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Latin America after the global crisis: the role of export-led and tradable-led growth regimes

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Is the ongoing economic slowdown in industrialized countries likely to impact Latin American growth negatively in the medium- to long-run? This paper considers various transmission channels that work through trade in goods and services, and finds econometric evidence suggesting that shrinking global imbalances may create problems for Latin America. Specifically, using panel data analysis, we find that the trade balance as a proportion of GDP is positively associated with Latin American economic growth over the period 1953–2009. We then develop a simple dynamic model to help explain our main finding through investment and saving behaviour.

Keywords: export-led growth; tradable-led growth; global imbalances; industrialization; capital accumulation

JEL Classifications: F43; O11, O54

1. Motivation and background

Unlike the East Asian tigers, Latin America as a region has not been known for sustained and rapid growth in recent years. Indeed, if anything, Latin America has witnessed two 'lost decades' spanning the 1980s and 1990s in the last half century. Not surprisingly then, information from the World Bank's World Development Indicators (WDI) shows that while Latin America's per capita income was 50% higher than East Asia's in 1970, the difference between the two regions completely vanished in 2000. Even more dramatic is the comparison among Latin American and East Asian *developing* economies. The divergence in growth rates since the 1980s helped Developing East Asia reduce its GDP per capita deficit with Developing Latin America from 14 times in 1960 to just two times in 2010. However, more recently, in part because of the commodity price boom since 2003, Latin America experienced renewed growth up until the years leading to the global financial crisis of 2008. The big question that now looms over the future is that of whether this renewed growth is sustainable in the face of shrinking advanced country imports and current account imbalances (see Figure 1)? This paper attempts to provide some preliminary answers.

In order to understand future prospects, we need to delve into historical data and explore how various external factors have affected Latin American growth in the

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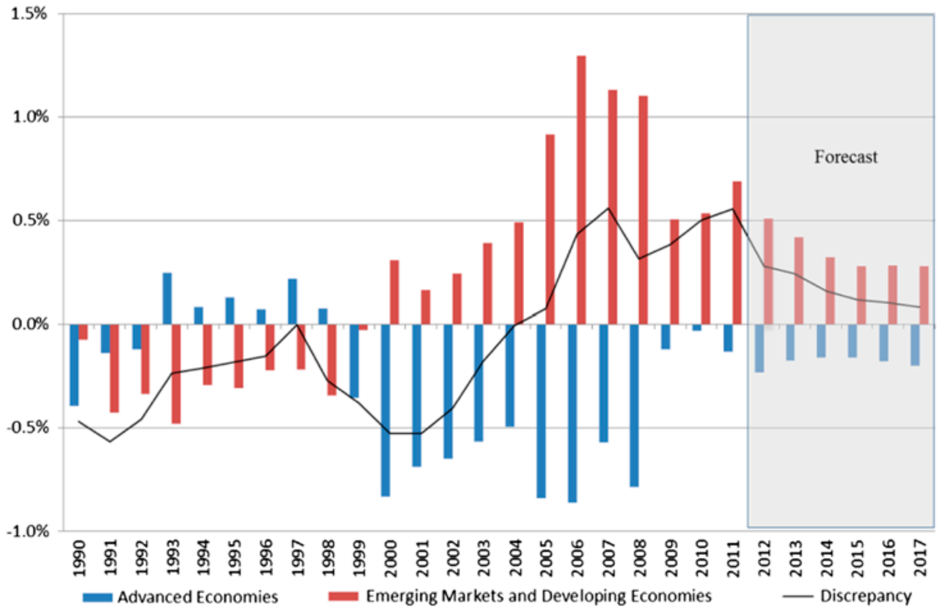

Figure 1. Global imbalances (current account balance as a percentage of World GDP). Source: World Economic Outlook – IMF (October 2012).

past. This paper focuses on the transmission mechanisms that work through trade in goods and services. Four such broad mechanisms or 'growth regimes' emerge from the literature:[1]

(1) Net export-led growth (NET_EXPORT): Net export or trade surplus-led growth is perhaps one of the most well-known *macroeconomic* mechanisms by which trade is thought to boost growth. The idea is usually interpreted in a short-run Keynesian sense, where prices are sticky and output is demand-driven. In such an environment, a boost to aggregate demand growth due to increased foreign spending on domestic goods will boost domestic income growth. However, unlike the traditional interpretation, the effects need not be short run or temporary. For example, growth in the Balance of Payments-Constrained Growth (BPCG) framework, developed originally by Thirlwall (1979), is constrained by the current account balance. In the presence of nominal price rigidity, current account deficits (surpluses) are removed through expenditure contraction (expansion). The presence of current account surpluses can, Thirlwall and others have argued, have long-run effects as investors increase spending on capital goods in response to higher world demand. In a later section, we provide an alternative mechanism through which world growth could simultaneously cause current account surpluses and boost medium-run growth.

(2) Manufactured exports-led growth (MANUF_EXPORT): One strand of literature has emphasized the special nature of manufactured exports as harbingers of technological progress. This literature emphasizes the supply-side aspects related to exports rather than the demand-side aspects of net exports. Feder

(1983) represents a major contribution in this tradition. In Feder's two sector model, the output of the non-export sector depends not only on the factors of production (labor and capital) but also on exports. This captures the externalities associated with factors unique to exports such as higher quality labor, internationally competitive management, etc. Moreover, the marginal product of factors in the export sector is greater than that in the non-export sector. Thus, exports, from this perspective, can potentially influence productivity and growth independently of their impact on the external balance.[2]

(3) Industrialized country-led export growth (EXPORT_TO_INDUS): Yet another strand of literature devotes pride of place to manufactured exports to *industrialized* countries. In this view, which can be placed against the background of the recent body of literature on learning-by-exporting and other export-related externalities, the process of exporting to industrialized countries is special because it is these countries where both competition and expectations of product quality are high. Empirical support for this view comes from both econometric studies[3] and circumstantial evidence.[4]

(4) Tradable sector-led growth strategy (TRADABLE): Finally, the mechanism that connects the production of exportables and import-substitutes – tradables in short – to domestic output growth may have more to do with the nature of the tradable sector itself, rather than that of exports. In other words, there may be something special about the tradable sector, regardless of whether its product is consumed at home or abroad. The tradable sector in developing countries is generally associated with industrial production.[5] If tradable production boosts technological change or moves labor from low-productivity to high productivity sectors, then the expansion of this sector has beneficial consequences, regardless of the source of consumption.[6]

The four channels described here can be influenced differently by recent developments in the world economy. In particular, given the focus of our paper, prospects for continued growth in Latin America following present global problems could be strong or weak depending on which channel has been the most salient in the region. Specifically, consider the question: are shrinking industrialized country trade imbalances in the aftermath of the recent global crisis necessarily bad for Latin American countries? The question is poorly phrased, at least in a macroeconomic sense, unless we spell out the mechanism through which the Latin American economies benefit or lose from trade in goods and services with the rest of the world. Canuto, Haddad, and Hanson (2010), for example, argue that developing countries have 'decoupled' over time from the advanced economies with growing South–South trade substituting for South–North trade. Latin American data (from the WDI) shows, for instance, that in 1960, for each dollar's worth of goods that the region exported to developing economies, nine dollars were exported to high income economies. In 2011, by contrast, Latin American merchandise exports to developing economies accounted for 32% of the total. The implication is that if NET_EXPORT has been the salient regime underlying Latin American growth, then the shrinkage of industrial country demand for Latin American products in the aftermath of the Great Recession need not matter for growth as long as trade balances with other developing countries improve sufficiently to offset re-balancing between Latin America and the North. If, on the other hand, there is something special about exporting to industrialized economies, then shrinking imbalances matter, especially if these originate from lower imports into these countries; a very likely scenario given stagnant aggregate demand in the North. Put differently, South–South trade is not a good substitute for South–North trade in this case and shrinking global imbalances darken Latin American prospects, at least over the medium-run.

Finally, if it is the tradable sector as a whole that is special in Latin American countries, rather than the production of exportables, then the slowdown of industrial country growth and the accompanying winding down of global imbalances need not constitute a source of concern for these countries. As Rodrik (2009) argues, an appropriate mix of production and consumption subsidies should enable a growing output of tradables to be consumed at home without any medium-run deceleration of growth.

Table 1 summarizes the different growth regimes discussed above and the implications for each of slower industrialized country growth.[7] The next section econometrically investigates the relevance of these regimes in light of the Latin American experience. Section 3 presents a simple dynamic model to partly explain our key finding. Section 4 concludes.

2. The empirics

2.1. Empirical strategy

The relative importance of the different versions of export-led growth, and tradable-led growth is examined with the following baseline regression for the dependent variable: the rate of real (chained) GDP per capita growth (*GRGDPCH*).

$$GRGDPCH_{j,t} = \alpha + \beta_0 \ln RGDPCH_{j,t-1} + \sum_{i=0}^{2} \delta_i TRADABLE_{j,t-i} + \sum_{i=0}^{2} \gamma_i MANUF\_EXPORT_{j,t-i} + \sum_{i=0}^{2} \lambda_i NET\_EXPORT_{j,t-i} + \sum_{i=0}^{2} \pi_i EXPORT\_TO\_INDUS_{j,t-i} + f_t + f_j + \varepsilon_{j,t}$$

Table 1. Growth regimes.

