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Economic growth and the role of trade in intermediates

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Abstract

We estimate the effect of imports and exports of intermediates on economic growth in a panel of more than 100 among developed and developing economies across the period 1976-2008. We find that both capital and intermediate imports positively affect growth. The overall effect is driven by the effect of imports in developing countries. This role for imports is especially confined to imports from high income economies. Exports do not appear to affect growth in the long run.

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1 Introduction

The last decades have been characterised by an unprecedented upsurge in the role of developing and transition economies in the world trade network. From the traditional view of countries' comparative advantage in final goods, the recent trend in international trade goes in the direction of trade in parts and fragments of production processes. Several political and economic factors have favoured this process. Declining communication costs and trade liberalisation episodes have favoured the redefinition of the boundaries of the manufacturing firms across the national borders. The end of the Uruguay round negotiations with the creation of the WTO in 1995, the entry of China in the organisation in 2001 and the erosion of trade protection in several sectors have represented an important opportunity for firms both in developing and developed economies. Through the relocation of some fragments of production, the former have become active players in the industrial production processes and the latter have preserved their competitiveness with little damage for their profit margins. Although trade in intermediates has become one of the main topics of the empirical studies at the firm level, yet, to the best of our knowledge, no overall cross country evidence exists on its role in enhancing economic growth. The endogenous growth literature points at increased access to foreign intermediates as a direct potential source for higher economic growth and as an indirect tool of knowledge diffusion through which higher growth rates can be achieved (Romer, 1990; Grossman and Helpman, 1991; Rivera-Batiz and Romer, 1991b,a). On the other hand, exporting may well foster specialisation in the export goods, the exploitation of static and dynamic scale economies and produce an upgrade of the country state of the art, due to the exporters' interaction with foreign customers and distant markets. Exports of intermediates may constitute by themselves an important source of knowledge, due to the higher innovation rate that usually is found to follow the export activity (Damijan, Kostevc, and Polanec, 2010; Bratti and Felice, 2011). Within this framework we mean to provide some preliminary evidence on the role of imports and exports of intermediates on economic growth. Making use of a wide unbalanced panel of developing and developed economies over the period 1976-2008, we estimate the relationship between imports and exports of intermediates and economic growth. We will also consider that some heterogeneity may exist according to the countries' development level and, to this purpose, we also test whether heterogeneous parameter estimates and significance levels follow the split of the sample into high and low&middle income economies. The rest of the work is structured as follows: the next section presents the main literature on the topic, then the following sections respectively present the data, the empirical model and

the results. A final section will discuss the finding and conclude highlighting further avenues for research.

2 The Literature

Among the extensive literature on trade and growth[1] our study is close to the literature on trade in capital goods, technology diffusion and innovation (Coe and Helpman, 1995; Keller, 1997; Eaton and Kortum, 2001a,b; Schneider, 2005; Caselli and Wilson, 2004) but it departs from it in that we consider exports as a vehicle for growth. Also, our focus is on intermediate goods and, following the idea that the latter may enhance productivity regardless of their R&D content, we do not try to measure it. Our work is also related to the stream of literature focusing on new imported varieties and total factor productivity growth at the country level (Feenstra, Madani, Yang, and Liang, 1997; Broda, Greenfield, and Weinstein, 2006), but it departs from it in that we consider a very specific type of imports - namely imports of intermediate and capital goods - we consider the role of exports too and, at this stage, we do not directly dissect the effect of increasing varieties, instead we focus on the overall effect of imports and exports and thus we also capture the effect of trading new goods.

[1]Edwards (1993) provides a wide but not too recent survey on the empirical literature on openness and growth, more recently Giles and Williams (2000) review the literature on exports and growth and López (2005) surveys the most recent and cited macro and micro studies on the topic. As far as the latter are concerned, the evidence of *learning by exporting* is still not conclusive (Greenaway and Kneller, 2007; Wagner, 2007) and although the positive effect of exporting on productivity is mainly relevant for developing economies, some studies highlight that exporting fosters product innovation too (Damijan, Kostevc, and Polanec, 2010; Bratti and Felice, 2011). A growing and more recent strand of literature, instead, is pointing at imports as a productivity enhancing activity. Empirical works usually confirm the efficiency enhancing effect of firm access to foreign intermediates, especially when they analyse developing countries (Amiti and Konings, 2007; Kasahara and Rodrigue, 2008; Paul and Yasar, 2009; Halpern, Koren, and Szeidl, 2005). For advanced economies, the general finding seems to point at a rather modest or null effect of imports on productivity (Görg, Hanley, and Strobl, 2008; Vogel and Wagner, 2010) and when such an effect occurs it is related to imports from high income countries (Lööf and Andersson, 2010), while imports from low income countries mainly positively affect the firm profits (Jabbour, 2010). On the other hand, imports of new intermediate goods varieties is found to foster the enlargement of the firm product scope (Goldberg, Khandelwal, Pavcnik, and Topalova, 2009; Kehoe and Ruhl, 2009).

3 The Data

The data used in the following analysis come from two different data sources. For the typical growth regression variables, we relied on the 2010 issue of the World Bank Development Indicators. The import and export flow data at the country level, instead, are from the WITS-COMTRADE data base. From this on line source, imports and exports were retrieved according to the BEC classification, in order to dissect the groups of products that are traditionally referred to as intermediates. Our definition of intermediates concerns all non primary and non energy inputs and, thus, it is related to the BEC categories 12 (processed food products), 22 (processed industrial supplies), 42 (parts of capital goods) and 53 (parts and components of cars and vehicles), while capital goods are those included in the section 41. Then, in our estimates below we adopt three different types of measures of intermediate trade: the first one concerns a broad definition of intermediate imports and exports (Msh and Xsh) including also capital goods among the intermediates; the second one only includes intermediates (Msh_{int} and Xsh_{int}); the final measure only includes capital goods (Msh_{cap} and Xsh_{cap}). Table 1 in the appendix includes the list of countries in the sample and the number of times each country appears in our estimation sample. Also the Table displays in bold the names of high income economies according to the World Bank Classification. This classification is the same adopted by the WITS-COMTRADE data base, so that, in the following, when trade with high and low&middle income economies is considered, this refers to the two groups as defined by the World Bank Classification system.

