (if any) is the difference between the actual RER and the predicted:

$$excess_i = ln\ RER_i - (\alpha\ hat + \beta\ hat\ ln\ GDPpcPPP_i)$$

In other words the difference between the actual ln RER and the estimated RER (or ln RER hat) gives a measure of the excess appreciation (overvaluation, or, if in the opposite case, undervaluation). We calculate three different excess appreciation measures: (i) $excess_{it}$ taking each overvaluation obtained, one for each year for each country, (ii) $excess_i$ taking an average overvaluation measure for the entire period, that is, one for each country, and (iii) $excess_i^{decade}$ taking an average overvaluation for the 1990s and another for the 2000s, that is, two measures for each country.

As an alternative measure of RER we calculate a bilateral RER.[21] This RER is a trade weighted RER constructed using the top five bilateral trade partners and as weights the share of total trade (imports plus exports) of each partner on total trade with the world: CPI_i / [CPI_{f1} * $Trade_{f1}$/$Trade_w$ + CPI_{f2} * $Trade_{f2}$/$Trade_w$ + … CPI_{f5} * $Trade_{f5}$/$Trade_w$]. Alternatively, another bilateral RER uses as weights the share of total trade of each top-five trade partner on total trade of the five trade partners.[22]

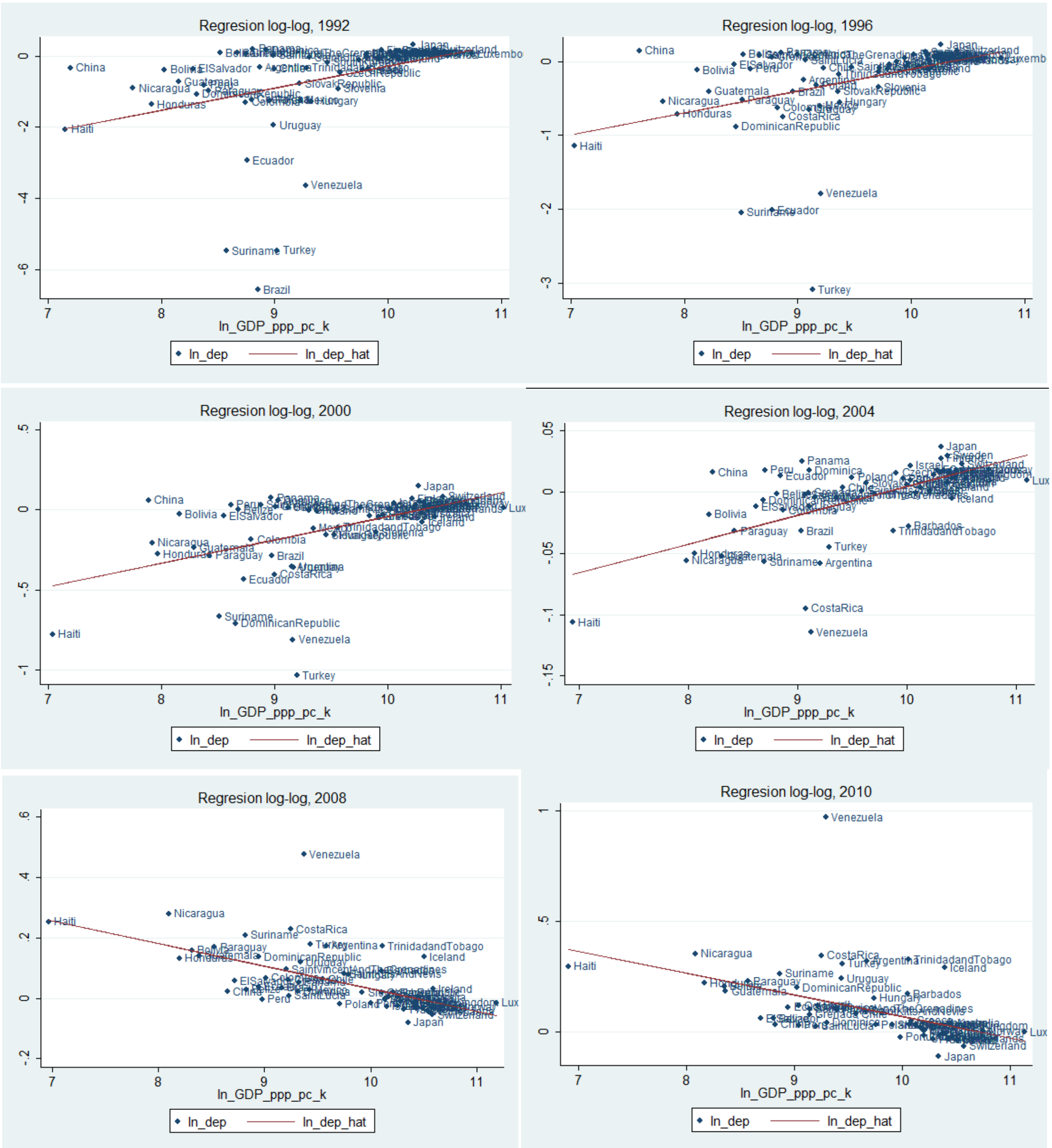
Results. Using the CPI ratios as the measure of RER, the regressions show evidence of the Balassa-Samuelson effect in cross-section: the richer the country the more appreciated the RER (beta coefficients are, in general, positive and significant). However after 2005 the effect is opposite (See Annex 2, Table A1). It is the case that some countries do have overvaluation of their RER while other have undervaluation. Figure A1 shows these countries, those that have an excess appreciation of the RER are those whose observations are above the line. We see that