Growth Regimes in Developing Economies			Shrinking trade deficits in advanced economies necessarily bad	Shrinking demand in advanced economies necessarily bad
Tradable-led growth		*TRADABLE*	No	No
Export-led growth driven by:	manufactured exports	*MANUF_EXPORT*	No	No
	current account surpluses	*NET_EXPORT*	Yes	No
	exports to industrialized countries	*EXPORT_TO_INDUS*	No	Yes

The right-hand side includes: (i) real GDP per capita (*RGDPCH*) in the previous period, to control for convergence; (ii) a proxy for the regime that we have called tradable-led growth (*TRADABLE:* value added in industry as a proportion of GDP); (iii) a proxy for manufactured export-led growth (*MANUF_EXPORT:* manufactured exports as a proportion of GDP); (iv) a proxy for net export-led growth (*NET_EXPORT:* external balance of goods and services as a proportion of GDP); and (v) a proxy for industrialized country-centered export-led growth (*EXPORT_TO_INDUS:* manufactured exports destined for developed countries as a proportion of total manufactured exports). Finally the regression includes time and country fixed effects (f), and the error term (ε). The subscripts j and t represent countries and time, while i (=0, 1, 2, ...) reflects lags.

Table 2 summarizes the variable definitions along with their source and sample details. For *TRADABLE*, *MANUF_EXPORT*, and *NET_EXPORT*, information was obtained from the World Bank's World Development Indicators (WDI). The definition for Industry used by the WDI includes the following activities of the International Standard Industrial Classification (ISIC): (i) Mining and Quarrying; (ii) Manufacturing; (iii) Electricity, Gas, and Water Supply; and (iv) Construction. The excluded sectors are basically Agriculture, Fishing, and Services. For the construction of *EXPORT_TO_INDUS*, data were obtained from the United Nation's COMTRADE database.

Our sample consists of a maximum of 33 Latin American countries (LA-33), 20 advanced economies (OECD), and time series from 1953 to 2009. In order to remove short run fluctuations, while taking into consideration the sample size constraints, we use the 3-year averages of our variables of interest. In addition to the sample LA-33, we also study three sub-samples of countries. Sub-sample LA-15 consists of the largest 15 Latin American economies. We focus our analysis on this group of economies that represents approximately 98% of the total Latin American GDP. Countries selected for this subsample had a nominal GDP in 2006 that was higher than the median of the entire sample. The group of primary commodity exporters, consists of 17 countries where the ratio primary exports/merchandise exports was greater than the median for Latin America (75.4%). Primary exports include agricultural raw materials, food, fuel, and ores and metals exports. Finally, we have a sample consisting of 16 exporters of non-primary goods (LA-33 after excluding primary commodity exporters).

Table 3 summarizes the main descriptive statistics for the key variables for the samples LA-33 and LA-15. Figure 2 provides the corresponding histograms for LA-15. The descriptive statistics show that the average growth rate in Latin America for both LA-33 and LA-15 is around 2%. The maximum growth rate in our LA-15 sample is 10.49% (Trinidad and Tobago, 2007–2009) and the minimum is –8.47% (Peru, 1989–1991). Most of the observations (76%) lie within plus/minus one standard deviation around the mean. In the case of industry as a proportion of GDP, distributions for LA-33 and LA-15 are also quite similar in terms of maximum and minimum values, and dispersion. As in the case of the dependent variable, most of the observations for industry as a proportion of GDP in LA-15 (70%) lie between the mean and the mean plus/minus-one standard deviation. For manufactured exports as a proportion of GDP, distributions for LA-15 and LA-33 are again similar. An important difference in sample distributions appears for the external balance of goods and services as a proportion of GDP. The average for this variable in LA-15 is close to 0%. However, for LA-33, the average current account deficit is 5.7%

Table 2. Data and sample definitions.

Code	Definition	Source	Coverage
GRGDPCH	Geometric growth rate of (chained) real GDP per capita	PWT 7.0	1950–2009
RGDPCH	(Chained) real GDP per capita	PWT 7.0	1950–2009
TRADABLE	Industry value added (% of GDP)	WDI	1960–2009
MANUF	Manufacturing value added (% of GDP)	WDI	1960–2009
MANUF_EXPORT	Manufactured exports (% of GDP). Calculation based on manufactured exports (% of merchandise exports), merchandise exports (current US$), and GDP (current US$)	Authors' calculations based on WDI	1960–2009
NET EXPORT	External balance on goods and services (% of GDP)	WDI	1960–2009
EXPORT_TO_INDUS	Manufactured exports (SITC 5–8) to developed countries as a proportion of manufactured exports to World	UN COMTRADE	1962–2009
GFCF_PROP_GDP	Gross fixed capital formation as a proportion of GDP	WDI	1960–2009
GG	Government spending as a share of GDP	WDI	1960–2009
LENR	Real lending interest rate. Calculation based on nominal lending interest rates, and consumer prices inflation.	WDI	1980–2009
CA_GDP	Current account balance (% of GDP)	ECLAC	1980–2009
OPENC	Openness [(exports+imports)/GDP]	WDI	1960–2009
SAV_GDP	Saving as a proportion of GDP	WDI	1960–2009
TOT	Terms of trade	WDI	1960–2009
Developed Countries	Australia, Austria, Belgium, Canada, Denmark, France, Germany, Greece, Iceland, Ireland, Japan, Luxembourg, Netherlands, New Zealand, Portugal, Spain, Sweden, Switzerland, United Kingdom, and United States		
Latin America (33 Countries)	Antigua and Barbuda, Argentina, The Bahamas, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago, Uruguay, and Venezuela		
Latin America (15 Countries)	Brazil, Mexico, Argentina, Venezuela, Colombia, Chile, Peru, Ecuador, Dominican Republic, Guatemala, Costa Rica, Uruguay, El Salvador, Trinidad and Tobago, and Panama		

(*Continued*)

Table 2. (*Continued*).

Code	Definition	Source	Coverage
Primary Commodity Exporters	Argentina, Belize, Bolivia, Chile, Colombia, Cuba, Ecuador, Grenada, Guyana, Honduras, Nicaragua, Panama, Paraguay, Peru, St. Vincent and the Grenadines, Trinidad and Tobago, and Venezuela		

of GDP. This difference is mostly explained by some Caribbean economies (Dominica, Grenada, St. Kitts and Nevis, St. Lucia, and St. Vincent and the Grenadines) that have had periods where the current account deficit has been higher than 30% of the GDP. Finally, the distributions for our proxy for EXPORT_TO_INDUS do not show substantial differences in the LA-15 and the LA-33 samples. The variable ranges from 1.51% (Guatemala, 1968–1970) to 94.48% for Mexico (1998–2000), not surprising for a country that has concentrated its exports to the United States for a long time.

As part of our econometric strategy, we first obtain Ordinary Least Square (OLS) estimates for our baseline regression. These estimates may, however, be biased. Variables in our specification may not be orthogonal to the error term because the rate of growth might simultaneously determine the regimes. For example, a current account deficit as a proportion of GDP might be the result of faster investment and output growth. Moreover, our proxies for the strategies may show persistence over time and have lagged effects on the dependent variable. Therefore, given our interest in exploring the causality running from the different regimes to growth in per capita real GDP, we estimate dynamic panel data models based on the Arellano-Bover General Method of Moments (GMM). These GMM specifications include the lagged dependent variable. We use lags of the dependent variable and the third lags of our key variables for the set of instruments. The Sargan test of over-identifying restrictions is employed to test the validity of our instruments.

In addition to our baseline regressions, we also estimate more parsimonious specifications. The simplification criterion consists of removing one by one the non-significant variables in the general model, preserving the horse-race nature of our regression in the general model. Alternative specifications are useful to examine our results in the general model, since, given the asymmetrical availability of data for each key variable, use of the more parsimonious model helps relax the limits imposed on the maximum number of observations used in a common sample.

2.2. Econometric results

Table 4 reports our main results using the entire sample of Latin American countries. The upper half of the Table lists the estimated coefficients while the lower half includes the calculated long-run coefficients.[8] OLS regressions (columns (1) and (2)) do not display a clear winning regime in our 'horse-race' approach. The convergence term coefficient is significant and has the expected negative sign. However, the baseline GMM regression (column (3)), dealing with potential problems of endogeneity, shows that *NET_EXPORT* is the only variable with a statistically significant *long run* effect on growth. The convergence term in the baseline GMM is still negative and

Table 3. Summary statistics.

