

“What a Difference a Source Makes! An analysis of export data”

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Abstract

This paper examines real export data from two common sources: IMF and UN Commodity Trade Statistics to determine the comparability of these data in level and percent change form, and if the export-led growth models are robust to the data source. Additionally, the comparability of the data deflated at a disaggregated level data or by a single export unit price index is examined. The results reveal that the data are neither comparable nor in a number of cases, correlated, suggesting that much of the debate regarding export led growth is fueled by data choice and methodology of deflation.

Keywords: export-led growth, Latin America
JEL codes: O11, O40, O54

I. INTRODUCTION

Researchers in international economics often use export data from a variety of sources and assume these data comparable. However, are these data interchangeable? This paper examines real export data from two commonly used sources: International Monetary Fund (IMF) and United Nations Commodity Trade Statistics (COMTRADE) to determine the comparability of these data in level and percent change form¹, and if the export-led growth models are robust to the data source. Additionally, the paper examines the comparability of the data deflated at a disaggregated level data or by a single export unit price index. Nominal United Nations trade data collected at the two digit level are deflated by the appropriate two digit commodity index and a single export price index to determine if the data are correlated and whether the level at which data are deflated affects the robustness of export-led models.

This analysis of data sources reveals that the data derived from different sources are not comparable. Does the choice of data source affect results of analyses? Indeed, this paper argues that debates surrounding topics such as export led growth may be a function of different data sources driving the incongruent results. To illustrate the importance of the data sources for the conclusions drawn in the study of export led growth, basic Granger-Causality tests are performed for sixteen Latin American countries varying the data source, the form (level or percent change), and the deflator.² The results reveal that the data are neither interchangeable nor in a number of cases, correlated.

The implications of this study are far reaching. Researchers should take careful note of the implications of their data for the findings of their studies. Furthermore, those involved in debates surrounding models using export data should endeavor to use the same data for analysis, lest we find ourselves talking past one another.

II. DATA: IFS, UN, and COMTRADE

The International Financial Statistics (IFS) data are nominal export data collected by the International Monetary Fund (IMF) and reported in *International Financial Statistics*. The United Nations (UN) data are the sum of two digit data from merchandise trade flows between member countries as reported by member countries to the United Nations Statistical Office. Data prior to 1990 are from the Bilateral Trade publications. Post 1990 data (COMTRADE) are from the World Trade Analyzer, which is UN data compiled by Statistics Canada. The nominal data is deflated by the index of unit value of exports which is the fixed-weight index of price of exports, constructed using the Laspeyres formula.³

The study focuses on Latin America because this is a part of on going research concerning export and growth in the region. Two-digit SITC nominal export data from the United Nations trade database for the years 1962-1995 were used to create the database. Nominal export values were deflated by appropriate product specific price deflators. Primary commodities were deflated using commodity price indices from the United Nations *Monthly Bulletin of Statistics* and IMF *International Financial Statistics*. Manufactured goods were deflated by their appropriate U.S. producer price index, using the general U.S. producer price index when an industry-level one was not available. Therefore, real export values (2 Digit) for a country are the sum of the real export values of each of the two-digit export values (Amin Gutierrez de Pineres and Ferrantino, 2000). Traditionally, a common deflator deflates total exports. The two digit deflated data are compared to the same nominal data set deflated by the single export unit price index to determine if the level at which the data are deflated matters.

III. RESULTS

Are IMF and COMTRADE data comparable?

There is a striking difference in the correlation of the data between levels and percentage change.⁴ Using 0.80 as a threshold, the data for El Salvador, Honduras, Panama and Peru not correlated in levels. In percentage change, the data for Costa Rica, Ecuador, Guatemala, Honduras, Mexico, Panama, Peru, Paraguay and Venezuela are not correlated. These results reveal that the data are not as interchangeable as one would expect. (See Table 1)

Are aggregated and disaggregated deflated data comparable?