[21] The bilateral RER is calculated only for the sample of Latin American Countries for which we study DD impacts on value added growth.

[22] In what follows the results are based only on the CPI_i/CPI_{us} measure. Excess appreciation estimation using the two bilateral RER delivered coefficients that were not significant.

overvaluation was present among several (but not all) Latin American countries during the 1990s, and early 2000s. However in the late 2000s, although there are still some countries where overvaluation can be seen, the regressions do not provide evidence of the Balassa-Samuelson relation.

Figure A1. Fitted values and ln RER, LAC countries, Selected Years



Source: Own estimations.
Note: The regressions show evidence of the Balassa-Samuelson effect in cross-section: the richer the country the more appreciated the RER. However after 2005 the effect is opposite (See this annex, Table 1). The graphs above show countries with an excess appreciation of the RER: see those observations above the line.

Table A1. RER regressions for Latin American and Caribbean, and OECD countries, cross-section regressions for each year in period 1992-2010.

Dependent Variable: ln RER					
Year	**Number of obs**	**Coef. of real GDP PPP pc**	**Std. Err.**	**t**	**P>|t|**
1992	60	0.6211***	0.2088	2.97	0.004
1993	60	0.5345***	0.1704	3.14	0.003
1994	60	0.4213***	0.1256	3.35	0.001
1995	60	0.3433***	0.1040	3.3	0.002
1996	60	0.2967***	0.0892	3.33	0.002
1997	60	0.2592***	0.0766	3.38	0.001
1998	60	0.2256***	0.0635	3.55	0.001
1999	60	0.1902***	0.0464	4.1	0.000
2000	60	0.1464***	0.0330	4.43	0.000
2001	60	0.1187***	0.0252	4.71	0.000
2002	60	0.1000***	0.0186	5.39	0.000
2003	60	0.0601***	0.0105	5.74	0.000
2004	60	0.0234***	0.0040	5.91	0.000
2005	60	(omitted)			
2006	60	-0.0200***	0.0041	-4.94	0.000
2007	60	-0.0403***	0.0075	-5.39	0.000
2008	60	-0.0747***	0.0126	-5.91	0.000
2009	60	-0.0838***	0.0182	-4.62	0.000
2010	60	-0.0981***	0.0234	-4.19	0.00

Source: Own estimations.
Standard errors in parentheses.
** significant at 10%; ** significant at 5%; *** significant at 1%.*
Notes: Real Exchange rate (RER) is calculated as the ratio of Consumer Price Index (CPI) for each country to that of the US. The regressions show evidence of the Balassa-Samuelson effect in cross-section: the richer the country the more appreciated the RER. However, after 2005 the sign of the GDP coefficients reverse.