	GRGDPCH	*TRADABLE*	*MANUF_EXPORT*	*NET_EXPORT*	*EXPORT_TO_INDUS*	
LA-33						
Mean	1.98	28.77	5.44	-5.66	45.91	
Median	2.07	27.65	3.40	-3.42	43.53	
Maximum	10.49	58.92	72.78	28.36	98.66	
Minimum	-11.09	13.94	0.01	-47.67	1.51	1.18408
Std. Deviation	3.20	8.82	6.96	10.27	25.49	
Observations	554	400	424	484	400	
LA-15						
Mean	2.09	33.04	4.63	-0.46	41.39	
Median	2.29	31.91	3.33	-1.22	41.19	
Maximum	10.49	58.92	24.37	28.36	94.48	
Minimum	-8.47	15.60	0.07	-19.86	1.51	1.13258
Std. Deviation	2.90	8.85	5.02	6.23	22.96	
Observations	285	191	227	248	216	

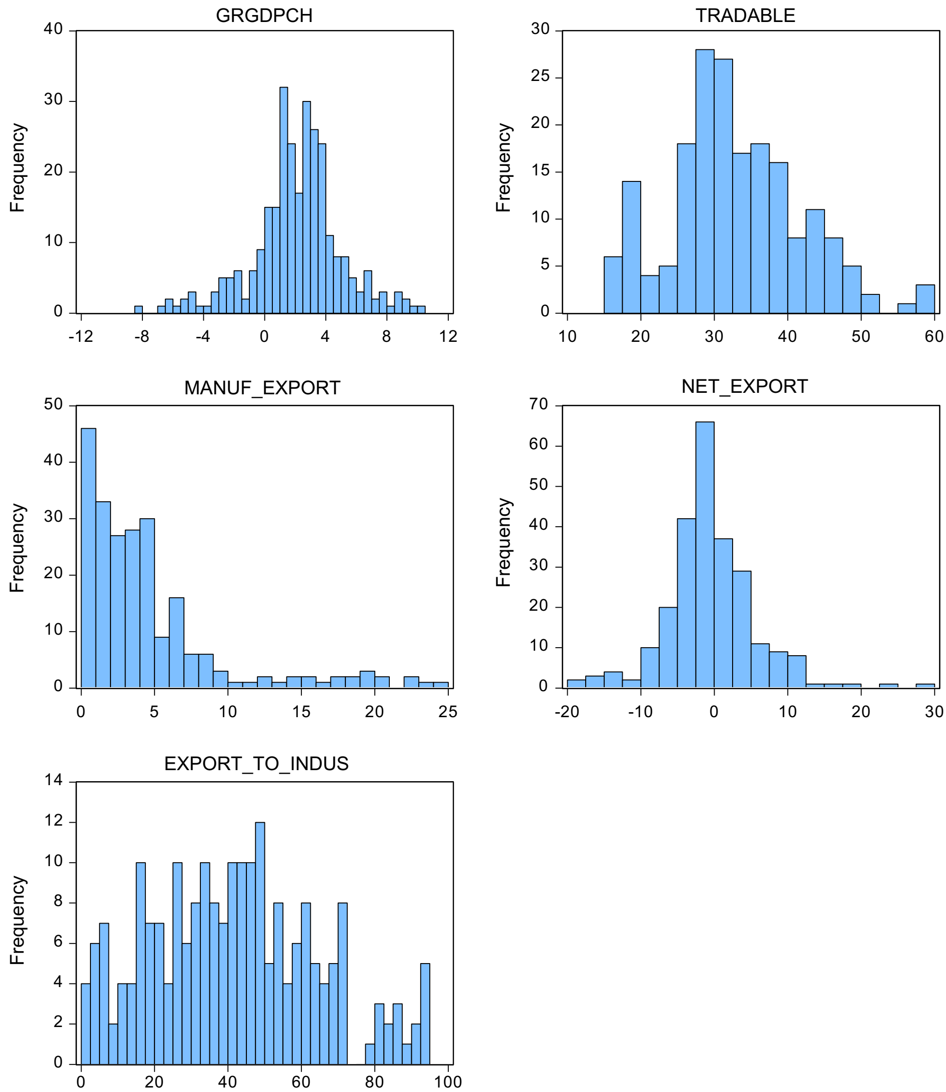

Figure 2. Histograms of main variables of interest (LA-15, 1953–2009).

significant. Some other individual coefficients are also significant: a positive estimate for $TRADABLE_t$, a positive estimate for $MANUF\backslash EXPORT_{t-1}$ and a negative estimate for $MANUF\backslash EXPORT_{t-2}$. The specific GMM regression (column (4)), resulting from the elimination one by one of the variables whose estimates were not individually significant, confirms our results from the baseline GMM regression. Notice that the number of observations in this specific GMM regression is substantially higher than in the baseline GMM regression. *NET_EXPORT* is again the only growth regime variable with a positive and significant long-run coefficient. For the entire sample, LA-33, a one standard deviation variation in $NET\backslash EXPORT_{t-1}$ boosts economic growth by 0.37 standard deviations. This is approximately 1.18 percentage points of growth, a noticeable effect given that the mean of *GRGDPCH* in LA-33 is 1.98%.

Table 4. Baseline growth regressions, 1953–2009.

Dependent variable: *GRGDPCH* (Growth rate of real GDP per capita)[a]

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	OLS Baseline LA-33	OLS Specific LA-33	GMM Baseline LA-33	GMM Specific LA-33	OLS Baseline LA-15	OLS Specific LA-15	GMM Baseline LA-15	GMM Specific LA-15	GMM Specific LA-15	GMM Specific LA-15
Constant	46.6747***	25.4342***			33.2758***	36.9741***				
	(4.13)	(3.94)			(2.76)	(2.75)				
$GRGDPCH_{t-1}$			0.3052***	0.2940***			0.1857***	0.2186***	0.2051***	0.2023***
			(5.13)	(6.27)			(2.66)	(3.56)	(4.62)	(4.65)
Ln $RGDPCH_{t-1}$	-5.1735***	-2.7434***	-7.3106***	-6.9554***	-3.5165**	-4.1250**	-4.6269***	-4.8897***	-5.5147***	-5.4427***
	(-3.78)	(-3.64)	(-5.65)	(-6.28)	(-2.47)	(-2.52)	(-3.94)	(-5.01)	(-4.94)	(-5.01)
$TRADABLE_t$	0.0779		0.0996*		0.1358	0.0977***	0.2304***	0.2130***		
	(0.88)		(1.72)		(1.47)	(2.75)	(3.26)	(3.28)		
$TRADABLE_{t-1}$	0.0447		-0.0576		-0.0118		-0.1443*	-0.1927***		
	(0.36)		(-0.85)		(-0.14)		(-1.69)	(-3.13)		
$TRADABLE_{t-2}$	-0.1067		0.0462		-0.0872		-0.0122			
	(-1.47)		(0.74)		(-1.02)		(-0.17)			
$MANUF\_EXPORT_t$	-0.0417		0.0285		-0.2078*	-0.1776*	-0.2621**	-0.2324***		
	(-0.44)		(0.42)		(-1.72)	(-1.85)	(-2.60)	(-3.26)		
$MANUF\_EXPORT_{t-1}$	0.0266		0.1566*	0.1661***	0.2011	0.2716***	0.2697*	0.1675**		
	(0.30)		(1.95)	(2.74)	(1.60)	(2.96)	(1.86)	(2.00)		
$MANUF\_EXPORT_{t-2}$	0.0425		-0.1663***	-0.1345**	0.0261		-0.0666			
	(0.80)		(–2.86)	(–2.39)	(0.20)		(–0.65)			
NET_EXPORT_t	-0.0619*		-0.0293		-0.0613		-0.1210**	-0.1557***	-0.0015	
	(–1.90)		(–0.85)		(–1.15)		(–2.38)	(–3.31)	(–0.0391)	
NET_EXPORT_{t-1}	0.0721		0.1204***	0.0867***	0.1856***	0.2142***	0.2291***	0.3059***	0.1578***	0.1556***
	(1.54)		(2.83)	(2.62)	(2.96)	(7.84)	(3.63)	(5.58)	(3.84)	(4.12)
NET_EXPORT_{t-2}	0.0262		0.0126		0.0660		0.0547			
	(0.50)		(0.29)		(1.24)		(0.79)			
$EXPORT\_TO\_INDUS_t$	0.0062		-0.0308		0.0071		-0.0298			
	(0.23)		(–1.25)		(0.22)		(–0.89)			
$EXPORT\_TO\_INDUS_{t-1}$	-0.0074		0.0254		0.0129		0.0567			
	(–0.20)		(0.84)		(0.18)		(1.47)			
$EXPORT\_TO\_INDUS_{t-2}$	-0.0004		0.0036		-0.0491	-0.0566**	-0.0220			
	(–0.0117)		(0.17)		(–0.96)	(–2.46)	(–0.85)			

