Levels of Economic Development and Harrod foreign trade multiplier: A Re-examination of empirical evidences

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Abstract:

Estimates of export and import demand functions for ninety countries using Stock and Watson (1993) Dynamic OLS are presented. These estimates are then used to examine the relationship between levels of economic development and Harrod foreign trade multiplier. We show that there is an inverted U relations, as predicted by Thirlwall (1997), contrary to Bairam (1997, 1993). Absence of inverse relation between levels of economic development and Harrod foreign trade multiplier imply that Thirlwall's law does not imply convergence.

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1. Introduction

Bairam (1997, 1993) shows that there is an inverse relationship between Harrod foreign trade multiplier (trade elasticities ratio) and levels of economic development, and income elasticities of exports demand and levels of economic development. However, Thirlwall (1997) criticizes Bairam's result for drawing inferences from a small and selective group of poor countries, which contain many industrializing countries but very few extremely poor countries. Thirlwall expects[1] an inverted U relationship if a full range of countries were included. This is because as countries move from primary products exports to light manufactures, demand for exports will rise, however as countries get richer they will get locked into antiquated industrial structure hence decreasing income elasticities.

In this paper[2] we re-examine the relationship between Harrod foreign trade multiplier and the levels of economic development using Stock and Watson (1993) dynamic ordinary least square (DOLS) with a larger number of countries.

--Figure 1 about here--

Figure 1 plots GDP per capita index versus Harrod foreign trade multiplier using Bairam's trade elasticities estimations and sample countries. From the figure there is a clear inverse relationship especially if the two oil exporting countries, Saudi Arabia and UAE are dropped from the graph.

The implication of Bairam's result is that Thirlwall's law does not imply uneven development. Using equation (1) which is the Thirlwall's law, this implication can be demonstrated.

$$y_i = \frac{y_i^* \varepsilon_i}{\pi_i} \tag{1}$$

Where y_i is domestic growth rate, y_i^* is foreign (world) growth rate, ε_i is income elasticities of exports demand and π_i is income elasticities of imports demand. If $\varepsilon_i > \pi_i$ for poor countries and $\varepsilon_i < \pi_i$ for rich countries as in figure 1, poor countries growth rate will be higher than rich countries growth rate in time of world expansion, hence there will be convergence which is not supported by empirical evidences. Empirical evidences shows that the disparity between rich and poor countries is growing.

Dutt (2002) also criticizes the implication from Bairam's result, however he suggests examining exports and import elasticities between North and South regions, by ignoring intra south and intra north trade, instead of looking at cross countries differences in trade elasticities.

2. Methodology, data and specification

All data used are annual from World Table of Economic and Social Indicators 1965-1991 downloaded from ICPSR[3], except for bilateral trade data (used in calculating trade weighted average), which is from the *IMF's Direction of Trade Statistics*.

In order to estimate trade elasticities we follow Houthakker and Magee (1969)[4], where import and export demand are function of income and relative prices:

$$\ln IM_{it} = \beta_0 + \beta_1 \ln y_{it} + \beta_2 \ln RMP_{it} + \mu_{it} \tag{2}$$

IM_{it} is *i*th country's real import during year *t*, calculated using value of total imports of goods and services deflated by unit value of imports. Country *i* real GDP is y_{it}. RMP_{it} is relative price of imports calculated as ratio of index unit value of imports to GDP deflator, and u_{it} is error term.

Export demand function is:

$$\ln EX_{it} = \alpha_0 + \alpha_1 \ln y^*_{it} + \alpha_2 \ln RXP_{it} + \mu_{it} \qquad (3)$$

EX_{it} is *i*th country real export during year *t*, calculated using value of total exports of goods and services deflated by unit value of exports. Foreign GDP y^*_{it} is weighted sum of GDP index (1985=100) for country *i* top 15 trading partners (importing countries), weighted by 1985 export share.

$$\ln y^*_{it} = \sum_j a_{ij} \ln y_{jt} , \qquad j = 1,\ldots,15 \qquad (4)$$

Export share from country *i* to country *j* is a_{ij}, where *j* is the index for country *i* top 15 trading partners.

RXP_{it} is calculated as PX_{it}/PXW_{it}, where PX_{it} is index for country *i* unit value of exports in year *t* and PXW_{it} is weighted average of export unit value for the region where country *i*th belong to. Hence,

$$PXW_{it} = \sum_k b_k PX_{kt} \qquad (5)$$

where b_k is country *k* export share and PX_{kt} is country *k* export unit value, where *k* is the index for countries in country *i*th region. Here we divide the countries into four regions, industrial, Asian, African and Latin American countries.