Annex 3 – The effects of policies (separately)

Table A2. Impact of capital inflows on manufacturing growth: The role of money

Dependent variable is annual rate of growth of value added in industry i in country j								
	Export boom		**FDI boom**		**Aid boom**		**Remittances boom**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Initial share	78.11***	47.13***	69.74***	46.33***	63.76**	45.67***	66.10***	48.05***
Inflow boom*Exportability1	-24.60***		2.472		-17.00***		-3.217	
Inflow boom*Exportability2		-12.90***		7.677		-11.67***		9.142**
Excess appreciation*Exportability1	-45		-49.01		-50.27		-50.38	
Excess appreciation*Exportability2		1.907		-1.206		0.267		9.142**
Log of broad money	53.85***	34.09***	43.83***	32.66**	38.38**	32.14**	40.24**	34.15***
Constant	-1,407***	-887.4***	-1,149**	-851.1**	-1,001**	-837.4**	-1,051**	-890.7***
Underidentification test Chi-sq(2) P-val	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Weak identification test (Cragg-Donald Wald F statistic)	790.9	8,684.0	803.9	9,401.0	790.4	8,719.0	783.6	8,607.0
Hansen test Chi-sq(1) P-val	0.828	0.166	0.806	0.304	0.863	0.217	0.786	0.539
Observations	3,600	3,600	3,600	3,600	3,600	3,600	3,600	3,600
R-squared	0.062	0.054	0.053	0.054	0.058	0.054	0.053	0.054

Source: Authors' calculations.

Note: Estimates are based on the GMM procedure. Lags of the instrumented variable are used as instruments. Standard errors are robust. ***, **, and * denote significance at 1, 5, and 10 percent, respectively. Other notes as in Table 5.

Table A3 Impact of capital inflows on manufacturing growth: The role of interest rate

Dependent variable is annual rate of growth of value added in industry i in country j								
	Export boom		**FDI boom**		**Aid boom**		**Remittances boom**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Initial share	20.01**	9.770*	23.56**	10.34**	23.14**	10.24*	23.55**	10.41**
Inflow boom*Exportability1	-22.25***		-1.415		-13.10***		-6.897*	
Inflow boom*Exportability2		-10.21**		6.542		-11.81***		6.684
Excess appreciation*Exportability1	-55.69		-64.56		-65.09		-67.42	
Excess appreciation*Exportability2		-1.58		-4.245		-2.758		6.684
Interest rate	-0.496***	-0.207	-0.544***	-0.209	-0.526***	-0.205	-0.534***	-0.212
Constant	10.420	12.010	10.860	11.640	16.80**	12.010	11.770	11.750
Underidentification test Chi-sq(2) P-val	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Weak identification test (Cragg-Donald Wald F statistic)	636.1	9,042.0	646.9	9,699.0	638.8	9,054.0	628.1	8,968.0
Hansen test Chi-sq(1) P-val	0.615	0.062	0.622	0.119	0.660	0.065	0.605	0.188
Observations	3,890	3,890	3,890	3,890	3,890	3,890	3,890	3,890
R-squared	0.059	0.052	0.051	0.051	0.054	0.052	0.052	0.051

Source: Authors' calculations.

Note: Estimates are based on the GMM procedure. Lags of the instrumented variable are used as instruments. Standard errors are robust. ***, **, and * denote significance at 1, 5, and 10 percent, respectively. Other notes as in Table 5.

Table A4. Impact of capital inflows on manufacturing growth: The role of official reserves