Time Dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Country Dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Long-run coefficients (sum of the individual coefficients)										
TRADABLE	0.0158		0.1269		0.0309	0.0977***	0.0908	0.0260		
Wald statistic	0.12		2.11		0.85	7.58	2.01	0.17		
p-value	[0.73]		[0.15]		[0.36]	[0.01]	[0.16]	[0.68]		
MANUF_EXPORT	0.0274		0.0270	0.0448	0.0194	0.0940	-0.0725	-0.0831		
Wald statistic	0.12		0.15	0.85	0.05	1.77	0.54	1.47		
p-value	[0.72]		[0.70]	[0.36]	[0.82]	[0.18]	[0.46]	[0.23]		
NET_EXPORT	0.0365		0.1492*	0.1228***	0.1902***	0.2142***	0.2000***	0.1923***	0.1966***	0.1951***
Wald statistic	0.59		3.26	6.31	7.04	61.47	4.48	6.95	11.52	15.84
p-value	[0.44]		[0.07]	[0.01]	[0.01]	[0.00]	[0.03]	[0.01]	[0.00]	[0.00]
EXPORT_TO_INDUS	-0.0016		-0.0026		-0.0291	-0.0566***	0.0060			
Wald statistic	0.00		0.01		0.85	6.05	0.03			
p-value	[0.95]		[0.94]		[0.36]	[0.01]	[0.87]			
Adjusted *R*-squared	0.36	0.23			0.48	0.52				
J-statistic			138.39	145.43			66.52	67.34	89.01	88.83
Instrument rank			150	153			94	94	103	103
Sargan test (*p*-value)			0.18	0.27			0.53	0.69	0.39	0.43
Serial correlation in the residuals	0.25	0.28	0.10	0.05	0.19	0.19	0.09	0.12	0.08	0.08
p-value (Wooldridge's test)	0.00	0.00	0.23	0.37	0.03	0.02	0.34	0.20	0.27	0.27
Cross-sections included	29	33	27	30	14	15	14	14	15	15
Observations	243	535	181	260	143	160	113	117	188	188

[a](*t*-statistic), $*p<0.10$, $**p<0.05$, $***p<0.01$. Long-run GMM estimates correspond to the sum of short-run coefficients divided by one minus the estimate for *GRGDPCHt*–1. Long-run OLS estimates are simply the sum of the short-run coefficients.

Columns (5)–(10) focus on the sub-group LA-15. As mentioned before, these countries are the largest economies in Latin America and represent 98% of the total Latin American GDP. Both OLS and GMM regressions validate the robustness of our coefficients for the NET_EXPORT regime. Interestingly, the long run coefficient for *NET_EXPORT* is very similar across different specifications, ranging between 0.19 and of 0.20.[9] Also interesting in terms of our specification is the fact that the GMM specific regression (column (8)), which was the result of one by one removing insignificant variables, includes exactly the same variables whose estimates were significant in column (7). Furthermore, column (10) shows that exclusion of the variables capturing the other growth regimes does not affect the magnitude of the coefficient. The robustness of the results holds if we compare the standardized long-run coefficients for the regressions for LA-33 and LA-15. For LA-15, a one standard deviation variation in $NET\backslash EXPORT_{t-1}$ boosts economic growth by 0.39 standard deviations (1.13 percentage points). The similarity in the effect for the samples LA-33 and LA-15 occurs because the difference in the long run estimates in columns (4) and (10) is offset by a lower standard deviation of $NET\backslash EXPORT_{t-1}$ in LA-15. The standard deviation in LA-33 (9.64) is 1.7 times the standard deviation in LA-15 (5.80).

Although our GMM regressions use instruments whose validity cannot be rejected by the Sargan test, it is also worth noting that that if there were any feedback from *GRGDPCH* to *NET_EXPORT*, it is likely to be negative rather than positive. Higher economic growth usually drives an expansion of imports that reduces current account surpluses. If this is the case, the bias in our estimate would tend to dampen any positive effect of *NET_EXPORT* on *GRGDPCH*. Furthermore, Granger Causality tests – available on request – reject the hypothesis that *NET_EXPORT* does not Granger cause *GRGDPCH* while being unable to reject the hypothesis that *GRGDPCH* does not Granger cause *NET_EXPORT.* Figure 3 presents scatter plots for the relationship between $NET\backslash EXPORT_{t-1}$ and lags of *GRGDPCH* for LA-15. These too point in the direction of causality running from $NET\backslash EXPORT_{t-1}$ towards *GRGDPCH.* Data display a positive correlation between $NET\backslash EXPORT_{t-1}$ and *GRGDPCH*, while the correlation between $NET\backslash EXPORT_{t-1}$ and lagged per capita growth rates is practically non-existent.[10]

Our estimates are also robust to specifying different temporal subsamples (Table 5). We divide the time frame into three periods, the first one from 1953 to 1994, the second from 1989 to 2009, and finally, from 1953 to 2003, which excludes the most recent years previous to the global economic crisis and the commodity price boom. The division into overlapping periods is not ideal but given the relatively small sample size we try to balance the number of observations for each group of regressions in the first two subsamples. Furthermore, the subsample 1989–2009 can be considered as the post 1980s' crisis period, marked by trade liberalization, and orthodox fiscal and monetary policies oriented towards macroeconomic stability. For the period 1989–2009, the long-run coefficient on *NET_EXPORT* is 0.30 (1.5 times higher than the estimate for the full sample), while for the period 1953 to 2003, it is much lower (0.12). These regressions suggest that the net export led growth regime has been relatively more important during the recent commodity price boom.

Since our results suggest a magnified effect of *NET_EXPORT* in Latin America during the recent commodity prices boom, we next explore whether countries that are more dependent on primary exports also depend more on the net export-led

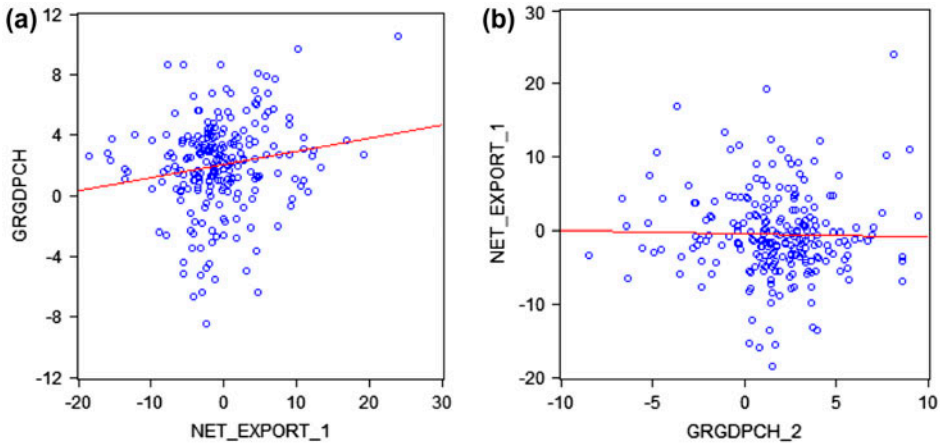

Figure 3. Scatter plots for (a) $GRGDPCH_t$ vs. $NET\backslash EXPORT_{t-1}$, (b) $NET\backslash EXPORT_{t-1}$ vs. $GRGDPCH_{t-2}$.

Table 5. Growth regressions for temporal subsamples.

Dependent variable: *GRGDPCH* (Growth rate of real GDP per capita)[a]	(1)	(2)	(3)
	GMM LA-15 1953–1994	GMM LA-15 1989–2009	GMM LA-15 1953–2003
$GRGDPCH_{t-1}$	0.1761** (2.48)	0.1307** (2.04)	0.2461*** (4.55)
$Ln\ RGDPCH_{t-1}$	-9.8367*** (–6.03)	-7.3115*** (–3.94)	-7.0844*** (–5.48)
NET_EXPORT_{t-1}	0.1385*** (2.93)	0.2581*** (4.43)	0.0934** (2.13)
Time dummies	yes	yes	yes
Country dummies	yes	yes	yes
Long-run coefficients (sum of the individual coefficients)			
NET_EXPORT	0.1681***	0.2969***	0.1239**
Wald statistic	8.41	15.74	4.50
p-value	[0.00]	[0.00]	[0.03]
J-statistic	56.06	53.70	75.67
Instrument rank	63	58	87
Sargan test (*p*-value)	0.33	0.27	0.39
Serial correlation in the residuals	0.03	0.13	0.06
p-value (Wooldridge's test)	0.79	0.17	0.49
Cross-sections included	15	15	15
Observations	113	104	158

[a](*t*-statistic), $*p<0.10$, $**p<0.05$, $***p<0.01$. Long-run GMM estimates correspond to the sum of short-run coefficients divided by one minus the estimate for *GRGDPCHt*–1.

growth regime. We divide our LA-33 sample into two groups: primary commodity exporters and others. Columns (1) and (2) in Table 6 present our estimates for the effect of $NET\backslash EXPORT_{t-1}$ on economic growth. Confirming our expectations, the long run estimate for primary commodity exporters is substantially higher. The net export led-growth regime seems to have a more important role in this group of Latin American countries than in non-primary commodity exporters. In both cases, however, our individual and long run estimates of $NET\backslash EXPORT_{t-1}$ are positive and statistically significant. As an additional test, we include in columns (3) and (4) the proxy for the competing tradable-led growth regime. Interestingly, the estimate for $TRADABLE_t$ is positively significant for non-primary commodity exporters in the long run. Furthermore, standardized coefficients of the independent effect of $NET\backslash EXPORT_{t-1}$ and $TRADABLE_t$ are approximately the same. A one standard deviation variation in each of these variables raises the growth rate by 0.22 standard deviations (0.65 percentage points). It is clear from these regressions that, on average, the role of the net export-led growth regime is more important in primary commodity exporters. However, its impact is still important in non-primary commodity exporters.