4 Empirical model and estimation issues

To assess the role of imports and exports of intermediates in enhancing long run growth, we adopt the following empirical model

$$y_{it} = \alpha_0 + \beta y_{it-5} + \gamma_0 s_{it} + \gamma_1 popgr_{it} + \gamma_2 FDI_{it} + \delta_0 Msh_{it} + \delta_1 Xsh_{it} + \lambda_t + \eta_i + \epsilon_{it} \quad (1)$$

where y_{it} and $y_{i,t-5}$ measure the log of the per capita real gross domestic product in country i at time t and five years before. Although in growth regressions annual data are sometimes used to improve the number of observations (Harrison, 1996), we prefer to follow the vast majority of studies and consider gorwth over a five year period, thus making use of five year panels (Islam, 1995; Knight, Loayza, and Villanueva, 1993). In the model, then, s_{it} is the five-year average national saving rate and $popgr_{it}$ is the five-year

average population growth rate. These two variables are the Solow determinants of the long run steady state per capita GDP, other than technical progress. Following the growth empirical literature, we augment the model with some country specific variables that are able to affect the steady state productivity level and thus transitional growth. In particular, our variables of interest are Msh_{it} and Xsh_{it} and stand for the share of intermediate imports and exports. Again, they are calculated as average over the five year period. To account for any time varying factor that could determine growth and trade at the same time, we have decided to include the variable FDI which measures the five-year average net inflow of FDI in the economy over the country GDP. Foreign investments are an important source of growth in developing economies with an adequate absorptive capacity and are also responsible for a large fraction of imports and exports in and from the host economy (Borensztein, De Gregorio, and Lee, 1998). Table 2 in the appendix presents the descriptive statistics for the variables used in the analysis. Finally, the model includes the time effects λ_t which are meant to control for common macro shocks across the countries in the sample, the country specific unobserved heterogeneity η_i and a transient shock ϵ_{it}. Model 1 is what in the empirical literature is known as a dynamic panel data model. The presence of the lag of the dependent variable among the regressors creates a source of correlation between the lag of income and the country specific unobserved heterogeneity in the error term. In this frame the Arellano and Bond (1991) First Difference and System GMM (Bond, 2002) estimator for panel data have been extensively used for the estimation of growth regressions, as they are believed to represent the most suitable tools to deal with the presence of the autoregressive term and the more general problems of the omitted variable bias and endogenous regressors. The recommendation, however is to prefer the latter when high persistence in the series makes past levels unlikely instruments for current differences. In that case, in fact, it has been proved that the First Difference GMM estimates of the autoregressive parameter are downward biased and go well below the downward biased low Fixed Effects estimates. Then, in order to appraise which estimator is the most suitable for the data at hand, Table 3 shows the performance of the Ordinary Least Squares, Fixed Effects, Difference and System GMM on the specification where only the first lag of the dependent variable and the traditional Solow variables are included as regressors. From the Table it emerges that the First Difference GMM estimator is unsuitable for the data at hand, due to its downward bias in the estimate of the autoregressive parameter. On the contrary, the System GMM performs rather well, conveying an estimate which is intermediate between the OLS and the FE ones (Bond, 2002). Finally, the failure to reject the null of the absence of second order autocor-

relation in the moment estimators suggests that instruments dated $t-1$ and t respectively in the difference and level equations can be used. Although the Hansen test displays a low p-value, we will show in the next section that when the model is completely specified the test will always confirm the validity of our instruments. Then, in the following we will stick to the use of System GMM, we will instrument all of our right hand side variables with instruments dated $t-1(t)$ and earlier for the difference (level) equation.

5 Results

The main results are displayed in Tables 4-6 for the three different measures of intermediates, i.e. the broad measure including capital and intermediate goods (columns 1-3), the narrow definition based on intermediates only (columns 4-6) and the capital goods trade measures (columns 7-9). Also the model is estimated on the whole sample (columns 1, 4 and 7) and the subsamples of high (columns 2, 5 and 8) and low&middle income economies[2] (columns 3, 6 and 9). Table 4 shows the parameter estimates of model 1 when only imports of intermediates are included as trade variables. In Table 5, only exports of intermediates are included and the third Table, Table 6, exports and imports are included at the same time. The main message from the three sets of estimates is that imports of intermediates, regardless of their definition, especially matter for developing economies' growth. Exports, instead, are not robustly related to growth: although intermediate exports promote developing countries' growth and capital exports seem to promote high income economies' growth in the short run, their parameter significance drops in the long run coefficient estimates[3] (see Table 5, coulmns 3, 6 and 8). When the two trade variables are included at the same time in the regression, only the significance of imports for developing economies is preserved. In these estimates exports never turn significant in the long run. To improve our understanding of the issue, we have further explored the role of intermediate and capital trade dissecting the role of imports and exports according to the origin and destination of the flow. In other words, following the idea that higher per capita income is related to higher technology levels in manufacturing production, we have tested whether the income

[2]The definition of high and low&middle income groups is the one by the World Bank. In Table 1 in appendix the high income countries are indicated in bold. The remaining ones are classified as low&middle.