The data deflated at the aggregate and disaggregated levels are not correlated in Bolivia, Colombia, Costa Rica, Ecuador, El Salvador, Honduras, Panama, and Peru. The percentage change data for Chile, Colombia, El Salvador, Peru, Uruguay, and Venezuela are not correlated. (See Table 1)

Examining the data aggregated over all sixteen countries reveals that IFS and COMTRADE data are only correlated at 0.4653, using percentage change data; yet, are correlated at .9945 in levels. Since most models first difference real export time series data to correct for non-stationarity, this lack of correlation in percentage levels could significantly influence the robustness of the models being tested. The level at which data are deflated are correlated at 0.8097 (percentage change) and 0.7897 (levels). The level at which the data are deflated and the source of the data could be a source of inconsistencies in macroeconomic models.

Are results affected by choice of data and/or level at which data are deflated?

The third question this paper addresses is how choice of data and level of deflation affect the results of simple Granger tests and if these factors were a source of the widespread

differences in the results drawn by researchers.⁵ Given the limitations of the dataset and the focus of the question being addressed in this paper, only simple bi-directional Granger tests are conducted (see Ahmad, 2001).⁶ Growth is examined as a function of exports: $GDP = g(GDP_{t-1}, EXP, EXP_{t-1})$ where

- Eq. 1 is GDP using IFS data
- Eq. 2 is GDP using COMTRADE data
- Eq. 3 is GDP using UN data deflated by a single export price index
- Eq. 4 is GDP using two-digit deflated UN data GDP

Exports are examined as a function of growth: $EXP = f(EXP_{t-1}, GDP, GDP_{t-1})$ where

- Eq 5 is EXP using IFS data
- Eq. 6 is EXP using COMTRADE data
- Eq. 7 is EXP using two-digit deflated UN data
- Eq. 8 is EXP using UN data deflated by a single export price index

The export and growth equations are evaluated for each data source allowing a comparison between IFS and COMTRADE data and between data deflated at the two digit levels versus data deflated by a single export unit price deflator. Only the results for the countries with inconsistencies are reported here.⁷

Data source affects the results. Examining if exports Granger cause GDP (See Table 2), in Costa Rica, GDP is positively related to lagged GDP and current exports using COMTRADE data but only to lagged GDP when using IFS data. Also in Panama, lagged GDP and current exports have a positive impact on GDP using IFS data, but current exports are not significant if using COMTRADE data. In five cases, the level of significance changes, for the models that examine if GDP Granger causes exports (See Tables 3a-b). For Costa Rica, using COMTRADE

data there is a positive relationship between GDP and exports but no relationship using IFS data. In Ecuador, lagged GDP has a negative impact on exports using COMTRADE data but no relationship using IFS data. In the cases of Guatemala and Peru, lagged exports have a negative impact on exports using COMTRADE data but no relationship using IFS data. In Panama, GDP has a positive impact on exports using IFS data but no relationship using COMTRADE data. The inconsistencies in the results have the potential to lead to erroneous policy with unintended consequences.

The second component of this analysis focuses on at what level data should be deflated. The export led growth equations are replicated using the two digit deflated data and data deflated using a single export price index. Once again, the choice matters (See Table 4). In Colombia, when using two digit deflated data there is a positive relationship between GDP and exports, while when using data deflated at the aggregate level there is no significance. For Ecuador, lagged exports are positively related growth at the two-digit level only. Examining the growth-led export results (See Table 5) we find that in El Salvador, there is a negative relationship for lagged exports and a positive relationship for lagged GDP using data deflated at the aggregate level; yet, only lagged exports are significant using two digit deflated data. For Mexico, lagged exports are positively related to current exports using two digit deflated data but there is no significance using aggregately deflated data. These preliminary results indicate that how the data is deflated can potentially affect the results; however, the inconsistencies are not as great as when considering the source of data.