Unlike Houthakker and Magee (1969) who used 26 countries to estimate foreign output, we only use 15 countries as an indicator for foreign output because these

countries constitute a significant[5] amount of trade share (for some smaller countries top 10 trading partners constitute a significant amount of trade share). We also use the region trade weighted price index instead of Houthakker and Magee two stage export price procedures[6] because if Houthakker and Magee procedure are followed most developing countries will be competing with industrial countries, which is not true. Using regional export prices, countries compete with similar countries instead of a particular country top exporters.

To conduct cointegration analysis, we start with the augmented Dickey-Fuller (ADF) unit root test for each of the variables in the trade equations. Next we use Johansen (1991, 1995) procedure to test for the existence of cointegration.

All regressions for ADF test are estimated with either one lag and a time trend, or one lag without time trend depending on data behavior. ADF unit root tests show that majority of the cases are not stationary[7].

Johansen cointegration test is conducted using the trace statistics assuming a trend and intercept (for majority of countries) for a VAR of lag length four and VAR of lag length chosen using Hannan Quinn Information criteria. We reject null hypothesis of no cointegration for majority of the cases[8].

To estimate trade elasticities Stock and Watson (1993) dynamic Ordinary Least Squares (DOLS) is used. Monte Carlo experiments show that the DOLS estimator performs well relative to the other asymptotically efficient estimators including the fully modified estimator of Phillips and Hansen (1990). The DOLS regression were carried out by adding one lead and lag of differenced explanatory variables to a static cointegration regression so as to eliminate small sample bias resulting from correlation between error

term and the explanatory variables. The error terms in the DOLS procedure are however serially correlated. The standard errors are therefore estimated using Newey and West (1987) adjustment.

The estimation results for trade and price elasticities for export and import are reported in Appendix A.

3. Levels of Economic Development and Harrod Foreign Trade Multiplier

In order to test the relationship between economic development and Harrod foreign trade multiplier we follow Bairam (1997,1993). Bairam postulate that there are possible relationship between trade elasticities and the relative per capita output level, hence:

$$\varepsilon_i = f(R_i, D_i) \tag{6}$$

$$\pi_i = f(R_i, D_i) \tag{7}$$

where R is the average per capita output relative to that of United States and D is dummy for oil exporting countries, where $D = 1$ for oil exporting country and $D = 0$ otherwise. OPEC countries used are reported in Appendix B. Bairam shows that the types of functional form used for equation (6) whether linear or log linear does not change the implication of the results that is income elasticities of exports ε_i is inversely related to the level of economic development. He also shows that income elasticities of import demand π_i does not change with levels of development. We do get the same result for π_i hence we concentrate on export elasticities.

Figure 2 plots GDP per capita index versus export elasticities, and figure 3 plots GDP per capita index versus Harrod foreign trade multiplier. GDP per capita index is calculated as percentage ratio of country i average GDP per capita from 1965 to 1991

over United States average GDP per capita from 1965 to 1991. In both cases the observations can be divided into two sections, the upward sloping and downward sloping section especially if OPEC countries are dropped from the graph (OPEC countries are also outliers in Bairam).

--Figure 2 about here--

--Figure 3 about here--

To test formally the relation after adding more countries we estimated four different regressions. Table 1 and table 2 report the results. In (i) ε_i is regressed on GDP per capita index only, in (ii) OPEC dummy is included, and in (iii) we add a quadratic term to the equation. In (iv) we changed the dependent variable from ε_i to $\frac{\varepsilon_i}{\pi_i}$ or the Harrod foreign trade multiplier. In conducting the regressions, countries with trade elasticities with T-statistics that is less than $|1.6|$ is not used. By dropping less significant trade elasticities we end up with 77 observation (from 90 countries used for estimation) for regression (i), (ii), and (iii), and 70 observations for (iv)[9].

Table 1: Income elasticities of exports and levels of economic development

(i)	$\varepsilon = 1.321 + 0.535R$ (0.16) (0.39)	R-squared = 0.0241 F(1,75) = 1.85
(ii)	$\varepsilon = 1.397 + 0.505R - 1.301D$ (0.16) (0.38) (0.54)	R-squared = 0.0948 F(2,74) = 3.87

Standard error in parenthesis.

Table 1 shows that there is a positive instead of a negative relation between export elasticities and GDP per capita index and negative coefficient for the OPEC dummy, however the coefficient for GDP per capita is not significant.

Table 2: Income elasticities of exports and levels of economic development

(iii)	$\varepsilon = 1.181 + 3.223R - 2.957R^2 - 1.458D$ (0.19) (1.44) (1.51) (0.44)	R-squared = 0.1402 F(3,73) =3.95
(iv)	$\frac{\varepsilon}{\pi} = 1.401 + 2.860R - 3.062R^2 - 1.739D$ (0.24) (1.68) (1.76) (0.62)	R-squared = 0.2360 F(3,66) = 3.27

Standard error in parenthesis

Table 2 shows that there is an inverted U relation between GDP per capita and income elasticities for exports as predicted by Thirlwall. Harrod foreign trade multiplier, regression (iv) also provide the same result. For regression (iv) if we use elasticities with T-statistics > $|2.0|$ the significance of coefficient increases, however the number of observations decrease to 65.