Table 6. Growth regressions for primary and non-primary commodity exporters.

Dependent variable: *GRGDPCH* (Growth rate of real GDP per capita)[a]	(1)	(2)	(3)	(4)
	GMM Primary Exporters	GMM Non-Primary Exporters	GMM Primary Exporters	GMM Non-Primary Exporters
$GRGDPCH_{t-1}$	0.3186***	0.2300***	0.3527***	0.1455***
	(7.56)	(4.89)	(8.29)	(2.98)
Ln $RGDPCH_{t-1}$	-6.5596***	-10.4499***	-5.9933***	-11.5931***
	(-7.41)	(-8.20)	(-6.41)	(-9.55)
NET_EXPORT_{t-1}	0.1165***	0.0609*	0.1668***	0.0599**
	(2.95)	(1.70)	(5.02)	(2.04)
$TRADABLE_t$			0.0230	0.0738**
			(0.40)	(2.31)
Time dummies	yes	yes	yes	yes
Country dummies	yes	yes	yes	yes
Long-run coefficients (sum of the individual coefficients)				
NET_EXPORT	0.1710***	0.0790*	0.2577***	0.0700**
Wald statistic	7.75	2.68	22.61	3.83
p-value	[0.00]	[0.10]	[0.00]	[0.05]
TRADABLE			0.0355	0.0864**
Wald statistic			0.16	4.93
p-value			[0.69]	[0.03]
J-statistic	79.77	81.46	74.50	66.81
Instrument rank	103	103	98	93
Sargan test (*p*-value)	0.70	0.65	0.68	0.77
Serial correlation in the residuals	0.11	0.04	0.14	0.14
p-value (Wooldridge's test)	0.13	0.61	0.10	0.12
Cross-sections included	17	16	16	14
Observations	187	163	143	122

[a](*t*-statistic), *$p<0.10$, **$p<0.05$, ***$p<0.01$. Long-run GMM estimates correspond to the sum of short-run coefficients divided by one minus the estimate for *GRGDPCHt*–1.

Although our main interest lies in exploring post-crisis prospects for Latin America by identifying the most robust transmission mechanism from the rest of the world to the Latin American economies through trade in goods and services, we run additional regressions (Table 7) that include some potential omitted variables typically employed in growth studies: government spending as a share of GDP (*GG*), saving as a proportion of GDP (*SAV_GDP*), a proxy for openness (*OPENC*), terms of trade (TOT), and world growth (*WORLD_GR*). Coefficients of only two of these additional control variables appear as positively significant: *SAV_GDP* and *WORLD_GR*. The regression controlling for *SAV_GDP* is the only case in which the coefficient for $NET\backslash EXPORT_{t-1}$ is slightly lower in comparison to our baseline regressions. Although the long run estimate of the effect of *WORLD_GR* is positive and statistically significant, controlling for world growth does not affect the inference on our estimate for the effect of $NET\backslash EXPORT_{t-1}$ on growth. This indicates that our results regarding the effect of trade surpluses are capturing something over and above world demand growth. Estimates for the long run effect of government spending as a proportion of GDP, and terms of trade are negative and statistically significant. While the inclusion of *GG* does not undermine either the significance or the size of the effect of the NET_EXPORT regime, the inclusion of *TOT* boosts the size of the long run estimate of *NET_EXPORT* from 0.20 to 0.52. This result suggests a positive correlation between terms of trade and the trade surplus in our LA-15 sample, which lowers the coefficient on the latter when regressions exclude the former variable.[11]

Columns (6) and (7) of Table 7 present the results of our regressions with time dummies for the most serious downturns in Latin American growth (1984 and 1990).[12] While the time dummies capture the economic downturns in those years, the coefficient on *NET_EXPORT* remains positive and significant.

Finally, it might be a potential concern that our estimates are driven by outliers. Although we have dealt with this concern to some extent by dividing our panels into different (temporal and cross sectional) sub-samples, Table 8 provides GMM regressions for LA-15 that limit the dispersion of both *GRGDPCH* and $NET\backslash EXPORT_{t-1}$. First, we limit the sample to the mean of each variable plus/minus two standard deviations (column (1)), and then to the mean plus/minus 1.5 standard deviations (column (2)). These samples, therefore, exclude severe economic downturns and expansions, and high current account surpluses and deficits. Our estimates are robust to this modification. Although the long run estimate of the effect of $NET\backslash EXPORT_{t-1}$ is reduced when the sample is limited to the mean of the key variables plus/minus 1.5 standard deviations, the positive and significant effect of the variable survives.[13]

2.3. The investment rate as a mechanism

Our empirical analysis finds that $NET\backslash EXPORT_{t-1}$ is a robust growth determinant for Latin American countries. Given our results, however, we have good reason to suspect that the underlying mechanism may not work solely through the direct demand channel, in the sense that a greater gap between exports and imports represents an expanding world demand for domestic output.[14] There may instead be additional effects on investment and medium-run growth. This section explores whether the investment channel is a relevant aspect of the net export-led growth mechanism in Latin America.

Table 7. Robustness to additional variables.

Dependent variable: *GRGDPCH* (Growth rate of real GDP per capita)[a]	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	GMM LA-15 *Z=GG*	GMM LA-15 *Z=SAV_GDP*	GMM LA-15 *Z=OPENC*	GMM LA-15 *Z= TOT*	GMM LA-15 *Z=WORLD_GR*	GMM LA-15 *Z=DUM_84*	GMM LA-15 *Z=DUM_84_90*
$GRGDPCH_{t-1}$	0.1796***	0.1939***	0.2159***	0.2064**	0.2356***	0.2270***	0.2151***
	(4.28)	(4.05)	(4.90)	(2.38)	(6.54)	(6.92)	(6.84)
Ln $RGDPCH_{t-1}$	-5.2678***	-5.9440***	-5.9054***	-8.9943***	-1.2217*	-2.1072***	-2.7329***
	(–5.47)	(–5.24)	(–4.94)	(–4.20)	(–1.68)	(–3.29)	(–4.63)
NET_EXPORT_{t-1}	0.1702***	0.1258**	0.1527***	0.4110***	0.1590***	0.1512***	0.1787***
	(4.51)	(2.25)	(3.84)	(5.65)	(3.37)	(3.73)	(4.40)
Z_t	-0.1380	0.1178***	-0.0378**	-0.0121	0.5939***	-5.1259***	-3.9551***
	(–1.64)	(3.54)	(–2.20)	(–0.70)	(4.57)	(–13.02)	(–13.54)
Z_{t-1}	-0.0938	-0.0467	0.0885***	-0.0485*	0.3926***		
	(–0.87)	(–0.79)	(3.65)	(–1.83)	(2.67)		
Z_{t-2}	-0.0207	0.0178	-0.0356**	0.0139	0.0325		
	(–0.29)	(0.45)	(–2.23)	(0.97)	(0.18)		
Time dummies	yes	yes	yes	yes	no	no	no
Country dummies	yes	yes	yes	yes	yes	yes	yes
Long-run coefficients (sum of the individual coefficients)							
NET_EXPORT	0.2074***	0.1561**	0.1947***	0.5179***	0.2080***	0.1956***	0.2276***
Wald statistic	20.35	4.46	13.90	19.28	10.77	12.66	17.56
p-value	[0.00]	[0.03]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
GG	-0.3077***						
Wald statistic	12.19						
p-value	[0.00]						
SAV_GDP		0.1103*					
Wald statistic		2.78					

p-value		[0.10]					
OPENC			0.0193				
Wald statistic			0.47				
p-value			[0.49]				
TOT				-0.0588*			
Wald statistic				3.15			
p-value				[0.08]			
WORLD_GR					1.3331***		
Wald statistic					21.86		
p-value					[0.00]		
J-statistic	80.98	87.42	84.33	45.54	94.07	96.01	95.86
Instrument rank	104	104	104	51	103	103	103
Sargan test (p-value)	0.60	0.41	0.50	0.22	0.57	0.57	0.57
Serial correlation in the residuals	0.08	0.09	0.12	0.09	0.12	0.08	0.13
p-value (Wooldridge's test)	0.27	0.22	0.11	0.33	0.12	0.32	0.09
Cross-sections included	15	15	15	15	15	15	15
Observations	183	188	188	85	188	188	188

[a](*t*-statistic), $*p<0.10$, $**p<0.05$, $***p<0.01$. Long-run GMM estimates correspond to the sum of short-run coefficients divided by one minus the estimate for *GRGDPCHt*–1.