Dependent variable is annual rate of growth of value added in industry i in country j								
	Export boom		**FDI boom**		**Aid boom**		**Remittances boom**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Initial share	49.20**	52.07***	56.78***	51.64***	47.52**	51.64***	60.54***	51.74***
Inflow boom*Exportability1	-22.19***		-1.332		-12.48***		-7.843**	
Inflow boom*Exportability2		-10.42**		5.8		-11.42***		5.142
Excess appreciation*Exportability1	-32.63		-39.29		-40.55		-43.17	
Excess appreciation*Exportability2		5.718		2.994		4.345		5.142
Log of foreign reserves	10.24*	13.39**	11.63**	13.06**	8.756	13.09**	12.80**	13.07**
Constant	-247.1*	-324.6**	-281.4**	-316.7**	-203.600	-317.3**	-310.0**	-316.8**
Underidentification test Chi-sq(2) P-val	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Weak identification test (Cragg-Donald Wald F statistic)	926.1	9,387.0	934.8	10,065.0	927.1	9,405.0	904.1	9,309.0
Hansen test Chi-sq(1) P-val	0.615	0.149	0.623	0.260	0.654	0.164	0.608	0.363
Observations	3,890	3,890	3,890	3,890	3,890	3,890	3,890	3,890
R-squared	0.060	0.053	0.052	0.052	0.054	0.053	0.052	0.052

Source: Authors' calculations.

Note: Estimates are based on the GMM procedure. Lags of the instrumented variable are used as instruments. Standard errors are robust. ***, **, and * denote significance at 1, 5, and 10 percent, respectively. Other notes as in Table 5.

Table A5. Impact of capital inflows on manufacturing growth: The role of government budget

Dependent variable is annual rate of growth of value added in industry i in country j								
	Export boom		**FDI boom**		**Aid boom**		**Remittances boom**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Initial share	9.875***	9.311**	8.759**	9.158**	4.423	8.917**	6.802*	9.297**
Inflow boom*Exportability1	-23.42***		-3.125		-13.75***		-8.192*	
Inflow boom*Exportability2		-9.549**		3.586		-11.06***		5.684
Excess appreciation*Exportability1	-37.3		-47.3		-47.92		-52.49	
Excess appreciation*Exportability2		-2.115		-7.15		-4.333		5.684
Budget balance to GDP	1.698	0.561	0.729	0.456	1.153	0.564	0.311	0.530
Constant	13.380	13.300	12.480	12.850	19.36**	13.340	12.920	13.080
Underidentification test Chi-sq(2) P-val	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Weak identification test (Cragg-Donald Wald F statistic)	833.1	7,587.0	838.9	8,668.0	832.9	7,785.0	788.2	7,792.0
Hansen test Chi-sq(1) P-val	0.580	0.092	0.616	0.184	0.632	0.110	0.602	0.262
Observations	3,724	3,724	3,724	3,724	3,724	3,724	3,724	3,724
R-squared	0.060	0.052	0.051	0.052	0.054	0.052	0.052	0.052

Source: Authors' calculations.

Note: Estimates are based on the GMM procedure. Lags of the instrumented variable are used as instruments. Standard errors are robust. ***, **, and * denote significance at 1, 5, and 10 percent, respectively. Other notes as in Table 5.

Table A6. Impact of capital inflows on manufacturing growth: The role of terms of trade

Dependent variable is annual rate of growth of value added in industry i in country j								
	Export boom		**FDI boom**		**Aid boom**		**Remittances boom**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Initial share	16.53*	10.57**	20.65**	11.19**	20.37**	11.04**	21.18**	11.24**
Inflow boom*Exportability1	-23.46***		-0.174		-13.21***		-7.564*	
Inflow boom*Exportability2		-10.15**		6.992		-11.89***		6.227
Excess appreciation*Exportability1	-30.59		-39.58		-40.87		-44.26	
Excess appreciation*Exportability2		3.978		1.283		2.724		6.227
Terms of trade	0.133	-0.020	-0.062	-0.043	-0.028	-0.028	-0.123	-0.026
Constant	-6.556	14.520	18.810	16.990	20.500	15.520	27.57*	14.980
Underidentification test Chi-sq(2) P-val	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Weak identification test (Cragg-Donald Wald F statistic)	896.8	9,367.0	917.1	10,065.0	901.7	9,384.0	870.1	9,280.0
Hansen test Chi-sq(1) P-val	0.583	0.099	0.597	0.176	0.636	0.105	0.584	0.267
Observations	3,890	3,890	3,890	3,890	3,890	3,890	3,890	3,890
R-squared	0.059	0.051	0.051	0.051	0.053	0.051	0.051	0.051

Source: Authors' calculations.