4. Conclusion

We show that there is an inverted U relation between income elasticities of exports demand and levels of economic development, and between Harrod foreign trade multipliers and levels of economic development. The results from this investigation show that Thirlwall's law does not imply even development or convergence. However, it also does not imply that individual poor country cannot break out from the poor country group. If poor country can increase their export elasticities such that the ratio of export

over import elasticities is higher than rich countries elasticities ratio they will grow faster than rich countries and hence the possibility of catching up. The possibility of catching up is also increased as rich countries tend to have a low trade multiplier.

Notes

[1] Thirlwall specific comment is on the relation between income elasticities of exports and levels of economic development, however he does not give empirical evidences to support his claim.

[2] Most of studies tested Thirlwall's used industrial countries data and non-stationarity of data was not taken into consideration. Here we take into consideration data non-stationarity and use larger set of countries.

[3] Inter-university Consortium for Political and Social Research (ICPSR) data can be downloaded at http://www.icpsr.umich.edu/

[4] This strand of literature follows Houthakker and Magee (1969) specification, starting with Thirlwall (1969) paper.

[5] Top 15 export market accounted for more than 70% of country exports for majority of countries.

[6] Houthakker two steps procedures for foreign export price:

$$PXW_{it} = \sum_j a_{ij} \sum_k \beta_{ik} PX_{kt} \qquad i = 1,\ldots,26 \qquad k = 1,\ldots,25$$

First a price index is constructed for each of the top 26 markets of country *i* using the export prices of 25 other top exporters to that market weighted by their share of exports

in a particular year. Then the resulting 26 price indexes are combined with the same weights used to calculate the foreign GDP for country i,. Hence each exporter has a price index comparing the exporter's price with the weighted average of the export prices of its 25 competitors in each of the 26 markets. If this procedures are used developing countries will compete with industrial countries which is not true. Houthakker and Magee (1969) use these procedures to estimate trade elasticities for industrial countries, hence developing countries is not a big issue.

[7] If time trend is not included, all data are non stationary. With time trend and constant: unit root cannot be rejected at 5% level in all but the following cases Australia, Iceland, Ireland, China, Papua New Guinea and Philippines for imports. Netherlands, China, Egypt, Gabon, Malawi, Tunisia, Zaire, Zambia for exports. Japan, United States, Senegal and Uruguay for GDP, Papua New Guinea for import prices.

[8] We choose lag length using Hannan Quinn criteria, we also check with different lag length if Hannan Quinn criteria lead to rejection of null hypothesis of no cointegration. For about 30 out of 180 cases (import and export equations) Hannan Quinn criteria lead to the conclusion of no cointegration. For those 30 cases we examine data behavior for trend or use different lag length. Of these 30 case some are not trending, or using lag length of four resulted to acceptance of cointegration.

9 In (i), (ii) and (iii) we only drop non significant export elasticities, in (iv) we drop non significant import and export elasticities.