Table 8. Robustness to limited dispersion in *GRGDPCH* and *NET_EXPORT.*

Dependent variable: *GRGDPCH* (Growth rate of real GDP per capita)[a]	(1)	(2)
	GMM LA-15 (*–4%<GRGDPCH<8%*) (*–12.1%<NET_EXPORT (–1)<11.1%*)	GMM LA-15 (*–2.5% <GRGDPCH<6.5%)* (*–6.6%<NET_EXPORT (–1)<8.2%*)
$GRGDPCH_{t-1}$	0.1690*** (3.14)	0.0742 (1.24)
Ln $RGDPCH_{t-1}$	-3.4886*** (–3.68)	-3.0964*** (–2.67)
NET_EXPORT_{t-1}	0.1719*** (3.81)	0.1238** (2.21)
Time dummies	yes	yes
Country dummies	yes	yes
Long-run coefficients (sum of the individual coefficients)		
NET_EXPORT	0.2068***	0.1337**
Wald statistic	13.38	4.59
p-value	[0.00]	[0.03]
J-statistic	79.86	72.96
Instrument rank	101	89
Sargan test (*p*-value)	0.64	0.48
Serial correlation in the residuals	0.15	-0.06
p-value (Wooldridge's test)	0.08	0.53
Cross-sections included	15	15
Observations	160	126

[a](*t*-statistic), *$p<0.10$, **$p<0.05$, ***$p<0.01$. Long-run GMM estimates correspond to the sum of short-run coefficients divided by one minus the estimate for *GRGDPCHt*–1.In column (1), boundaries correspond to the mean of each variable plus/minus 2 standard deviations.In column (2), boundaries correspond to the mean of each variable plus/minus 1.5 standard deviations.

An implication of some endogenous growth models, in particular those that belong to the AK family of models, is that capital accumulation is positively correlated with long run growth rates.[15] A body of empirical literature has evaluated this prediction. For example, a comprehensive investigation by Bond, Leblebicioğlu, and Schiantarelli (2010) finds evidence supporting a positive relationship between the investment share (of GDP) and the long run growth rate of GDP per worker in a sample of 75 countries over the period 1960–2000. A sub-sample analysis in Bond, Leblebicioğlu, and Schiantarelli (2010) indicates, however, that their result is only robust for non-OECD countries. This finding, which suggests that the effect of capital accumulation on economic growth is conditional on the stage of economic development, has implications for Latin American economies, which appear to display the features of capital (not labor) constrained economies.

Our attempt to econometrically identify the role of investment in the net export-led growth regime consists of two steps: first, we test if gross fixed capital formation as a proportion of GDP (*GFCF_PROP_GDP*) is a correlate of economic growth in

Latin America. Second, we include our proxy for net export led growth along with *GFCF_PROP_GDP* in the right-hand side of the growth regression.

Our empirical analysis suggests that investment as a proportion of GDP is a robust determinant of growth. Table 9 shows the GMM estimates of the effect of the investment share on growth for the LA-15 group. As in the previous section, we use lags of the dependent variable and the third lag of the investment share as instruments. Once again, the Sargan test is used to test the validity of our instruments. Column (1) confirms our expectation regarding the effect of the investment share on growth. The long run effect estimate (0.24) indicates that a one standard deviation change in gross fixed capital formation as a proportion of GDP translates into a change in the growth rate equal to 0.34 percentage points. Column (2) reports the

Table 9. Capital accumulation and growth.

Dependent variable: *GRGDPCH* (Growth rate of real GDP per capita)[a]	(1)	(2)	(3)
	GMM Baseline LA-15	GMM Specific LA-15	GMM Specific LA-15
$GRGDPCH_{t-1}$	0.1614***	0.1179***	0.1315***
	(3.34)	(2.59)	(2.78)
Ln $RGDPCH_{t-1}$	-6.0425***	-6.1132***	-6.3565***
	(–4.92)	(–5.16)	(–5.18)
$GFCF\_PROP\_GDP_t$	0.2750***	0.2487***	0.2355***
	(6.40)	(5.88)	(5.04)
$GFCF\_PROP\_GDP_{t-1}$	-0.1000*		
	(–1.67)		
$GFCF\_PROP\_GDP_{t-2}$	0.0239		
	(0.45)		
NET_EXPORT_{t-1}			0.0945**
			(2.36)
Time dummies	yes	yes	yes
Country dummies	yes	yes	yes
Long-run coefficients (sum of the individual coefficients)			
GFCF_PROP_GDP	0.2372***	0.2819***	0.2711***
Wald statistic	7.02	38.92	27.59
p-value	[0.01]	[0.00]	[0.00]
NET_EXPORT			0.1088**
Wald statistic			5.37
p-value			[0.02]
J-statistic	74.40	75.45	76.56
Instrument rank	103	103	104
Sargan test (*p*-value)	0.79	0.81	0.78
Serial correlation in the residuals	0.03	0.07	0.06
p-value (Wooldridge's test)	0.67	0.33	0.46
Cross-sections included	15	15	15
Observations	174	174	174

[a](*t*-statistic), *$p<0.10$, **$p<0.05$, ***$p<0.01$. Long-run GMM estimates correspond to the sum of short-run coefficients divided by one minus the estimate for *GRGDPCHt–1*.

Table 10. GMM regression for DLNER as the dependent variable (LA15, 1953–2009).

Dependent variable: DLENR (First difference of the real lending interest rate)[a]	(1)	(2)
	GMM Baseline LA-15	GMM Specific LA-15 (*–30%<DLENR<30%*)
NET_EXPORT_t	–2.1516*** (–3.37)	–0.8037* (–1.72)
Time Dummies	yes	yes
Country Dummies	yes	yes
J-statistic	31.07	41.60
Instrument rank	45	45
Sargan test (*p*-value)	0.66	0.21
Serial correlation in the residuals	−0.50	0.07
p-value (Wooldridge's test)	0.00	0.34
Cross-sections included	15	15
Observations	94	89

[a](*t*-statistic), $^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$.

estimates for a more parsimonious specification of the regression in column (1), after removing one by one those variables whose coefficients were not significant. Estimates in column (2) are not substantially different from those in column (1).

Column (3) presents the estimates resulting from including $NET\backslash EXPORT_{t-1}$. These are interesting for two reasons. First, they indicate that the long run effect of the investment share on growth is not dramatically affected by the inclusion of $NET\backslash EXPORT_{t-1}$. The estimate of the long run effect of *GFCF_PROP_GDP* only drops from 0.28 to 0.27. Second, the long run estimate for the coefficient associated with $NET\backslash EXPORT_{t-1}$ falls by 45% (in comparison with the estimate in Table 4 (Column (10)). The fact that the effect of $NET\backslash EXPORT_{t-1}$ on growth in Table 4 is much higher suggests that the investment share explains an important part of the effect of $NET\backslash EXPORT_{t-1}$ on growth. This, in turn, suggests that part of the effect of $NET\backslash EXPORT_{t-1}$ on growth may occur through the investment share. Expansions in the trade surpluses (or reductions of the trade deficits) in period t – 1 fosters capital accumulation and thus economic growth. Certainly, there is still an unconditional, positive and statistically significant effect of $NET\backslash EXPORT_{t-1}$ on growth. In Table 10 (Column (3)), the long run estimate for the effect of $NET\backslash EXPORT_{t-1}$ is 0.11. This latter effect may be capturing expansions of output that are not necessarily induced by capital accumulation but by medium run adjustments in capacity utilization when firms face additional net demand for domestic output.

Our results up until this point lead us to the question: why would trade surpluses boost investment? Our first answer is straightforward: a greater net demand for domestic output increases expected profits, which encourages some firms to increase the scale of production over the medium run. Firms, which may have a desired rate of capacity utilization, respond to the new profit incentives by expanding capacity through investment. Controlling for world demand growth should, in principle, incorporate this channel. However, as discussed earlier, our empirical results suggest that world demand growth is only a part of the story. We will, therefore, explore a second, more international finance oriented, possibility that may also be very important in the Latin American case. By basic macroeconomic accounting, the current account and the capital account are two sides of the same coin. Thus, *ceteris paribus*, a positive current account reduces the external debt stock. The reduction in the debt stock (or greater national collateral) may lead to a reduction of the risk premium, and hence the borrowing costs, faced by domestic investors. This, in turn, could foster capital accumulation and economic growth. These mechanisms obviously operate in a context defined by a particular set of assumptions. Thus, the next section presents a very simple formal model that builds on this intuition.

3. A simple dynamic model

Our empirical results supporting a positive relationship between trade surpluses and growth are hard to accommodate in the standard neoclassical model of saving and investment with perfect capital mobility. The nature of the funds (domestic or external) financing investment is irrelevant in that basic framework because an excess of domestic savings would substitute for capital inflows (and vice versa). An opposite view is that domestic and external funds are better understood as complements rather than as substitutes in the process of capital accumulation (Aghion, Comin, and Howitt 2006). In other words, domestic savings may matter in economic growth terms since they attract foreign direct investment. This explanation, however, does not necessarily predict a positive relationship between the current account and growth.

In this section, we present a possibility that has, to the best of our knowledge, not been explored in previous contributions. Positive current account shocks, sometimes absorbed by savings, may reduce the risk premium paid by investors and thus the cost of investing. This mechanism, which leads to capital accumulation and economic growth, does predict a positive relationship between the current account and growth.