[3]Long run parameters for imports, Msh_{it}, and exports, Xsh_{it}, are obtained as the short run parameter non linear combination $\frac{\delta_0}{1-\beta}$ and $\frac{\delta_1}{1-\beta}$. Standard errors are calculated via the delta method.

level of the trade partner may somehow improve our understanding of the overall import effect of the previous Table and of the lack of any effect for exports. Then, Tables 7 and 8 present the results for the estimation of the empirical model when imports/exports originate/are directed to high income and low&middle income economies respectively. Some interesting qualifications of the previous results emerge. Imports of intermediates only affect economic growth when they are from high income economies, imports from low&middle income economies never turn significant. High income countries seem to benefit from intermediate exports to other high income economies, however this effect is barely significant in the long run.

Turning to the remaining variables parameter estimates, the saving rate is positive and significant in the whole sample and in the subsamples of high and low&middle income economies, while the population rate never turns significant. Finally, the effect of the net inflow of FDI is always positive although it only is significant for the whole sample and the subsample of low&middle income economies, thus reflecting how relevant foreign investments are for economic growth in developing countries.

Robustness - To make sure that our results are not driven by the choice of a particular instruments set, we check the robustness of our findings by reducing the number of lags of the variables used as instruments, as suggested by the literature on the GMM estimators (Roodman, 2009). Then we only used lags dated from $t-1$ to $t-3$ (t to $t-2$) in the differenced (level) equation and the results are displayed in Table 9. Our main result stays unchanged.

6 Summary and conclusions

The present work has tried to shed some new light on the trade-growth nexus focusing on the effect of imports and exports of intermediates on economic growth in a wide and long panel of countries. By estimating an empirical growth model augmented with the inclusion of such trade variables by means of System GMM, we have found some interesting results. Intermediate and capital imports only matter for long run growth in developing economies. Intermediate and capital exports do not display a robust positive growth effect. The trade-growth nexus, then, seems to work more through imports than exports. Also, only imports from high income countries foster economic growth in developing countries, thus hinting once again at the working of *learning-by-importing* and technology diffusion.

The natural prosecution of this work is related to the evaluation of the growth effect margins of intermediate trade in the lines of (Feenstra, Madani,

Yang, and Liang, 1997; Broda, Greenfield, and Weinstein, 2006) and to the appraisal of increased intermediate input quality on economic growth. Finally, the role of institutional development in the exploitation of the benefits from the trading activity needs to be addressed.

References

Amiti, M., and J. Konings (2007): "Trade Liberalization, Intermediate Inputs, and Productivity: Evidence from Indonesia," *American Economic Review*, 97(5), 1611–1638.

Arellano, M., and S. Bond (1991): "Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations," *Review of Economic Studies*, (58), 277–297.

Bond, S. (2002): "Dynamic panel data models: a guide to microdata methods and practice," *CeMMAP Working Paper*, (09/02).

Borensztein, E., J. De Gregorio, and J.-W. Lee (1998): "How does foreign direct investment affect economic growth?," *Journal of International Economics*, 45(1), 115–135.

Bratti, M., and G. Felice (2011): "Are Exporters More Likely to Introduce Product Innovations?," Development Working Papers 306, Centro Studi Luca dÁgliano, University of Milano.

Broda, C., J. Greenfield, and D. Weinstein (2006): "From Groundnuts to Globalization: A Structural Estimate of Trade and Growth," NBER Working Papers 12512, National Bureau of Economic Research, Inc.

Caselli, F., and D. J. Wilson (2004): "Importing technology," *Journal of Monetary Economics*, 51, 1–32.

Coe, D., and E. Helpman (1995): "International R&D spillovers," *European Economic Review*, 39, 859–887.

Damijan, J. P., C. Kostevc, and S. Polanec (2010): "From Innovation to Exporting or Vice Versa?," *The World Economy*, 33(3), 374–398.

Eaton, J., and S. Kortum (2001a): "Technology, trade, and growth: A unified framework," *European Economic Review*, 45(4-6), 742–755.

——— (2001b): "Trade in capital goods," *European Economic Review*, 45(7), 1195–1235.

Edwards, S. (1993): "Openness, Trade Liberalization, and Growth in Developing Countries," *Journal of Economic Literature*, 31(3), 1358–93.

Feenstra, R. C., D. Madani, T.-H. Yang, and C.-Y. Liang (1997): "Testing Endogenous Growth in South Korea and Taiwan," NBER Working Papers 6028, National Bureau of Economic Research, Inc.

Giles, J. A., and C. L. Williams (2000): "Export-Led Growth: A Survey of the Empirical Literature and Some Noncausality Results, Part 1," *Journal of International Trade and Economic Development*, 9, 261–337.

Goldberg, P., A. Khandelwal, N. Pavcnik, and P. Topalova (2009): "Trade Liberalization and New Imported Inputs," *American Economic Review*, 99(2), 494–500.

Greenaway, D., and R. Kneller (2007): "Firm heterogeneity, exporting and foreign direct investment," *Economic Journal*, 117(517), F134–F161.

Görg, H., A. Hanley, and E. Strobl (2008): "Productivity effects of international outsourcing: evidence from plant-level data," *Canadian Journal of Economics*, 41(2), 670–688.

Grossman, G. M., and E. Helpman (1991): *Innovation and Growth in the Global Economy*, MIT Press Books. The MIT Press.

Halpern, L., M. Koren, and A. Szeidl (2005): "Imports and Productivity," CEPR Discussion Papers 5139, C.E.P.R. Discussion Papers.