Note: Estimates are based on the GMM procedure. Lags of the instrumented variable are used as instruments. Standard errors are robust. ***, **, and * denote significance at 1, 5, and 10 percent, respectively. Other notes as in Table 5.

Table A7. Impact of capital inflows on manufacturing growth: The role of exchange rate regimes

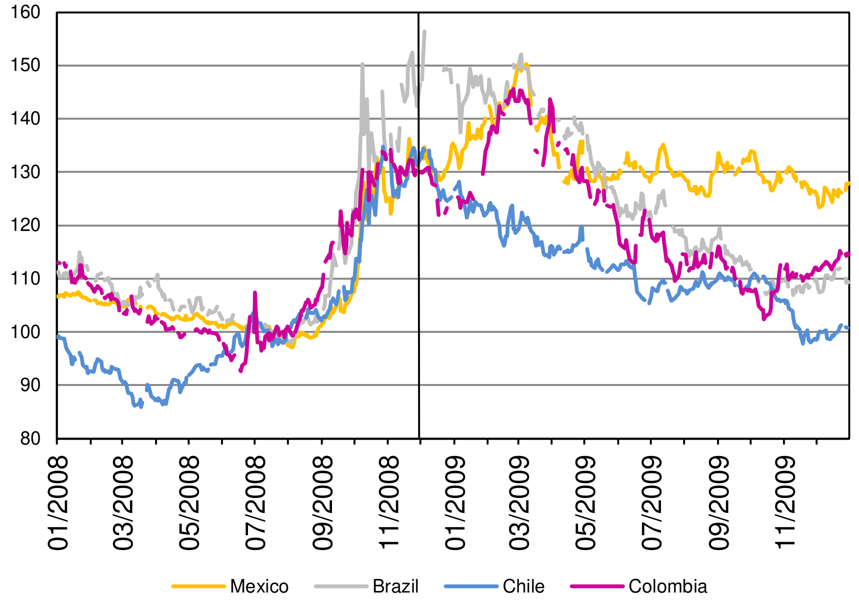
Dependent variable is annual rate of growth of value added in industry i in country j								
	Export boom		**FDI boom**		**Aid boom**		**Remittances boom**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Initial share	32.10**	17.26**	40.83***	18.07**	38.88***	17.66**	40.31***	18.39**
Inflow boom*Exportability1	-21.43***		-1.414		-12.71***		-6.785*	
Inflow boom*Exportability2		-9.723**		6.455		-11.44***		6.959
Excess appreciation*Exportability1	-48.86		-61.17		-60.72		-63.86	
Excess appreciation*Exportability2		-0.918		-3.557		-2.031		6.959
Exchange rate regime	-6.547*	-3.823	-9.045***	-3.972	-8.320**	-3.805	-8.788***	-4.113
Constant	17.32**	16.00*	20.36**	15.81*	25.36***	15.99*	20.98***	16.08*
Underidentification test Chi-sq(2) P-val	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Weak identification test (Cragg-Donald Wald F statistic)	675.3	9,122.0	693.2	9,798.0	686.4	9,142.0	674.7	9,064.0
Hansen test Chi-sq(1) P-val	0.697	0.094	0.747	0.165	0.775	0.098	0.725	0.258
Observations	3,890	3,890	3,890	3,890	3,890	3,890	3,890	3,890
R-squared	0.059	0.052	0.051	0.052	0.054	0.052	0.052	0.052

Source: Authors' calculations.

Note: Estimates are based on the GMM procedure. Lags of the instrumented variable are used as instruments. Standard errors are robust. ***, **, and * denote significance at 1, 5, and 10 percent, respectively. Other notes as in Table 5.

Annex 4 – Nominal Exchange Rate developments

Figure A1.- Nominal Exchange Rate against US dollar, 2008-2009



Source: Statistics from the International Monetary Fund (IMF) and own calculations.
Note: July 2008=100.