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Appendix A

Estimated export and import elasticities

Countries	π	κ	ε	η	ε-π	GDP/capita
Argentina	1.20 (0.34)	-0.86 (0.08)	0.90 (0.30)	-0.09 (0.59)	-0.30	15.09
Australia	1.17 (0.11)	-0.39 (0.21)	1.15 (0.10)	-0.26 (0.21)	-0.02	75.38
Austria	1.58 (0.03)	-0.69 (0.07)	2.42 (0.04)	-0.36 (0.14)	0.84	67.19
Burundi	1.98 (0.22)	-1.34 (0.25)	1.47 (0.23)	-0.26 (0.15)	-0.52	1.36
Bangladesh	1.21 (0.14)	-0.39 (0.15)	1.01 (0.88)	0.27 (1.40)	-0.21	1.17
Bolivia	1.14 (0.29)	-0.45 (0.29)	0.06 (0.32)	-0.64 (0.17)	-1.09	3.60
Brazil	0.66 (0.15)	-0.19 (0.14)	2.51 (0.14)	-1.09 (0.27)	1.85	12.26
Barbados	0.42 (0.15)	-0.60 (0.15)	3.74 (0.59)	-2.04 (0.35)	3.32	25.44
Canada	1.29 (0.04)	-0.89 (0.06)	1.45 (0.09)	-0.63 (0.22)	0.15	87.19
Congo	0.83 (0.19)	-1.00 (0.58)	2.68 (0.21)	-0.27 (0.19)	1.85	5.91
Switzerland	1.91 (0.17)	-0.50 (0.21)	1.79 (0.09)	-0.54 (0.15)	-0.12	116.80
Chile	1.13 (0.20)	-0.24 (0.10)	1.48 (0.25)	-0.27 (0.14)	0.35	12.04
China	0.81 (0.48)	0.57 (0.57)	1.86 (0.18)	0.73 (0.53)	1.04	2.03
Cote d'Ivorie	1.45 (0.08)	-0.61 (0.12)	1.44 (0.14)	-0.05 (0.17)	-0.01	5.36
Cameroon	0.98 (0.05)	-1.07 (0.14)	1.49 (0.52)	-1.43 (0.49)	0.52	4.84
Colombia	0.79 (0.07)	-0.73 (0.18)	1.81 (0.16)	-0.99 (0.17)	1.02	7.48
Costa Rica	0.92 (0.15)	-0.79 (0.30)	1.75 (0.12)	-0.72 (0.21)	0.83	9.92
Germany	1.54 (0.05)	-0.47 (0.07)	1.83 (0.05)	-0.22 (0.11)	0.29	84.87
Dominica	0.32 (0.24)	0.09 (0.27)	2.33 (0.26)	-0.76 (0.20)	2.02	7.46
Denmark	0.91 (0.04)	-0.56 (0.05)	1.68 (0.06)	-0.59 (0.27)	0.77	87.19
Algeria	2.64 (0.35)	1.86 (0.59)	0.89 (0.15)	-0.30 (0.10)	-1.75	12.73
Egypt	1.13 (0.13)	-0.54 (0.15)	1.29 (0.35)	-0.86 (0.59)	0.16	3.83
Spain	1.70 (0.10)	-0.44 (0.17)	2.53 (0.07)	-1.12 (0.27)	0.82	36.67
Ethiopia	1.71 (0.33)	-0.67 (0.15)	0.31 (0.29)	-0.96 (0.23)	-1.40	0.83
Finland	1.06 (0.06)	-0.46 (0.06)	1.71 (0.15)	-0.66 (0.39)	0.65	79.35
Fiji	0.63 (0.39)	-0.34 (0.61)	1.04 (0.09)	-0.84 (0.09)	0.42	10.61
France	1.29 (0.06)	-0.43 (0.11)	1.86 (0.08)	-0.18 (0.35)	0.57	77.04
Gabon	0.83 (0.14)	-0.76 (0.33)	0.24 (0.67)	0.01 (0.63)	-0.58	21.95
U. Kingdom	1.10 (0.04)	-0.48 (0.04)	1.10 (0.07)	-0.05 (0.14)	-0.01	59.87
Ghana	-0.93 (0.30)	0.17 (0.11)	-0.63 (0.25)	0.17 (0.34)	0.29	2.86
Greece	1.44 (0.12)	-0.93 (0.15)	1.84 (0.23)	-1.58 (0.43)	0.39	27.04
Guatemala	1.51 (0.32)	-0.82 (0.36)	0.68 (0.15)	0.03 (0.34)	-0.83	6.70
Hong Kong	1.19 (0.07)	-0.75 (0.55)	2.30 (0.08)	-0.48 (0.19)	1.12	40.46
Honduras	0.40 (0.11)	-0.19 (0.12)	0.93 (0.17)	0.20 (0.36)	0.53	4.56
Haiti	1.97 (0.19)	-0.38 (0.17)	1.52 (0.20)	-0.97 (0.42)	-0.45	1.88
Burkina Faso	1.04 (0.17)	-0.23 (0.21)	2.37 (0.38)	-0.13 (0.29)	1.34	1.34
Indonesia	1.38 (0.04)	-1.23 (0.08)	1.15 (0.17)	-0.12 (0.15)	-0.24	3.38
India	1.29 (0.16)	-0.26 (0.20)	1.22 (0.15)	-0.63 (0.37)	-0.07	1.83
Ireland	1.15 (0.03)	-0.42 (0.11)	3.02 (0.12)	-1.40 (0.34)	1.87	36.69
Iran	2.53 (0.25)	-0.04 (0.15)	0.42 (0.66)	-0.54 (0.43)	-2.11	16.67
Iceland	0.64 (0.11)	-0.66 (0.22)	1.82 (0.12)	-1.02 (0.20)	1.18	89.55
Israel	0.81 (0.08)	-0.12 (0.17)	2.37 (0.10)	-0.24 (0.08)	1.56	44.54
Italy	1.10 (0.05)	-0.49 (0.04)	2.11 (0.15)	-0.52 (0.32)	1.01	56.94
Jamaica	1.00 (0.31)	-0.42 (0.07)	0.09 (0.27)	0.00 (0.59)	-0.92	9.46
Japan	0.91 (0.08)	-0.32 (0.06)	2.00 (0.10)	-1.41 (0.57)	1.08	79.43
Kenya	0.64 (0.28)	-0.67 (0.31)	0.25 (0.18)	-0.49 (0.31)	-0.40	2.37
Korea	1.20 (0.04)	-0.09 (0.15)	4.14 (0.14)	-1.14 (0.27)	2.95	14.82
Sri Lanka	0.76 (0.19)	-0.61 (0.18)	0.38 (0.32)	0.28 (0.47)	-0.38	2.60