Harrison, A. (1996): "Openness and growth: A time-series, cross-country analysis for developing countries," *Journal of Development Economics*, 48(2), 419–447.

Islam, N. (1995): "Growth Empirics: A Panel Data Approach," *The Quarterly Journal of Economics*, 110(4), 1127–70.

Jabbour, L. (2010): "Offshoring and Firm Performance: Evidence from French Manufacturing Industry," *The World Economy*, 33(3), 507–524.

Kasahara, H., and J. Rodrigue (2008): "Does the use of imported intermediates increase productivity? Plant-level evidence," *Journal of Development Economics*, 87(1), 106–118.

Kehoe, T. J., and K. J. Ruhl (2009): "How important is the new goods margin in international trade?," Staff Report 324, Federal Reserve Bank of Minneapolis.

Keller, W. (1997): "Are international R&D spillovers trade-related? Analyzing spillovers among randomly matched trade patterns," NBER Working Papers 6065, National Bureau of Economic Research, Inc.

Knight, M., N. Loayza, and D. Villanueva (1993): "Testing the Neoclassical Theory of Economic Growth: A Panel Data Approach," *IMF Staff Papers*, 40(3), 512–541.

Lööf, H., and M. Andersson (2010): "Imports, Productivity and Origin Markets: The Role of Knowledge-intensive Economies," *The World Economy*, 33(3), 458–481.

López, R. A. (2005): "Trade and Growth: Reconciling the Macroeconomic and Microeconomic Evidence," *Journal of Economic Surveys*, 19(4), 623–648.

Paul, C. J. M., and M. Yasar (2009): "Outsourcing, productivity, and input composition at the plant level," *Canadian Journal of Economics*, 42(2), 422–439.

Rivera-Batiz, L. A., and P. M. Romer (1991a): "Economic Integration and Endogenous Growth," *The Quarterly Journal of Economics*, 106(2), 531–55.

Rivera-Batiz, L. A., and P. M. Romer (1991b): "International trade with endogenous technological change," *European Economic Review*, 35(4), 971–1001.

Romer, P. M. (1990): "Endogenous Technological Change," *Journal of Political Economy*, 98(5), 71–102.

Roodman, D. (2009): "How to do xtabond2: An introduction to difference and system GMM in Stata," *Stata Journal*, 9(1), 86–136.

Schneider, P. H. (2005): "International trade, economic growth and intellectual property rights: A panel data study of developed and developing countries," *Journal of Development Economics*, 78(2), 529–547.

Vogel, A., and J. Wagner (2010): "Higher productivity in importing German manufacturing firms: self-selection, learning from importing, or

both?," *Review of World Economics (Weltwirtschaftliches Archiv)*, 145(4), 641–665.

Wagner, J. (2007): "Exports and Productivity: A Survey of the Evidence from Firm-level Data," *The World Economy*, 30(1), 60–82.

Appendix

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Table 1: Sample composition - List of Countries

Country	Frequency	Country	Frequency	Country	Frequency
Albania	4	**Germany**	7	Pakistan	7
Algeria	7	Ghana	7	Panama	6
Angola	3	**Greece**	7	Papua New Guinea	7
Antigua and Barbuda	1	Grenada	5	Paraguay	7
Argentina	7	Guatemala	7	Peru	7
Armenia	2	Guinea	5	Philippines	7
Australia	7	Guinea-Bissau	7	**Poland**	2
Austria	7	Guyana	7	**Portugal**	7
Azerbaijan	2	Haiti	2	Puerto Rico	1
Bahamas, The	7	Honduras	7	Romania	4
Bahrain	4	**Hong Kong SAR, China**	7	Russian Federation	3
Bangladesh	7	**Hungary**	7	Rwanda	7
Barbados	6	**Iceland**	7	**Saudi Arabia**	7
Belarus	2	India	7	Senegal	7
Belgium	7	Indonesia	7	Seychelles	7
Belize	6	Iran, Islamic Rep.	7	Sierra Leone	7
Benin	7	**Ireland**	7	**Singapore**	7
Bhutan	4	**Israel**	7	**Slovak Republic**	4
Bolivia	7	**Italy**	7	**Slovenia**	2
Bosnia and Herzegovina	2	Jamaica	7	Solomon Islands	2
Botswana	7	**Japan**	7	South Africa	7
Brazil	7	Jordan	5	**Spain**	7
Brunei Darussalam	4	Kazakhstan	2	Sri Lanka	7
Bulgaria	4	Kenya	7	St. Kitts and Nevis	5
Burkina Faso	7	Kiribati	4	St. Lucia	4
Burundi	7	**Korea, Rep.**	7	Vincent and the Grenadines	7
Cambodia	2	**Kuwait**	1	Sudan	7
Cameroon	7	Kyrgyz Republic	3	Suriname	5
Canada	7	**Latvia**	6	Swaziland	7
Cape Verde	4	Lebanon	3	**Sweden**	7
Central African Republic	7	Lesotho	7	**Switzerland**	7
Chad	7	Liberia	5	Syrian Arab Republic	7
Chile	7	Libya	1	Tajikistan	3
China	7	Lithuania	2	Tanzania	2
Colombia	7	**Luxembourg**	7	Thailand	7
Comoros	4	**Macao SAR, China**	4	Togo	7
Congo, Dem. Rep.	1	Macedonia, FYR	2	Tonga	4
Congo, Rep.	7	Madagascar	7	**Trinidad and Tobago**	7
Costa Rica	7	Malawi	7	Tunisia	7
Cote d'Ivoire	7	Malaysia	7	Turkey	7
Croatia	2	Maldives	1	Turkmenistan	3
Cyprus	5	Mali	7	Uganda	4
Czech Republic	2	**Malta**	7	Ukraine	3
Denmark	7	Mauritania	7	**United Arab Emirates**	6
Djibouti	2	Mauritius	5	**United Kingdom**	6
Dominica	5	Mexico	7	**United States**	7
Dominican Republic	7	Moldova	2	Uruguay	7
Ecuador	7	Mongolia	4	Vanuatu	5
Egypt, Arab Rep.	7	Morocco	7	Venezuela, RB	7
El Salvador	7	Mozambique	4	Vietnam	4
Eritrea	2	Namibia	4	Yemen, Rep.	1
Estonia	4	Nepal	7	Zambia	7
Ethiopia	4	**Netherlands**	7	Zimbabwe	7
Fiji	7	New Caledonia	1		
Finland	7	**New Zealand**	7		
France	7	Nicaragua	7		
Gabon	7	Niger	7		
Gambia, The	7	**Norway**	7		
Georgia	6	**Oman**	7	Total	944