Annex 5 – Boom periods

Table A8 – Export boom periods per country per year

	Argentina	**Bolivia**	**Brazil**	**Chile**	**Columbia**	**Ecuador**	**Mexico**	**Panama**	**Peru**	**Uruguay**
1992								1		
1993	0							1		
1994	0						0	1		
1995	1	1		1		1	1	1	1	
1996	1	0	1	1		1	1	1	1	
1997	1	0	1	1		1	1	1	0	
1998	1	0	0	0		0	1	1	0	1
1999	0	0	0	0		0	1	1	0	0
2000	0	0	0	0	0	0	1	1	0	0
2001	0	0	0	0	0	0	1		1	0
2002	0		0	0	0	0	1		1	0
2003			0	0	0	0	0		1	0
2004			0	0	0	0	1		1	0
2005			1	1	0	1	1		0	0
2006			1	1	0	1	1		1	1
2007			1	1	1	1	1			1
2008			1	1	1	1	0			
2009			0		1		0			
2010			1		1		0			

Source: Drafted by the authors

Table A9 – FDI booms per country per year

	Argentina	Bolivia	Brazil	Chile	Columbia	Ecuador	Mexico	Panama	Peru	Uruguay
1992								0		
1993	0							0		
1994	0						0	0		
1995	0	0		0		0	0	0	1	
1996	1	0	0	1		0	0	1	1	
1997	0	1	1	1		1	0	1	0	
1998	0	1	1	0		1	0	0	0	1
1999	1	1	1	1		1	0	0	0	1
2000	1	0	1	0	0	0	1	0	0	1
2001	0	0	1	0	0	0	1		0	0
2002	0		0	0	0	1	1		0	0
2003			0	0	0	1	1		1	0
2004			0	1	0	1	1		1	0
2005			0	0	1	0	1		1	0
2006			0	0	1	0	0		1	1
2007			1	1	1	0	1			1
2008			1	1	1	1	1			
2009			1		0		0			
2010			1		0		0			

Source: Drafted by the authors

Table A10- Aid booms per country per year

	Argentina	Bolivia	Brazil	Chile	Columbia	Ecuador	Mexico	Panama	Peru	Uruguay
1992								1		
1993	1							0		
1994	0						1	0		
1995	0	0		1		1	1	0	0	
1996	0	1	1	1		1	1	1	0	
1997	0	1	1	1		0	0	0	1	
1998	0	0	1	0		0	0	0	1	1
1999	0	0	0	0		0	0	1	1	1
2000	0	0	1	0	0	0	0	1	1	0
2001	1	1	0	0	0	0	0		1	0
2002	1		0	0	0	1	0		1	0
2003			0	0	1	0	0		0	1
2004			0	0	0	0	0		1	1
2005			0	1	0	1	1		1	0
2006			0	1	1	0	1		0	1
2007			1	1	0	1	0			1
2008			1	1	1	1	0			
2009			1		1		1			
2010			1		0		1			

Source: Drafted by the authors

Table A11 – Remittances booms per country per year

	Argentina	Bolivia	Brazil	Chile	Columbia	Ecuador	Mexico	Panama	Peru	Uruguay
1992								0		
1993	1							1		
1994	1						1	1		
1995	1	0		0		1	1	1	1	
1996	0	0	1	0		1	0	0	1	
1997	0	1	1	0		1	0	0	0	
1998	0	1	0	0		0	0	0	0	1
1999	0	0	0	0		1	0	0	0	0
2000	0	1	0	1	0	1	0	1	0	0
2001	1	0	0	1	0	0	0		0	0
2002	1		0	1	0	0	0		1	0
2003			1	1	1	0	1		1	1
2004			1	1	1	0	1		1	1
2005			0	1	0	1	1		1	1
2006			1	0	1	1	1		1	0
2007			1	0	1	1	1			0
2008			1	0	1	0	1			
2009			0		0		0			
2010			0		0		0			