Morocco	0.95 (0.22)	-0.34 (0.28)	1.81 (0.17)	0.24 (0.20)	0.86	5.12
Madagascar	2.40 (1.28)	-1.29 (0.35)	-0.40 (0.18)	-0.58 (0.23)	-2.80	2.29
Mexico	1.36 (0.18)	-0.69 (0.28)	3.03 (0.34)	-0.06 (0.70)	1.68	14.69
Mali	1.54 (0.16)	-0.39 (0.15)	2.17 (0.30)	-0.20 (0.24)	0.63	1.51
Malta	1.05 (0.06)	-0.85 (0.09)	2.51 (0.25)	-0.25 (0.18)	1.46	23.46
Mauritania	1.48 (0.49)	0.57 (0.50)	1.58 (0.35)	0.25 (0.33)	0.09	2.98
Mauritius	1.48 (0.12)	-1.11 (0.29)	2.20 (0.17)	0.02 (0.14)	0.72	8.73
Malawi	1.23 (0.27)	-1.51 (0.29)	1.35 (0.23)	0.04 (0.19)	0.13	1.18
Malaysia	1.58 (0.13)	-1.25 (0.19)	1.58 (0.08)	-0.38 (0.24)	0.00	11.05
Niger	0.38 (0.83)	0.32 (0.43)	0.52 (0.43)	-1.25 (0.43)	0.15	2.24
Nigeria	1.66 (0.21)	-0.75 (0.11)	1.38 (0.66)	-0.59 (0.35)	-0.28	4.75
Nicaragua	0.38 (0.40)	-0.01 (0.28)	0.76 (0.31)	1.16 (0.38)	0.38	5.43
Netherlands	1.24 (0.05)	-0.60 (0.13)	1.72 (0.09)	-1.05 (0.28)	0.49	73.94
Norway	0.73 (0.12)	-0.52 (0.21)	2.03 (0.08)	-0.28 (0.08)	1.30	91.15
Nepal	1.69 (0.23)	-0.28 (0.13)	1.45 (0.47)	-0.49 (0.61)	-0.24	1.11
New Zealand	1.38 (0.11)	-0.30 (0.08)	1.32 (0.06)	-0.05 (0.17)	-0.07	52.29
Pakistan	1.02 (0.08)	-0.51 (0.10)	0.18 (0.37)	-3.35 (0.64)	-0.84	2.22
Panama	0.09 (0.20)	-0.39 (0.10)	1.11 (0.42)	-1.23 (0.28)	1.03	12.37
Peru	0.55 (0.44)	-0.72 (0.31)	-0.34 (0.27)	-1.54 (0.40)	-0.89	7.85
Philippines	1.34 (0.16)	-0.78 (0.14)	0.88 (0.13)	-1.41 (0.31)	-0.46	4.05
Papua N. Guinea	0.98 (0.34)	-0.62 (0.51)	2.33 (0.33)	0.70 (0.41)	1.35	4.99
Portugal	1.44 (0.07)	-0.90 (0.13)	2.14 (0.29)	-1.27 (0.86)	0.70	17.98
Paraguay	1.21 (0.27)	-0.41 (0.46)	2.40 (0.38)	-2.10 (0.55)	1.19	7.21
Saudi Arabia	1.07 (0.09)	-1.10 (0.13)	-0.79 (0.40)	0.30 (0.36)	-1.86	50.05
Senegal	0.81 (0.14)	-0.08 (0.09)	1.29 (0.20)	0.54 (0.23)	0.48	3.52
Singapore	1.00 (0.03)	-0.24 (0.06)	2.03 (0.16)	-0.62 (0.16)	1.03	42.95
Sierra Leone	-0.73 (1.05)	-0.60 (0.45)	-2.10 (0.27)	-0.59 (0.35)	-1.36	2.12
El Salvador	0.49 (0.27)	0.18 (0.15)	0.06 (0.23)	0.14 (0.32)	-0.43	5.35
Somalia	2.41 (0.41)	-1.74 (0.30)	0.01 (0.67)	-1.48 (0.85)	-2.40	1.04
Sweden	1.15 (0.08)	-0.44 (0.05)	1.38 (0.07)	-0.31 (0.31)	0.24	96.45
Togo	1.99 (0.26)	-0.68 (0.30)	1.19 (0.44)	-0.62 (0.33)	-0.79	2.32
Thailand	1.26 (0.12)	-0.71 (0.20)	2.38 (0.30)	-0.52 (0.62)	1.12	5.25
Trinidad Tobago	1.18 (0.26)	-1.12 (0.12)	-0.40 (0.16)	-0.43 (0.05)	-1.57	27.31
Tunisia	1.18 (0.26)	-0.17 (0.61)	1.82 (0.20)	-0.09 (0.31)	0.64	7.53
Turkey	1.47 (0.15)	-0.07 (0.18)	2.70 (0.68)	0.28 (0.37)	1.22	8.38
Tanzania	-0.92 (1.02)	0.15 (0.44)	-1.84 (0.26)	-0.04 (0.39)	-0.92	1.76
Uruguay	1.05 (0.44)	-0.43 (0.16)	0.85 (0.22)	0.62 (0.35)	-0.21	14.68
U. States	2.09 (0.06)	-0.43 (0.05)	1.15 (0.07)	-0.48 (0.17)	-0.93	100
Venezuela	2.12 (0.27)	-0.77 (0.12)	-0.40 (0.14)	-0.57 (0.04)	-2.52	24.17
South Africa	0.80 (0.29)	-0.82 (0.24)	1.14 (0.15)	-0.51 (0.11)	0.34	13.85
Zaire	1.95 (0.48)	-0.79 (0.08)	0.58 (0.23)	-0.27 (0.15)	-1.36	2.96
Zambia	0.35 (0.77)	-0.96 (0.12)	-0.78 (0.19)	-0.23 (0.10)	-1.13	3.93