N.B. High income economies according to the World Bank definition are indicated in bold. The remaining ones are classified as low and middle income economies

Table 2: Descriptive Statistics

Variables		Mean	Standard Deviation	Min.	Max.	Observations
y	overall	7.61	1.58	4.69	10.82	N = 944
	between		1.53	4.83	10.34	n = 171
	within		0.24	6.53	8.81	T = 5.52047
s	overall	0.02	0.01	-0.03	0.09	N = 944
	between		0.01	-0.01	0.06	n = 171
	within		0.01	-0.04	0.05	T = 5.52047
$popgr$	overall	0.18	0.15	-0.69	0.67	N = 944
	between		0.15	-0.47	0.58	n = 171
	within		0.06	-0.34	0.71	T = 5.52047
Msh	overall	0.14	0.14	0.00	1.24	N = 939
	between		0.11	0.00	0.84	n = 169
	within		0.09	-0.70	0.70	T = 5.55621
Xsh	overall	0.08	0.12	0.00	1.33	N = 939
	between		0.10	0.00	0.81	n = 169
	within		0.07	-0.73	0.59	T = 5.55621
Msh_{int}	overall	0.11	0.11	0.00	0.96	N = 939
	between		0.09	0.00	0.65	n = 169
	within		0.07	-0.54	0.52	T = 5.55621
Xsh_{int}	overall	0.07	0.10	0.00	1.04	N = 939
	between		0.08	0.00	0.58	n = 169
	within		0.06	-0.51	0.53	T = 5.55621
Msh_{cap}	overall	0.03	0.03	0.00	0.28	N = 939
	between		0.02	0.00	0.19	n = 169
	within		0.02	-0.16	0.20	T = 5.55621
Xsh_{cap}	overall	0.01	0.03	0.00	0.38	N = 939
	between		0.02	0.00	0.23	n = 169
	within		0.02	-0.22	0.16	T = 5.55621
FDI	overall	2.92	9.52	-54.36	234.41	N = 874
	between		18.30	-15.22	234.41	n = 168
	within		4.08	-36.21	46.16	T = 5.20238

Table 3: Comparison of estimators' performance

	[1]	[2]	[3]	[4]
	OLS	FE	GMM-DIFF	GMM-SYS
y_{t-5}	0.988***	0.654***	0.494***	0.963***
	[0.005]	[0.035]	[0.078]	[0.019]
$popgr$	-1.932***	3.324***	7.115***	-1.968
	[0.743]	[0.930]	[2.373]	[1.519]
s	0.308***	0.830***	0.368	0.529***
	[0.069]	[0.152]	[0.250]	[0.132]
Constant	0.172***	2.414***		0.337**
	[0.044]	[0.249]		[0.137]
Observations	944	944	772	944
R-squared	0.988	0.752		
Number of group		171	163	171
$AR(1)$			0	0
$AR(2)$			0.43	0.54
$Hansen$			0.01	0.02

Table 4: Intermediate Imports

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
	ALL	HIGH INCOME	L&M INCOME	ALL	HIGH INCOME	L&M INCOME	ALL	HIGH INCOME	L&M INCOME
y_{t-5}	0.961***	0.965***	0.932***	0.961***	0.963***	0.932***	0.964***	0.969***	0.938***
	[0.013]	[0.019]	[0.020]	[0.013]	[0.018]	[0.020]	[0.013]	[0.019]	[0.019]
popgr	-0.323	-1.169	1.602	-0.281	-1.224	1.673	-0.454	-1.424	1.199
	[1.386]	[1.634]	[1.662]	[1.398]	[1.615]	[1.663]	[1.325]	[1.564]	[1.651]
s	0.518***	0.482**	0.613***	0.525***	0.485***	0.625***	0.504***	0.505***	0.584***
	[0.132]	[0.189]	[0.147]	[0.133]	[0.187]	[0.150]	[0.129]	[0.190]	[0.142]
Msh	0.179**	0.041	0.491***						
	[0.076]	[0.029]	[0.141]						
Msh_{int}				0.224**	0.045	0.622***			
				[0.093]	[0.036]	[0.177]			
Msh_{cap}							0.748**	0.269*	1.609**
							[0.367]	[0.160]	[0.750]
FDI	0.006***	0	0.011***	0.006***	0	0.011***	0.007***	0	0.011***
	[0.002]	[0.000]	[0.002]	[0.002]	[0.000]	[0.002]	[0.002]	[0.000]	[0.002]
Constant	0.257***	0.337*	0.331***	0.257***	0.356*	0.329***	0.239***	0.289	0.326***
	[0.092]	[0.185]	[0.117]	[0.093]	[0.184]	[0.119]	[0.091]	[0.192]	[0.112]
Observations	873	237	636	873	237	636	873	237	636
Number of group	167	46	121	167	46	121	167	46	121
	LONG RUN COEFFICIENTS								
Msh	4.586**	1.178	7.199***						
	[2.234]	[1.186]	[2.154]						
Msh_{int}				5.717**	1.231	9.127***			
				[2.738]	[1.275]	[2.734]			
Msh_{cap}							20.858*	8.718	25.870**
							[11.435]	[9.071]	[10.633]
$AR(1)$	0.00	0.02	0.00	0.00	0.02	0.00	0.00	0.02	0.00
$AR(2)$	0.28	0.94	0.13	0.28	0.93	0.13	0.29	0.98	0.13
$Hansen$	0.35	1.00	1.00	0.37	1.00	1.00	0.32	1.00	0.99