Source: Drafted by the authors

Annex 6 – Summary statistics and panel used

Table A12 – Summary statistics of all included variables

	Obs	Mean	Std.Dev	Min	Max
Growth of manufacturing value added	5045	10.09	139.88	(126.1)	7,426.6
Export boom	5719	0.50	0.50	0	1
FDI boom	5719	0.46	0.50	0	1
Aid boom	5719	0.47	0.50	0	1
Remittance boom	5719	0.51	0.50	0	1
Exportability1	5719	0.52	0.50	0	1
Exportability2	5719	0.13	0.33	0	1
External dependence on capital	5716	0.40	0.38	(0.45)	1.49
Initial share in manufacturing value added	5629	1.47	2.47	0.00	28.52
Excess appreciation	5719	(0.01)	0.36	(1.66)	1.21
Log of broad money	5412	26.64	2.97	21.67	32.29
Interest rate	5719	14.26	13.82	1.24	86.10
Log of foreign reserves	5719	23.19	1.54	20.04	26.38
Exchange rate regime	5719	3.06	1.11	1.00	4.00
Terms of trade changes	5719	106.84	18.35	80.56	189.46
Government balance to GDP	5357	(1.43)	2.15	(5.07)	7.80

Table A13 Unbalanced panel, periods and number of years

Country	Periods of Value Added data available	Number of years
Argentina	1993-2002	10
Bolivia	1995-2001	7
Brazil	1996-2010	15
Chile	1995-2008	14
Colombia	2000-2010	11
Ecuador	1995-2008	14
Mexico	1989, 1994-2010	17
Panama	1992-2001	10
Peru	1995-96; 2001-2010	12
Uruguay	1998-2005; 2007-2008	10
AVERAGE		12
MEDIAN		12

Source: UNIDO

Notes: Number of years for Mexico excludes year 1989. Data for Peru includes years 1995-1996, see gap in year 1997. For Uruguay, there is a gap in year 2006.

Table A14 Unbalanced panel, sectors and number of years

ISIC	Description	Argentina	Bolivia	Brazil	Chile	Colombia	Ecuador	Mexico	Panama	Peru	Uruguay	Total
151	Processed meat,fish,fruit,vegetables,fats	10	7	15	14	11	14	17	9	12	10	**121**
152	Dairy products	10	7	15	14	11	14	14	9	12	9	**117**
153	Grain mill products; starches; animal feeds	10	7	15	14	11	14	17	9	12	9	**120**
154	Other food products	10	7	15	14	11	14	17	9	12	9	**120**
155	Beverages	10	7	15	14	11	14	17	9	12	9	**120**
160	Tobacco products	10	7	15	0	11	14	17	6	7	10	**99**
171	Spinning, weaving and finishing of textiles	10	7	15	14	11	14	17	0	12	10	**112**
172	Other textiles	10	7	15	14	11	14	17	1	12	9	**111**
173	Knitted and crocheted fabrics and articles	10	7	15	14	11	14	14	9	12	9	**115**
181	Wearing apparel, except fur apparel	10	7	15	14	11	13	17	9	12	10	**120**
182	Dressing & dyeing of fur; processing of fur	1	0	0	0	3	11	1	0	12	0	**28**
191	Tanning, dressing and processing of leather	10	7	15	14	11	14	17	9	12	10	**121**
192	Footwear	10	7	15	14	11	14	17	9	12	9	**118**
201	Sawmilling and planing of wood	10	7	15	14	11	14	8	8	12	10	**111**
202	Products of wood, cork, straw, etc.	1	7	15	14	11	14	17	9	12	9	**111**
210	Paper and paper products	10	7	15	1	11	14	17	9	12	10	**108**
221	Publishing	10	7	12	14	11	14	10	9	12	10	**111**
222	Printing and related service activities	10	7	15	14	11	14	17	9	12	0	**111**
223	Reproduction of recorded media	1	7	15	6	0	2	10	0	2	8	**51**
231	Coke oven products	10	0	15	4	2	0	10	0	2	3	**46**
232	Refined petroleum products	10	7	15	0	11	14	17	6	12	9	**101**
233	Processing of nuclear fuel	1	0	2	0	0	0	0	0	0	0	**3**
241	Basic chemicals	10	7	15	14	11	14	17	8	12	10	**120**
242	Other chemicals	10	7	15	14	11	14	17	9	12	9	**120**
243	Man-made fibers	10	1	15	10	4	4	17	0	12	0	**73**