IV. CONCLUSION

These results stress the need to test the robustness of models as they pertain to choice of data set and methodology for deflation. This study suggests that much of the debate regarding

export led growth could be fueled solely by data choice and methodology for deflation. Given the policy implications of these studies, more care must be taken to ensure the results are robust to not only model specification but also regarding data issues. Further research remains to be done to see how these factors affect the results of more complicated trade models and other macroeconomic models that utilize real export data.

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Table 1. Correlation Coefficients

Country	IFS & COMTRADE		UN & 2Digit Deflated	
	Levels	Percentage	Levels	Percentage
Argentina	0.9999	0.9999	0.9751	0.9613
Bolivia	0.9550	0.8009	0.2317	0.9232
Brazil	0.9999	0.9972	0.9605	0.8542
Chile	0.9993	0.9501	0.9240	0.6852
Colombia	0.9962	0.8429	0.5599	0.5933
Costa Rica	0.9729	0.6990	0.7175	0.9995
Ecuador	0.9977	0.7520	0.6772	0.9369
El Salvador	0.7919	0.8563	-0.0071	0.7494
Guatemala	0.9209	0.4276	0.9324	0.9864
Honduras	0.7730	0.6875	0.5146	0.9422
Mexico	0.9620	0.4813	0.8104	0.9218
Nicaragua	0.9617	0.8179	0.6778	0.8570
Panama	0.1480	0.1069	0.3873	0.9222
Peru	0.6959	0.7944	-0.4512	0.7767
Paraguay	0.8582	0.2837	0.7461	1.0000
Uruguay	0.9857	0.8386	0.0138	-0.0669
Venezuela	0.9651	0.5380	0.8036	0.5455
All Countries	0.9945	0.4653	0.7897	0.8097

Table 2. Export-led Growth Equations

	Costa Rica		Panama	
	GDP(eq.1)	GDP(eq.2)	GDP(eq.1)	GDP(eq.2)
GDP _{t-1}	0.4592* (0.1926)	0.3692† (0.1967)	0.3778* (0.1762)	0.4742** (0.1716)
IFS	0.0569 (0.0620)	-	0.0354** (0.0135)	-
IFS _{t-1}	-0.0523 (0.0853)	-	0.0054 (0.0146)	-
COMTRADE	-	0.1473† (.0803)	-	0.0595 (0.0797)
COMTRADE _{t-1}	-	-0.0177 (0.0813)	-	-0.0132 (0.0787)
Constant	0.0245* (0.0106)	0.0196† (0.0104)	0.0449** (0.0169)	0.0442* (0.0182)
N	32	29	31	31
R ²	0.2317	0.2961	0.3831	0.2410

Note: †p<0.10, *p<0.05, **p<0.01

Table 3a. Growth-led Export Equations

	Costa Rica		Ecuador		Guatemala	
	IFS (Eq.5)	COMTRADE (Eq. 6)	IFS (Eq.5)	COMTRADE (Eq. 6)	IFS (Eq.5)	COMTRADE (Eq. 6)
Y _{t-1}	-0.2047 (0.2624)	-0.1422 (0.1881)	-0.0334 (0.2012)	0.1685 (0.1870)	-0.1568 (0.1628)	-0.6678** (0.1426)
GDP	0.5435 (0.5745)	0.8047† (0.4387)	2.3079** (0.5457)	2.5760** (0.4528)	0.7555 (0.9708)	0.9934 (1.1571)
GDP _{t-1}	0.5276 (0.6449)	0.3794 (0.4852)	-0.4059 (0.6804)	-1.1670† (0.6368)	0.9109 (0.9195)	0.5429 (1.1635)
Constant	0.0415 (0.0349)	0.0206 (0.0257)	-0.0060 (0.0439)	0.0107 (0.0369)	0.0017 (0.0373)	0.0271 (0.0430)
N	32	32	29	29	32	32
R ²	0.0953	0.2059	0.4223	0.5782	0.1509	0.4803

Note: (†p<0.10, *p<0.05, **p<0.01)