Table 5: Intermediate Exports

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
	ALL	HIGH INCOME	L&M INCOME	ALL	HIGH INCOME	L&M INCOME	ALL	HIGH INCOME	L&M INCOME
y_{t-5}	0.964***	0.966***	0.952***	0.965***	0.966***	0.952***	0.966***	0.960***	0.948***
	[0.013]	[0.019]	[0.017]	[0.013]	[0.019]	[0.017]	[0.013]	[0.017]	[0.018]
popgr	-0.167	-1.312	1.899	-0.123	-1.358	1.947	-1.048	-1.395	1.411
	[1.367]	[1.524]	[1.880]	[1.399]	[1.547]	[1.890]	[1.363]	[1.521]	[1.764]
s	0.519***	0.479***	0.558***	0.528***	0.490***	0.565***	0.497***	0.457**	0.574***
	[0.133]	[0.185]	[0.152]	[0.134]	[0.183]	[0.152]	[0.126]	[0.187]	[0.152]
Xsh	0.135	0.069*	0.265**						
	[0.087]	[0.039]	[0.133]						
Xsh_{int}				0.152	0.085	0.320**			
				[0.099]	[0.053]	[0.143]			
Xsh_{cap}							0.47	0.297**	0.505
							[0.329]	[0.132]	[0.510]
FDI	0.007***	0	0.011***	0.007***	0	0.011***	0.006***	0	0.011***
	[0.002]	[0.000]	[0.002]	[0.002]	[0.000]	[0.002]	[0.002]	[0.000]	[0.003]
Constant	0.253***	0.329*	0.262**	0.239***	0.320*	0.255**	0.265***	0.388**	0.317***
	[0.091]	[0.186]	[0.111]	[0.089]	[0.186]	[0.110]	[0.096]	[0.172]	[0.117]
Observations	873	237	636	873	237	636	873	237	636
Number of group	167	46	121	167	46	121	167	46	121
	LONG RUN COEFFICIENTS								
Xsh	3.714	1.991	5.522*						
	[2.442]	[1.751]	[3.256]						
Xsh_{int}				4.378	2.517	6.725*			
				[2.934]	[2.358]	[3.566]			
Xsh_{cap}							13.785	7.481	9.729
							[9.251]	[5.103]	[10.261]
$AR(1)$	0.00	0.02	0.00	0.00	0.02	0.00	0.00	0.02	0.00
$AR(2)$	0.28	0.94	0.11	0.27	0.93	0.11	0.36	0.98	0.13
$Hansen$	0.33	1.00	0.99	0.33	1.00	0.99	0.38	1.00	1.00

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Table 6: Intermediate Imports and Exports

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
	ALL	HIGH INCOME	L&M INCOME	ALL	HIGH INCOME	L&M INCOME	ALL	HIGH INCOME	L&M INCOME
y_{t-5}	0.966***	0.958***	0.938***	0.966***	0.956***	0.938***	0.968***	0.958***	0.942***
	[0.012]	[0.017]	[0.019]	[0.012]	[0.017]	[0.019]	[0.011]	[0.017]	[0.018]
popgr	-0.477	-0.929	1.265	-0.396	-1.006	1.354	-1.099	-0.919	0.703
	[1.311]	[1.449]	[1.612]	[1.326]	[1.500]	[1.595]	[1.315]	[1.474]	[1.547]
s	0.480***	0.420**	0.551***	0.499***	0.457***	0.562***	0.480***	0.396**	0.557***
	[0.118]	[0.173]	[0.144]	[0.120]	[0.176]	[0.148]	[0.123]	[0.179]	[0.143]
Msh^{wld}	0.171*	-0.018	0.489***						
	[0.103]	[0.041]	[0.177]						
Xsh^{wld}	-0.012	0.086	-0.113						
	[0.118]	[0.056]	[0.172]						
Msh^{wld}_{int}				0.236*	-0.016	0.593***			
				[0.127]	[0.058]	[0.213]			
Xsh^{wld}_{int}				-0.042	0.095	-0.083			
				[0.143]	[0.082]	[0.191]			
Msh^{wld}_{cap}							0.519	0.018	1.454*
							[0.361]	[0.183]	[0.768]
Xsh^{wld}_{cap}							0.142	0.310*	-0.23
							[0.368]	[0.178]	[0.579]
FDI	0.006***	0	0.010***	0.006***	0	0.010***	0.006***	0	0.011***
	[0.002]	[0.000]	[0.002]	[0.002]	[0.000]	[0.002]	[0.002]	[0.000]	[0.002]
Constant	0.231***	0.412**	0.315***	0.225***	0.426***	0.312***	0.239***	0.425**	0.321***
	[0.088]	[0.164]	[0.114]	[0.086]	[0.165]	[0.115]	[0.089]	[0.169]	[0.107]
Observations	873	237	636	873	237	636	873	237	636
Number of group	167	46	121	167	46	121	167	46	121
	LONG RUN COEFFICIENTS								
Msh^{wld}	5.015	-0.44	7.898***						
	[3.437]	[1.007]	[2.581]						
Xsh^{wld}	-0.358	2.061	-1.832						
	[3.489]	[1.651]	[2.616]						
Msh^{wld}_{int}				7.011	-0.371	9.606***			
				[4.311]	[1.314]	[3.182]			
Xsh^{wld}_{int}				-1.25	2.166	-1.351			
				[4.278]	[2.123]	[2.962]			
Msh^{wld}_{cap}							15.985	0.429	24.919**
							[12.448]	[4.399]	[11.506]
Xsh^{wld}_{cap}							4.389	7.324	-3.94
							[11.048]	[5.029]	[9.619]
$AR(1)$	0	0.02	0	0	0.02	0	0	0.02	0	0
$AR(2)$	0.32	0.9	0.16	0.3	0.91	0.15	0.37	0.94	0.16
$Hansen$	0.87	1	1	0.85	1	1	0.85	1	1