3.1. Capital accumulation and output growth

Imagine a capital constrained economy whose aggregate production function is described by a Leontief/fixed coefficients specification:

$$Y = \sigma K \tag{1}$$

where Y is the level of output, $K$is the capital stock, and σ represents both the marginal and average product of capital. The parameter σ is also the inverse of the capital-output ratio. Given this production function, the output growth rate is described by:

$$\hat{Y} = \hat{K} \tag{2}$$

Equation (3) describes capital accumulation, which is equal to the level of investment minus depreciation. We make the standard assumption that capital depreciates at a constant rate δ.

$$\dot{K} = I - \delta K \tag{3}$$

Dividing equation (3) by K, and using equations (1) and (2) yields:

$$\hat{Y} = \hat{K} = \sigma \frac{I}{Y} - \delta \tag{4}$$

Equation (4) describes the positive relationship between the investment share I/Y and economic growth discussed in the previous section.

3.2. Interest rates, investment and savings

Suppose the international interest rate paid by capital-accumulating firms (r_i) is higher than the internationally-determined interest rate paid to savers (r_s). These interest rates are binding in the domestic economy. The spread ($R \geq 0$) – which is likely to be significant in a developing economy with shallow financial markets – reflects the risk premium, which is specified to be a function of the level of external debt as a proportion of the level of output D/Y, and a variable (α) that captures, for example, transaction costs, intermediation profits in the financial system, and default expectations that are independent of the level of debt.

$$r_i = r_s + R \tag{5}$$

$$R = R\left(\frac{D}{Y}, \alpha\right) = R(d, \alpha) \tag{6}$$

where $d=D/Y$. We assume that $\frac{\partial R}{\partial d} > 0$. At the national level, a greater level of debt as a proportion of output means a higher probability of default that is taken into account in the risk premium. Investment and savings vary with the relevant interest rate and, through equation (5), the risk premium:

$$\frac{I}{Y} = i = i(r_i, \theta) = i(r_s + R, \theta) \tag{7}$$

$$\frac{S}{Y} = s = s(r_s, \gamma) \tag{8}$$

As commonly assumed, $\frac{\partial i}{\partial r_i} < 0$ and $\frac{\partial s}{\partial r_s} > 0$, the latter partial derivative assuming that the substitution effect dominates the income effect. Variables θ and γ represent exogenous parameters.

The level of external debt changes when the domestic economy requires external saving to finance the gap between domestic investment and domestic savings (i.e., a negative current account surplus, CA).

$$dD/dt = \dot{D} = -CA \tag{9}$$

3.3. Risk premium dynamics

The evolution of the risk premium over time is related to that of debt. Differentiating equation (6) with respect to time yields:

$$\dot{R} = \frac{\partial R}{\partial d}\dot{d} + \frac{\partial R}{\partial \alpha}\dot{\alpha}\dot{R} = \frac{\partial R}{\partial d}\left[\frac{\dot{D}}{Y} - d\hat{Y}\right] + \frac{\partial R}{\partial \alpha}\dot{\alpha} \tag{10}$$

Substituting from equations (2) and (9) yields:

$$\dot{R} = \frac{\partial R}{\partial d}\left[-\frac{CA}{Y} - d\hat{K}\right] + \frac{\partial R}{\partial \alpha}\dot{\alpha} \tag{11}$$

Now, the current account surplus is the excess of national saving over investment. Thus, making use of equations (7) and (8) allows us to explicitly introduce saving and investment:

$$\begin{aligned}\dot{R} &= \frac{\partial R}{\partial d}[i - s - d(\sigma i - \delta)] + \frac{\partial R}{\partial \alpha}\dot{\alpha}\dot{R} \\ &= \frac{\partial R}{\partial d}[(1 - \sigma d)i(r_s + R, \theta) - s(r_s, \gamma) + \delta d] + \frac{\partial R}{\partial \alpha}\dot{\alpha}\end{aligned} \tag{12}$$

If $\sigma d < 1$, this first-order differential equation system is stable, and the risk premium does not collapse to zero or explode as a result of an exogenous shock. Stability therefore depends on the debt-capital ratio. $(\sigma d = \frac{D}{K})$.

Imagine a shock to the current account captured by a rise in the saving parameter (γ). This could be a positive terms of trade shock that improves the fiscal balance in the case of governments administering an exportable good (for example, an oil price shock).[16] Starting from a balanced current account, the impact effect is to create a surplus). Given that the greater level of domestic saving over investment has a negative effect on debt accumulation, the risk premium starts falling over time.[17] The resulting lower interest rate paid by capital-accumulating firms improves the viability of investment projects and fosters capital accumulation and economic growth.

The stability condition guarantees that, once the adjustment is completed, the economy settles in a new steady state where the risk premium level is lower than the pre-shock level. This stability condition only requires the assumption that the debt-capital ratio be less than unity ($\sigma d < 1$). Intuitively, this is due to the two offsetting effects of investment on the change in risk premium. On the one hand, a higher investment share has a contemporaneous negative effect on the current account as a proportion of GDP, leading to an increasing risk premium. On the other hand, the capital accumulation fostered by investment reduces the debt-output ratio and hence the risk premium. The stability condition limits the size of the former effect and excludes the possibility, for example, that a very small positive shock on the current account unleashes a continuous decline in the risk premium that results in a corner solution.

Our empirical evidence indicates that the prediction from this simple framework is a plausible story in which our general results fit. Along with our findings on the role of net exports and the investment share on growth, our data also display a negative correlation between the current account as a proportion of GDP and the first difference of the real lending interest rate. The GMM regression presented in Table 10 appears to confirm the negative relationship, predicted by our model, for the sample LA-15.[18] The estimate for the effect of *NET_EXPORT* on *DLNER* is not only negative but statistically significant and high in magnitude. A one standard deviation change in *NET_EXPORT* reduces the first difference of the real lending interest rate by 15.4 percentage points (around 95% of the standard deviation of DLENR). However, after excluding some potential outliers and limiting the sample to values of

DLENR between –30% and +30%, a one standard deviation change in NET_EXPORT reduces the first difference of the real lending interest rate by 5.9 percentage points (around 64% of the standard deviation of DLENR), still a very noticeable effect. This GMM regression must, of course, be seen as a preliminary exploration of the relationship between NET_EXPORT and DLENR. Future work will investigate this relationship more thoroughly.[19]

4. Concluding remarks

The aftermath of the Great Recession presents two new challenges to developing economies: shrinkage of global imbalances and a slowdown of the growth of imports in advanced economies. Depending on the nature of the economic growth (tradable or export-led growth) experienced by developing countries, these economies might be more or less vulnerable to this turn of events. This paper tackles the question from a Latin American perspective by investigating the potential channels that transmit global shocks to this region through trade in goods and services. Among the channels explored, we find that the lagged trade balance as a proportion of GDP is the most robust correlate of growth. Our estimates for the baseline regression suggest that a one standard deviation variation in the trade balance as a proportion of GDP boosts growth by 1.18 percentage points. Moreover, the robustness of our estimates regarding the role of the trade balance suggests that Latin American growth is currently vulnerable to the shrinkage of global imbalances.

Furthermore, our findings suggest that a significant part of the effect of the trade balance has worked through the investment share of GDP. We developed a simple dynamic model to encapsulate the effect of positive trade balances on investment via the lending interest rate. Positive shocks to the current account reduce the risk premium and thus the interest rates paid by investors. In a capital constrained economy, the resulting higher investment share translates into economic growth. Thus, our model predicts a positive relationship between lagged trade surpluses and economic growth. Preliminary empirical analysis provides some evidence pointing to this channel, although more thorough analysis is required before we can reach robust conclusions.

Returning to the broader question that motivated the present study, how does one interpret the implications of our main finding in light of shrinking global imbalances? The answer obviously is not particularly rosy, unless Latin American trade surpluses with developed economies are replaced in the future by surpluses with other developing countries. This conclusion finds support in other literature. Ocampo (2009), for example, notes that the export-led growth strategy, which was a pervasive idea during the period of Latin American economic liberalization, is now clearly constrained by the weak global trade conditions, and hence Latin American economies need to rethink the importance of domestic markets and the possibility of deeper regional integration as engines of economic growth.[20]

The implications are not uniformly worrisome, however. In particular, increases in the share of the tradable sector and the investment share of GDP do appear to be associated with growth, especially for countries that are not primary commodity exporters. The challenge over the medium-run for these countries may consist of finding the right mix of policies to facilitate investment in the modern industrial sector without necessarily relying on positive external shocks to the trade balance.

The redesign of growth strategies is not costless, however. The difficulties in the execution of second best policies that attempt to create a transition from an export-led growth regime toward a tradable-led growth regime based on domestic markets are explicit, for example, in the management of a stable and competitive real exchange rate (SCRER). This tool may certainly enhance the expansion of the tradable sector and hence economic growth in Latin America. In fact, according to Frenkel and Rapetti (2008), this policy was a key element in the outstanding growth performance of Argentina from 2002 to 2007. However, as discussed persuasively by Frenkel and Rapetti (2008), the implementation of this instrument of economic policy also faces the risk of an eventual inflationary process and macroeconomic instability when the domestic economy lacks a clear coordination between monetary and fiscal policies. The recent and abrupt devaluation of the Argentinean peso (January 2014) following a period of increasing inflation seems to be confirming those fears.