Standard errors are in parentheses

π- Income elasticity of import demand

κ- Price elasticity of import demand

ε- Income elasticity of export demand

η- Price elasticity of export demand

GDP/capita- Index of GDP per capita. Constructed as the average GDP per capita from 1965-1991 divided by United States GDP per capita average.

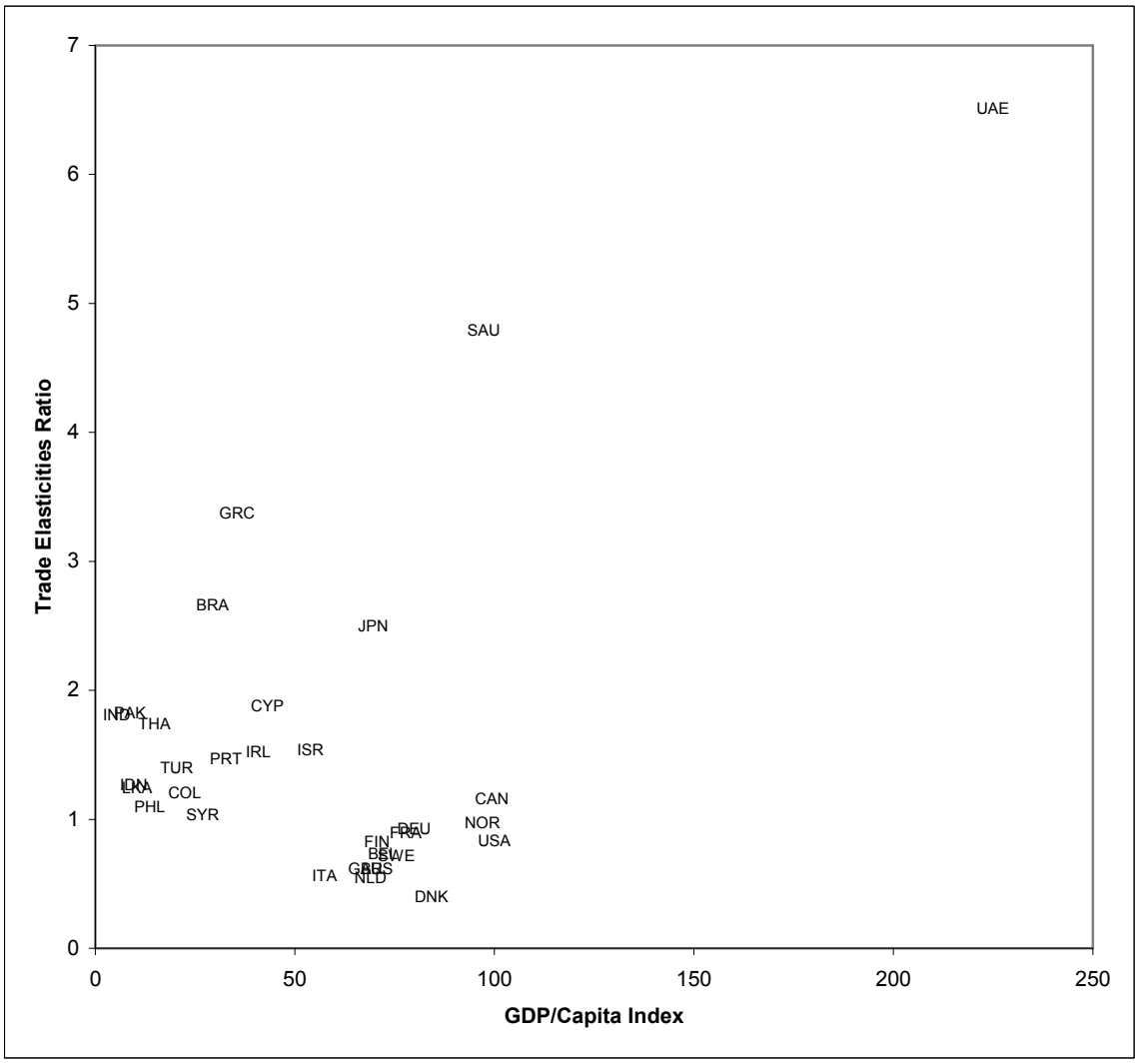
Appendix B

OPEC Countries

Algeria*	Indonesia*	Iran*
Iraq	Libya	Kuwait
Nigeria*	Qatar	Saudi Arabia*
U.A.E.	Venezuela*	

*Oil exporting countries used in regression

Figure 1: GDP per capita index versus Harrod Foreign Trade Multiplier from (Bairam 1997)



Source: Bairam (1997). Nigeria with elasticities ratio of 8.94 is not in the graph.

Figure 2: GDP per Capita Index versus Export Elasticities (1965-1991)