Table 7: Intermediate Imports and Exports from/to High Income Countries

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
	ALL	HIGH INCOME	L&M INCOME	ALL	HIGH INCOME	L&M INCOME	ALL	HIGH INCOME	L&M INCOME
y_{t-5}	0.960***	0.956***	0.930***	0.960***	0.953***	0.931***	0.966***	0.956***	0.936***
	[0.013]	[0.017]	[0.019]	[0.013]	[0.017]	[0.019]	[0.012]	[0.018]	[0.018]
popgr	-0.327	-0.905	1.199	-0.205	-0.765	1.316	-0.725	-0.959	1.097
	[1.328]	[1.434]	[1.623]	[1.337]	[1.465]	[1.615]	[1.337]	[1.469]	[1.592]
s	0.502***	0.432**	0.585***	0.514***	0.454***	0.582***	0.497***	0.390**	0.578***
	[0.120]	[0.174]	[0.138]	[0.122]	[0.170]	[0.140]	[0.122]	[0.176]	[0.142]
Msh^{hi}	0.304**	-0.094	0.744***						
	[0.133]	[0.101]	[0.233]						
Xsh^{hi}	0.014	0.250**	-0.149						
	[0.146]	[0.119]	[0.227]						
Msh^{hi}_{int}				0.366**	-0.102	0.838***			
				[0.163]	[0.125]	[0.287]			
Xsh^{hi}_{int}				0.045	0.309*	-0.005			
				[0.171]	[0.163]	[0.231]			
Msh^{hi}_{cap}							1.249***	0.031	2.308**
							[0.478]	[0.380]	[0.972]
Xsh^{hi}_{cap}							0.018	0.478	-0.467
							[0.461]	[0.307]	[0.691]
FDI	0.006***	0	0.010***	0.006***	0	0.011***	0.005**	0	0.011***
	[0.002]	[0.000]	[0.002]	[0.002]	[0.000]	[0.002]	[0.002]	[0.000]	[0.002]
Constant	0.268***	0.430***	0.382***	0.264***	0.447***	0.377***	0.231**	0.440**	0.347***
	[0.094]	[0.164]	[0.120]	[0.093]	[0.162]	[0.122]	[0.092]	[0.180]	[0.107]
Observations	873	237	636	873	237	636	873	237	636
Number of group	167	46	121	167	46	121	167	46	121
	LONG RUN COEFFICIENTS								
Msh^{hi}	7.634*	-2.116	10.603***						
	[3.940]	[2.262]	[3.192]						
Xsh^{hi}	0.361	5.642*	-2.118						
	[3.663]	[3.215]	[3.123]						
Msh^{hi}_{int}				9.246**	-2.161	12.164***			
				[4.665]	[2.640]	[4.088]			
Xsh^{hi}_{int}				1.139	6.581	-0.071			
				[4.315]	[4.055]	[3.353]			
Msh^{hi}_{cap}							36.980**	0.713	36.157***
							[18.071]	[8.864]	[12.713]
Xsh^{hi}_{cap}							0.535	10.985	-7.317
							[13.607]	[7.366]	[10.365]
$AR(1)$	0	0.02	0	0	0.02	0	0	0.02	0
$AR(2)$	0.3	0.91	0.17	0.29	0.9	0.16	0.32	0.93	0.15
Hansen	0.86	1	1	0.88	1	1	0.85	1	1