Table 3b. Growth-led Export Equations

	Panama		Peru	
	IFS (Eq. 5)	COMTRADE (Eq. 6)	IFS (Eq. 5)	COMTRADE (Eq. 6)
Y_{t-1}	-0.2341 (0.1803)	0.0507 (0.1879)	-0.1883 (0.1862)	-0.4263* (0.1746)
GDP	5.7208** (2.1839)	0.3396 (0.4549)	0.1125 (0.4067)	-0.0209 (0.5987)
GDP_{t-1}	0.5239 (2.4208)	-0.0410 (0.4641)	-0.2198 (0.4068)	-0.3615 (0.5890)
Constant	-0.2719 (0.2363)	-0.0023 (0.0483)	0.0236 (0.0250)	0.0448 (0.0361)
N	31	31	32	32
R^2	0.2689	0.8629	0.0494	0.1983

Note: (†p<0.10, *p<0.05, **p<0.01)

Table 4. Export-led Growth Equations

	Colombia		Ecuador	
	GDP(eq.5)	GDP(eq.6)	GDP(eq.5)	GDP(eq.6)
UN	0.0112 (0.0165)	-	0.0706** (0.0167)	-
UN_{t-1}	-0.0099 (0.0165)	-	0.0143 (0.0213)	-
2 Digit UN	-	0.0377** (0.0216)	-	0.0809** (0.0157)
2 Digit UN_{t-1}	-	-0.0013 (0.0229)	-	0.0497* (0.0217)
Constant	0.0208* (0.0087)	0.0192* (0.0084)	0.0299** (0.0114)	0.0381** (0.0099)
N	26	26	29	29
R^2	0.3019	0.3675	0.4708	0.5989

Note: (†p<0.10, *p<0.05, **p<0.01)

Table 5. Growth-led Export Equations

	El Salvador		Mexico	
	2 Digit UN (Eq. 7)	UN (Eq. 8)	2 Digit UN (Eq. 7)	UN (Eq. 8)
Y_{t-1}	-0.3984† (0.1998)	-0.6636** (0.1694)	-0.3266† (0.1921)	-0.1748 (0.1905)
GDP	2.1807 (2.6246)	-0.6764 (2.3690)	-5.3043** (1.8185)	-8.6789** (2.3042)
GDP _{t-1}	2.7508 (2.9562)	4.9421† (2.6572)	0.0411 (2.3274)	0.8521 (3.1956)
Constant	-0.0610 (0.0940)	-0.0932 (0.0834)	0.4477** (0.1171)	0.4836** (0.1568)
N	26	26	32	32
R ²	0.2798	0.4685	0.4030	0.4227

Note: (†p<0.10, *p<0.05, **p<0.01)

¹ Percentage change is included since most longitudinal studies use the export data in the percentage change format to correct for unit roots often found in level data.

² The sample contains 16 Latin American countries: Argentina, Bolivia, Brasil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, México, Panamá, Perú, Paraguay, Uruguay, and Venezuela.

³ Oxford Latin American Economic History Database- Methodology. [Http://oxlad.qeh.ox.ac.uk/sources.php](http://oxlad.qeh.ox.ac.uk/sources.php)

⁴ The results of the correlations, for aggregate series in both levels and percentage change, are available upon request from the author.

⁵ For in-depth analysis of export led growth literature see Ahmad, 2001. For studies that use IFS data see Bahmani-Oskooee, Mohtadi, and Shabsigh, 1991; Jung and Marshall, 1985. For a study that uses COMTRADE data see Amin Gutierrez de Pineres and Ferrantino, 2000. More recent papers on the topic of export-led growth are Abu-Quarn and Abu-Bader (2004), Balanguer and Cantavella-Jorda (2004), and Abual-Foul (2004).

⁶ Simple Granger tests are limited to capturing short run dynamics between exports and growth when employing a simple bi-variate model.

⁷ Results for all countries in the sample are available from the author upon request.