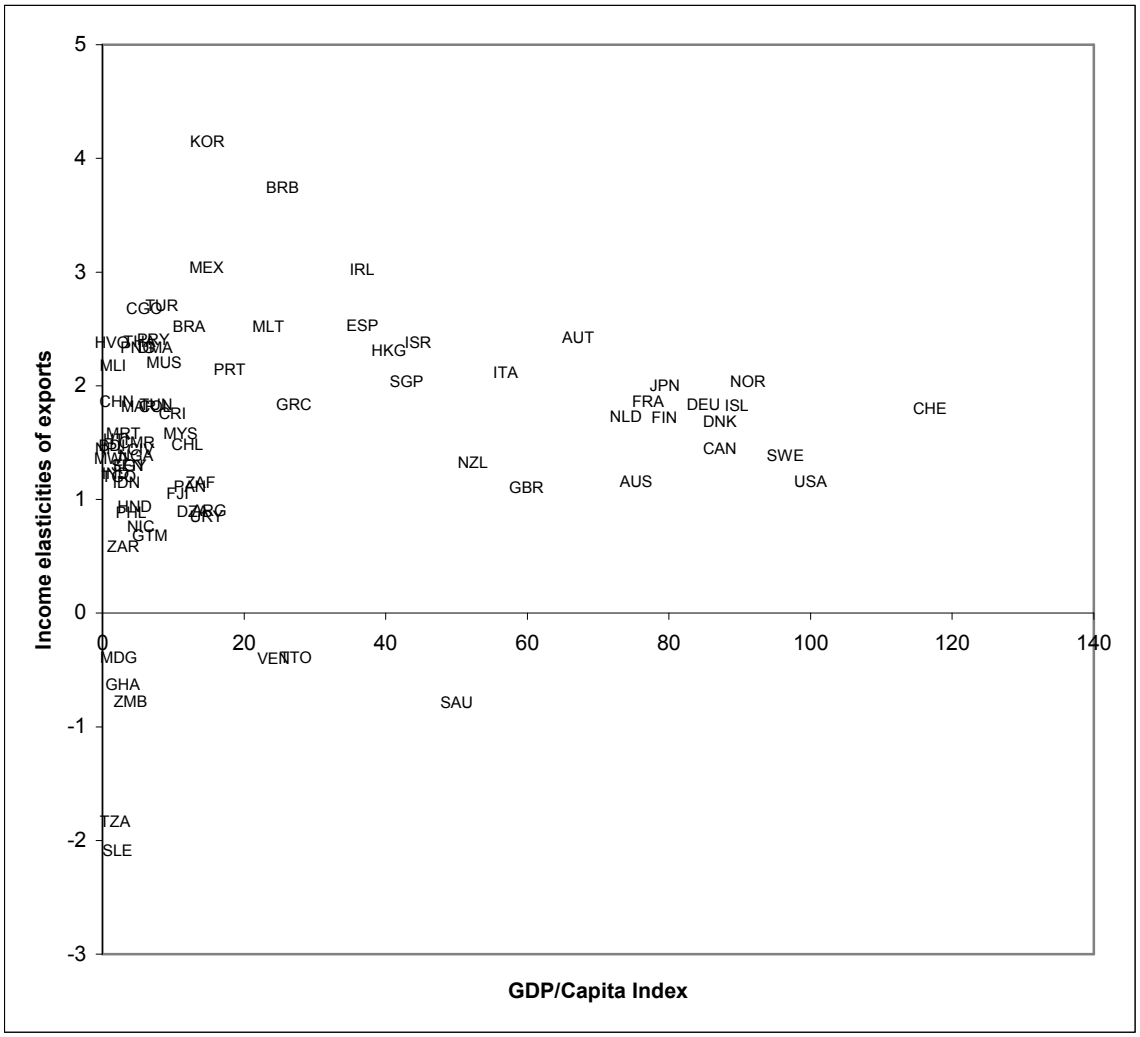
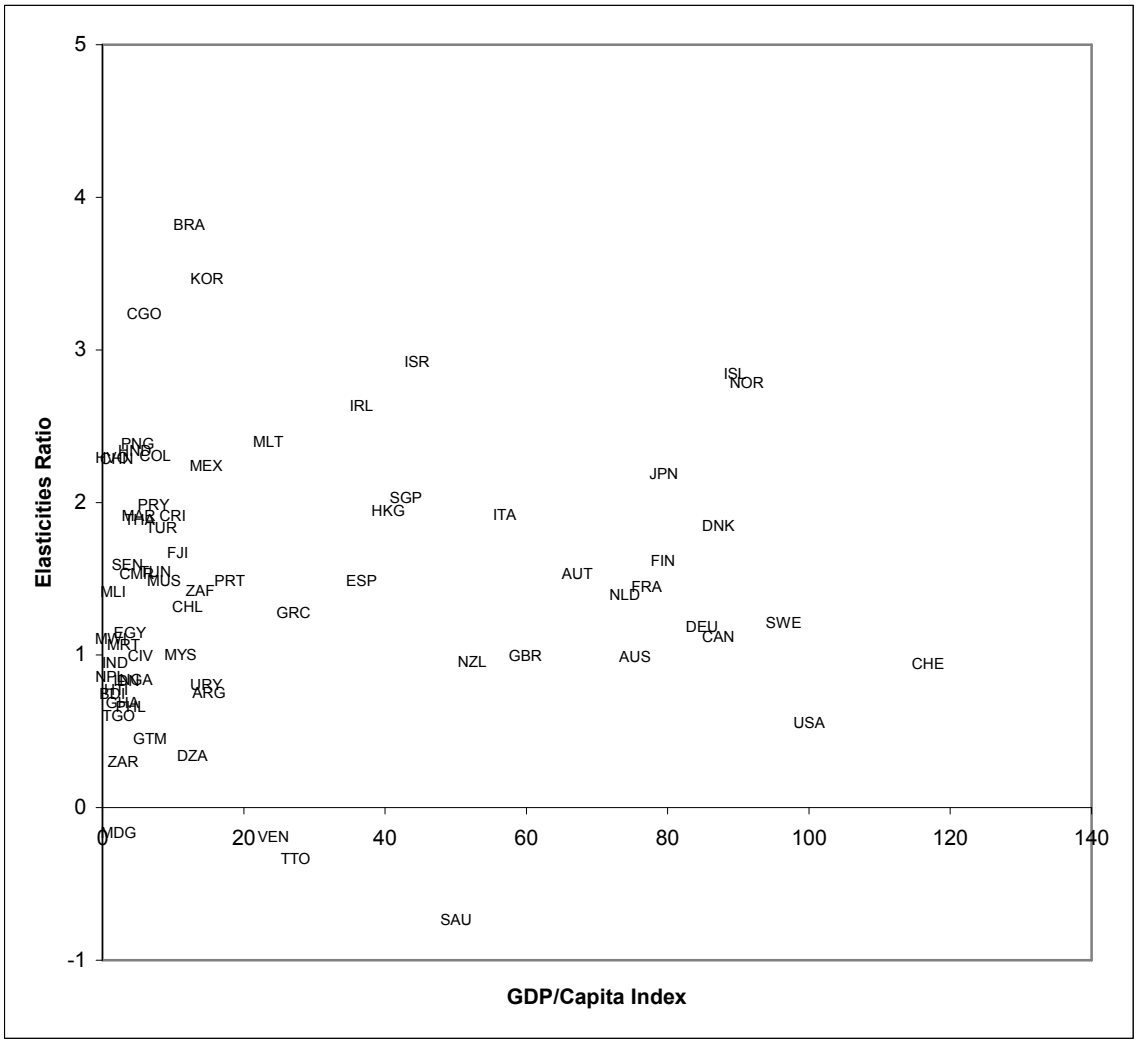


Figure 3: GDP per Capita Index versus Harrod Foreign Trade Multiplier (1965-1991)



Barbados with elasticities ratio of 8.85 is not in the graph