Table 8: Intermediate Imports and Exports from/to Low&Middle Income Countries

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
	ALL	HIGH INCOME	L&M INCOME	ALL	HIGH INCOME	L&M INCOME	ALL	HIGH INCOME	L&M INCOME
y_{t-5}	0.968***	0.955***	0.967***	0.968***	0.955***	0.967***	0.968***	0.956***	0.963***
	[0.012]	[0.017]	[0.015]	[0.012]	[0.017]	[0.015]	[0.011]	[0.016]	[0.016]
popgr	-0.805	-1.027	0.976	-0.739	-1.133	1.124	-0.972	-1.151	0.687
	[1.338]	[1.548]	[1.597]	[1.338]	[1.558]	[1.573]	[1.308]	[1.506]	[1.787]
s	0.515***	0.460**	0.500***	0.530***	0.475***	0.511***	0.495***	0.470***	0.510***
	[0.131]	[0.179]	[0.157]	[0.131]	[0.177]	[0.159]	[0.129]	[0.181]	[0.150]
Msh^{lmi}	0.16	0.008	0.566						
	[0.246]	[0.068]	[0.401]						
Xsh^{lmi}	-0.2	-0.011	-0.433						
	[0.234]	[0.105]	[0.354]						
Msh^{lmi}_{int}				0.352	0.041	0.794*			
				[0.334]	[0.130]	[0.479]			
Xsh^{lmi}_{int}				-0.403	-0.075	-0.564			
				[0.302]	[0.170]	[0.365]			
Msh^{lmi}_{cap}							-0.739	-0.092	-0.299
							[0.609]	[0.140]	[1.316]
Xsh^{lmi}_{cap}							1.089	0.462	0.701
							[0.785]	[0.302]	[1.964]
FDI	0.007***	0	0.010***	0.007***	0	0.010***	0.007***	0	0.011***
	[0.002]	[0.000]	[0.003]	[0.002]	[0.000]	[0.003]	[0.002]	[0.000]	[0.003]
Constant	0.243***	0.445***	0.184*	0.232**	0.441***	0.172*	0.257***	0.430***	0.241**
	[0.089]	[0.164]	[0.097]	[0.092]	[0.163]	[0.096]	[0.083]	[0.157]	[0.109]
Observations	873	237	636	873	237	636	873	237	636
Number of group	167	46	121	167	46	121	167	46	121
	LONG RUN COEFFICIENTS								
Msh^{lmi}	4.942	0.179	16.992						
	[7.982]	[1.531]	[11.812]						
Xsh^{lmi}	-6.198	-0.252	-12.99						
	[7.866]	[2.343]	[11.076]						
Msh^{lmi}_{int}				11.093	0.922	24.141			
				[11.736]	[2.989]	[14.735]			
Xsh^{lmi}_{int}				-12.697	-1.695	-17.131			
				[11.115]	[3.797]	[12.102]			
Msh^{lmi}_{cap}							-22.969	-2.094	-8.107
							[20.578]	[3.450]	[36.509]
Xsh^{lmi}_{cap}							33.824	10.561	18.99
							[24.199]	[8.738]	[54.762]
$AR(1)$	0	0.02	0	0	0.02	0	0	0.02	0
$AR(2)$	0.32	0.92	0.15	0.3	0.94	0.14	0.36	0.94	0.17
$Hansen$	0.84	1	1	0.81	1	1	0.79	1	1

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Table 9: Intermediate Imports and Exports - Only 3 lags of the variables used as instruments

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
	ALL	HIGH INCOME	L&M INCOME	ALL	HIGH INCOME	L&M INCOME	ALL	HIGH INCOME	L&M INCOME
y_{t-1}	0.970***	0.963***	0.940***	0.970***	0.964***	0.939***	0.971***	0.960***	0.948***
	[0.013]	[0.018]	[0.020]	[0.013]	[0.018]	[0.020]	[0.013]	[0.020]	[0.019]
$popgr_t$	-0.171	-0.898	1.83	-0.151	-1.005	1.929	-0.599	-1.307	1.679
	[1.365]	[1.601]	[1.694]	[1.383]	[1.639]	[1.677]	[1.374]	[1.614]	[1.719]
s	0.461***	0.426**	0.556***	0.481***	0.447**	0.572***	0.465***	0.457**	0.550***
	[0.115]	[0.190]	[0.138]	[0.116]	[0.190]	[0.137]	[0.119]	[0.199]	[0.141]
Msh	0.175*	-0.016	0.476***						
	[0.106]	[0.041]	[0.180]						
Xsh	-0.013	0.09	-0.105						
	[0.121]	[0.059]	[0.170]						
Msh_{int}				0.238*	-0.011	0.579***			
				[0.128]	[0.060]	[0.213]			
Xsh_{int}				-0.042	0.106	-0.077			
				[0.144]	[0.089]	[0.183]			
Msh_{cap}							0.566	-0.003	1.447*
							[0.375]	[0.174]	[0.779]
Xsh_{cap}							0.103	0.305*	-0.184
							[0.379]	[0.173]	[0.615]
FDI	0.006***	0	0.010***	0.006***	0	0.010***	0.006***	0	0.010***
	[0.002]	[0.000]	[0.002]	[0.002]	[0.000]	[0.002]	[0.002]	[0.000]	[0.002]
Constant	0.203**	0.365**	0.298**	0.197**	0.353*	0.300**	0.209**	0.391**	0.263**
	[0.096]	[0.176]	[0.121]	[0.094]	[0.185]	[0.121]	[0.099]	[0.198]	[0.119]
Observations	873	237	636	873	237	636	873	237	636
Number of group	167	46	121	167	46	121	167	46	121
	LONG RUN COEFFICIENTS								
Msh	5.738	-0.433	7.870***	.	.	.	.	.	.
	[4.430]	[1.154]	[2.957]						
Xsh	-0.434	2.427	-1.733						
	[4.008]	[2.122]	[2.690]						
Msh_{int}				7.87	-0.3	9.463***			
				[5.571]	[1.675]	[3.546]			
Xsh_{int}				-1.377	2.933	-1.265			
				[4.895]	[3.042]	[2.902]			
Msh_{cap}							19.266	-0.083	27.979**
							[15.821]	[4.338]	[13.921]
Xsh_{cap}							3.517	7.643	-3.562
							[12.509]	[5.682]	[11.609]
$AR(1)$	0.00	0.02	0.00	0.00	0.02	0.00	0.00	0.02	0.00
$AR(2)$	0.30	0.90	0.14	0.29	0.89	0.13	0.33	0.97	0.13
$Hansen$	0.21	1.00	0.91	0.22	1.00	0.90	0.15	1.00	0.89

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