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Notes

1. See Hernandez and Razmi (2013) for a more detailed exposition and literature review.
2. Van Biesebroeck (2005) finds evidence that manufactured exports expedite productivity growth, with scale economies playing an important role in this regard. Greenaway and Kneller (2007) find that British manufacturing exporting firms experience productivity growth relative to non-exporters. Moreover, the magnitude of divergence across industries appears to be driven by differences in the scope for learning. The export effect is greater if the distance to the technological frontier is large, as is the case generally for developing country firms. See Wagner (2007), Pedro and Yang (2009), and Silva, Africano, and Alfonso (2010) for comprehensive reviews of papers investigating the learning-by-exporting channel.
3. Theoretical and empirical support comes from Verhoogen (2008), who develops a model in which differential quality valuation on the part of consumers leads Southern exporters to produce higher quality goods for export and to upgrade their technologies. The paper finds econometric support for this prediction for Mexico. De Loecker (2007) concludes from an econometric study that productivity gains from exporting are greater for firms exporting to high income countries. Hernandez and Razmi (2013) find, based on panel data evidence for Asian countries, that the proportion of a country's exports destined for advanced economies is a positive and robust correlate of GDP growth.
4. Pack (2001), for example, argues that international competitive pressures allowed purchasing firms in the rest of the world to exert pressure on East Asian exporters, producing under contract, to cut costs and adhere to quality standards by increasing their efficiency.
5. This is partly due to the continued presence of tariff and non-tariff barriers in agriculture that hinder trade in these products.
6. Rodrik (2008), for example, argues that the tradable sector is particularly afflicted with market failures and institutional weaknesses, leading these economies to devote a sub-optimal share of their resources to this sector. Second-best policies to subsidize tradable production, therefore, are likely to facilitate growth. Razmi, Rapetti, and Skott (2012)

develop a model with underemployed labor, where the tradable sector is the modern, capital-intensive one.

7. Hernandez and Razmi (2013) provide a more detailed discussion of these growth regimes.
8. The long-run coefficient is simply the sum of the short-run coefficients in the OLS case, while in the GMM case – where the lagged dependent variable is a regressor – the long-run coefficient is the sum of the short-run coefficients divided by one minus the coefficient on the lagged dependent variable.
9. Following an anonymous referee's suggestion, we examined the robustness of our baseline regression using a proxy for *TRADABLE* that includes value added in manufacturing only as a proportion of GDP (*MANUF*). Data for this variable are available from the World Bank's World Development Indicators. Our estimates are robust (see Table A1 in an 'Available on Request' appendix). Furthermore, the long-run coefficient associated with NET_EXPORT increases from 0.1923 (Table 4, column (8)) to 0.2765.
10. These scatterplots are not noticeably affected if we control for outliers. These additional figures are available on request.
11. Hernandez (2013), for example, finds robust evidence indicating that short-run output fluctuations in Colombia, a country particularly dependent on oil and other primary commodities, are positively affected by exogenous terms of trade shocks. Around one third of Colombia's quarterly growth is the result of changes in these terms of trade. Since the paper focuses on quarterly data, potential negative effects associated with the 'Dutch disease' factor do not appear as relevant. However, our regression in Table 7 (column (4)), suggests the existence of a negative effect of terms of trade in the medium- to long run in Latin America. Since our data also show a positive correlation between terms of trade and the trade balance of goods and services, these correlations may explain the apparent downward bias of our estimate for *NET_EXPORT* in the baseline regression that does not control for the terms of trade (Table 4). Therefore, in terms of our general results, our positive estimates for the effect of *NET_EXPORT* on growth in Table 4 may be considered as conservative.
12. Time fixed effects are excluded for obvious reasons.
13. In order to confirm that our results are not driven by a particular country, we ran regressions that excluded one by one the economies in the sample LA-15. Our general result is still robust. These regressions are not presented but are available on request.
14. Recall, among other results from Table 7, that controlling for world growth does not noticeably affect the coefficient on NET_EXPORT_{t-1}.
15. This is in stark contrast to those emerging from Solow-type exogenous growth models, in which only an exogenous technological shock can modify the long run steady state growth rate.
16. Indeed, data for Latin America display a positive correlation between terms of trade and the current account as a proportion of GDP.
17. The negative effect on the risk premium might be re-enforced by a positive balance sheet effect (or greater collateral effect) on the domestic firms.
18. We only excluded two observations from our data sample given their extremely high values for DLNER: Peru 1990 (–940.84) and Peru 1993 (1094.57). These observations are the result of a severe hyperinflation in Peru in our 3 year average for 1990 (1988–1990).
19. We provide in the 'Available on Request' appendix a regression that uses the current account balance as a proportion of GDP (Table A2). Our results using this alternative measure are qualitatively similar.
20. The ECLAC's Preliminary Overview of the Economies of Latin America and the Caribbean (2013) concludes that the modest growth of Latin America in 2013 was mainly supported by robust domestic demand. On the other hand, net exports contributed negatively to GDP growth in the same year.

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Dependent variable: *GRGDPCH* (Growth rate of real GDP per capita)[a]

	(1)	(2)	(3)	(4)
	OLS Baseline LA-15	OLS Specific LA-15	GMM Baseline LA-15	GMM Specific LA-15
Constant	30.0794***	31.5639***		
	(3.31)	(3.72)		
$GRGDPCH_{t-1}$			0.2137***	0.2359***
			(3.54)	(4.44)
Ln $RGDPCH_{t-1}$	-2.7264**	-3.0468***	-4.0790***	-5.4535***
	(–2.61)	(–3.05)	(–3.93)	(–6.74)
$MANUF_t$	-0.0361		-0.0229	
	(–0.47)		(–0.22)	
$MANUF_{t-1}$	0.1288		0.0959	
	(0.78)		(0.50)	
$MANUF_{t-2}$	-0.1751	-0.1312*	-0.1290	-0.1152***
	(–1.53)	(–1.84)	(0.26)	(–2.98)
$MANUF\_EXPORT_t$	-0.1886	-0.1768**	-0.2630**	-0.2530***
	(–1.60)	(–2.30)	(–2.25)	(–2.95)
$MANUF\_EXPORT_{t-1}$	0.1913	0.2048***	0.2576	0.2138**
	(1.12)	(3.36)	(1.56)	(2.27)
$MANUF\_EXPORT_{t-2}$	0.1121		0.0030	
	(0.66)		(0.02)	
NET_EXPORT_t	-0.0132		-0.0193	
	(–0.22)		(–0.42)	
NET_EXPORT_{t-1}	0.1652***	0.1694***	0.1769***	0.2113***
	(3.03)	(4.24)	(3.45)	(4.77)
NET_EXPORT_{t-2}	-0.0026		0.0009	
	(–0.04)		(0.01)	
$EXPORT\_TO\_INDUS_t$	-0.0024		-0.0350	
	(–0.06)		(–0.94)	
$EXPORT\_TO\_INDUS_{t-1}$	-0.0013		0.0490	
	(–0.02)		(1.26)	
$EXPORT\_TO\_INDUS_{t-2}$	-0.0546		-0.0307	
	(–0.91)		(–0.95)	
Time Dummies	yes	yes	yes	yes
Country Dummies	yes	yes	yes	yes
Long-run coefficients (sum of the individual coefficients)				
MANUF	-0.0825	-0.1312*	-0.0713	-0.1507***
Wald statistic	1.35	3.40	0.79	8.46
p-value	[0.25]	[0.07]	[0.37]	[0.00]
MANUF_EXPORT	0.1149	0.0281	-0.0031	-0.0513
Wald statistic	1.73	0.23	0.00	0.59
p-value	[0.19]	[0.63]	[0.98]	[0.44]
NET_EXPORT	0.1493*	0.1694***	0.2015*	0.2765***
Wald statistic	2.79	17.94	3.13	18.80
p-value	[0.09]	[0.00]	[0.08]	[0.00]
EXPORT_TO_INDUS	-0.0583		-0.0213	
Wald statistic	1.27		0.16	
p-value	[0.26]		[0.69]	
Adjusted R-squared	0.43	0.58		
J-statistic			75.77	74.84
Instrument rank			92	93
Sargan test (p-value)			0.19	0.48
Serial correlation in the residuals	0.21	0.29	0.03	0.06
p-value (Wooldridge's test)	0.02	0.00	0.72	0.52
Cross-sections included	15	15	14	14
Observations	139	149	108	114

[a](*t*-statistic), $*p<0.10$, $**p<0.05$, $***p<0.01$. Long-run GMM estimates correspond to the sum of short-run coefficients divided by one minus the estimate for *GRGDPCHt*–1. Long-run OLS estimates are simply the sum of the short-run coefficients.

Dependent variable: *DLENR* (First difference of the real lending interest rate)[a]	(1)
	GMM Baseline LA-15
CA_GDP_t	-3.1915*** (–2.90)
Time Dummies	yes
Country Dummies	yes
J-statistic	29.07
Instrument rank	39
Sargan test (*p*-value)	0.62
Serial correlation in the residuals	-0.50
p-value (Wooldridge's test)	0.00
Cross-sections included	15
Observations	77

[a](*t*-statistic), **p*<0.10, ***p*<0.05, ****p*<0.01.