251	Rubber products	10	7	15	14	11	14	17	9	12	10	**120**
252	Plastic products	10	7	15	14	11	14	17	9	12	9	**120**
261	Glass and glass products	10	7	15	14	11	14	17	9	12	10	**121**
269	Non-metallic mineral products n.e.c.	10	7	15	14	11	14	17	9	12	9	**120**
271	Basic iron and steel	10	7	15	14	11	14	17	7	12	6	**115**
272	Basic precious and non-ferrous metals	10	7	15	14	11	14	17	9	12	0	**109**
273	Casting of metals	10	7	15	0	2	13	13	0	12	0	**72**
281	Struct.metal products;tanks;steam generators	10	7	15	14	11	14	17	9	12	10	**121**
289	Other metal products; metal working services	10	7	15	14	11	14	17	9	12	9	**120**
291	General purpose machinery	10	7	15	14	11	13	17	1	12	10	**112**
292	Special purpose machinery	10	7	15	14	11	11	17	1	12	9	**107**
293	Domestic appliances n.e.c.	10	4	15	14	11	14	14	0	12	9	**103**
300	Office, accounting and computing machinery	10	0	15	1	3	1	17	0	12	9	**68**
311	Electric motors, generators and transformers	10	4	15	14	11	14	17	1	12	8	**106**
312	Electricity distribution & control apparatus	1	7	12	14	11	14	8	0	12	0	**81**
313	Insulated wire and cable	10	7	12	14	11	13	17	0	12	0	**96**
314	Accumulators, primary cells and batteries	10	7	15	10	11	14	14	0	12	0	**93**
315	Lighting equipment and electric lamps	1	7	15	14	11	14	17	1	12	0	**92**
319	Other electrical equipment n.e.c.	1	0	15	14	11	12	14	0	12	0	**79**
321	Electronic valves, tubes, etc.	10	0	15	14	11	0	17	0	11	7	**85**
322	TV/radio transmitters; line comm. apparatus	1	0	15	5	10	12	17	0	12	0	**72**
323	TV and radio receivers and associated goods	10	0	15	9	11	8	17	0	12	0	**82**
331	Medical, measuring, testing appliances, etc.	10	5	15	14	11	13	16	1	6	7	**98**
332	Optical instruments & photographic equipment	1	7	15	14	11	14	17	0	6	0	**86**
333	Watches and clocks	1	0	12	14	0	0	1	0	6	0	**34**
341	Motor vehicles	10	0	15	14	11	14	17	0	12	8	**101**
342	Automobile bodies, trailers & semi-trailers	10	7	15	14	11	14	17	1	8	0	**99**
343	Parts/accessories for automobiles	10	7	15	14	11	14	17	1	12	0	**101**
351	Building and repairing of ships and boats	10	0	15	14	11	14	17	1	12	10	**105**
352	Railway/tramway locomotives & rolling stock	10	1	15	5	0	0	17	0	10	0	**58**

353	Aircraft and spacecraft	1	0	15	14	11	0	3	0	10	2	**56**
359	Transport equipment n.e.c.	10	1	15	14	11	13	17	0	12	9	**102**
361	Furniture	10	7	15	14	11	14	17	1	12	10	**113**
369	Manufacturing n.e.c.	10	7	15	14	11	14	17	1	12	9	**112**
371	Recycling of metal waste and scrap	0	0	12	0	0	0	0	0	0	3	**15**
372	Recycling of non-metal waste and scrap	0	0	12	0	0	0	1	0	2	0	**15**
	Total	**491**	**303**	**869**	**681**	**563**	**685**	**882**	**235**	**646**	**364**	**5,777**
	Period	1993-2002	1995-2001	1996-2010	1995-2008	2000-2010	1995-2008	1989, 1994-2010	1992-2001	1995-1996; 2001-2010	1998-2005; 2007-2008	
	Number of years	10	7	15	14	11	14	17	10	12	10	
	Average Industries per year	49	43	58	49	51	49	52	24	54	36	
		Argentina	**Bolivia**	**Brazil**	**Chile**	**Colombia**	**Ecuador**	**Mexico**	**Panama**	**Peru**	**Uruguay**	**Total**

Source: UNIDO.

Note: Each time an industry appears it represents a year. For instance, for Brazil most industries (on average 58, out of 61 possible) appear throughout the 15 years of the data available for this country (1996-2010) .