SIZE, STRUCTURE AND DEVALUATION

BY

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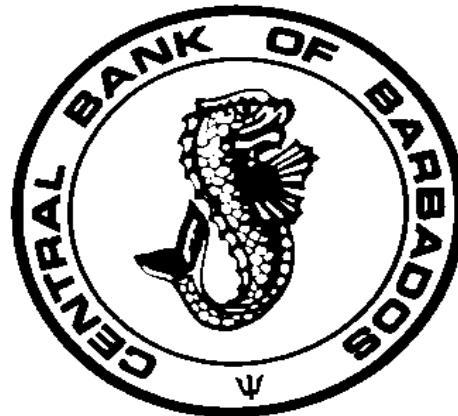
CENTRAL BANK OF BARBADOS

Size, Structure and Devaluation

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Exchange rate devaluations have been used by economies around the world in an attempt to enhance their external price competitiveness. This paper evaluates the efficacy of this strategy in small-island developing states. We classify countries around the world into two broad categories, large or small according to population, land area and economic size, proxied by GDP. We compare large countries with small countries according to the following dimensions: the country's share of world export markets, the diversity of exports of goods and services, the elasticity of import demand for consumer and producer goods, and the sensitivity of prices and wages to exchange rate changes. Using these results, we assess the efficacy of devaluation as a competitive strategy in small states as well as in larger countries. For small open economies, our findings are that exchange rate devaluations, at best, result in a redistribution of income within the country or, at worst, result in a deterioration in external competitiveness, the balance of payments, and economic contraction.

Keywords: Economic size; Concentration; Exports; Devaluation

1 Introduction

This paper explores the implications of country size on the efficacy of competitive exchange rate devaluations. There are three channels through which an exchange rate shock is likely to affect a nation's output. The first depends on the elasticity of demand. If the market price of the country's exports fall, an additional amount of goods and services may be demanded, depending on the price elasticity of demand (Rose, 1991). A second channel occurs through the substitution of domestic for foreign demand, as foreign prices increase relative to domestic prices as a result of the currency devaluation. The third channel for expanding production via exchange rate depreciation arises through the impact of devaluation on the profitability of exports of goods and services. The devaluation increases the selling price of exports relative to the price of domestic inputs, both measured on domestic currency, and therefore increases profit margins.

However, there is good reason to believe that the channels through which a devaluation may impact on output will less effective in small states. The small economy is an atomistic producer in a competitive international market for most of the goods or services that it sells abroad and therefore has little or no influence on world market prices. The demand facing exporters in small economies is infinitely large compared with their production capacity, and they may therefore sell everything that is produced at the ruling price. The constraint on production is therefore capacity rather than demand, and competitive exchange rate devaluations are unlikely to have a significant impact on output (Helleiner, 1982). The first indicator we will examine in an attempt to

distinguish small from large, is each country's share of the world market in each of its five largest exports of goods and services.

The second channel through which a depreciation is thought to spur output growth is through import substitution. Import substitution is possible to the extent that there is overlap between the items in the export basket and the items in the import basket. Countries cannot substitute for commodities they do not produce, and they reduce growth and welfare if they substitute for items they do not produce at internationally competitive prices. Our study matches individual import categories against exports within the same category, in an attempt to measure the limits of import substitution for large and small economies.

The third possibility of benefitting from a devaluation arises from the effects that a depreciation of the exchange rate would have on the profitability of exporters owing to the rising local currency price of exports relative to the local currency price of inputs. All imports used in production increase in price (in local currency) by the amount of devaluation. Therefore, exporting becomes more profitable to the extent that exporters use local rather than imported inputs, and to the extent that local costs, especially wage costs, are insensitive to the devaluation. This is an incentive to increase investment in export production, provided wage earners are not expected to secure wage increases to offset the devaluation-induced rise in inflation. However, in this case, the profitability gain comes at the expense of a fall in the real income of workers, whereas the ultimate objective of growth is to increase the real income of the workforce. In the absence of data on the impact of exchange rate changes on export profitability, we make inferences

from the overall import propensity, and the correlation between world prices, exchange rate changes and inflation.

The contribution of our study is to provide quantitative indicators of the structural features of small economies that affect the efficiency of the three channels just discussed, and to compare these effects with the effects of the structures of large countries. The remainder of the paper is organised along the following lines. Section 2 provides a review of the literature in relation to devaluation. Section 3 introduces a definition of the "small economy" relevant to the analysis of the effects of devaluation. Section 4 provides the evidence on which our conclusions are based, for each of the channels identified in the Introduction. Section 4.1 provides evidence of world market shares of the exports (goods and services) of large and small economies; Section 4.2 provides indicators of the potential for import substitution of large and small economies; and Section 4.3 offers an assessment of the possible impact of exchange rate depreciation on the profitability of exporting. Section 5 concludes.

2   Background

For many years, devaluations have been advocated and implemented as a means of boosting the external price competitiveness of an economy. However, due to the peculiarities of each individual country, such devaluation episodes have not always been successful (Barbone & Rivera-Batiz, 1987; Lizondo & Montiel, 1989; Bahmani-Oskooee & Miteza, 2006). The elasticity of demand of imports and exports is an important element that must be examined in the context of devaluation. For a devaluation to have a positive impact on the balance of payments, the so-called

Marshall-Lerner conditions must hold, i.e. the sum of the imports and exports elasticity must sum to more than one. Syed et al. (2004), using the non-parametric kernel estimation technique to estimate import and export elasticities, report that the condition was satisfied for their sample of six developed countries, particularly those with a fixed exchange rate regime. In contrast, Straughn (2003), using a multivariate cointegration approach to test the validity of the Marshall-Lerner condition in three Caribbean Community and Common Market (CARICOM) countries reports that the Marshall Lerner conditions did not hold for any of the three countries considered (Barbados, Jamaica and Trinidad and Tobago).

The indicators of size found in the literature include population, GDP, land area, per capita income and income distribution (Srinivasan, 1985). Population provides an indication of the market size as well as the level of human resources available in the economy. GDP is an indicator of the size of a country's domestic market, while land area shows the potential of a country's ability to diversify its non-human resources (Carter, 1997; Briguglio, 1995). Authors and institutions use different thresholds in distinguishing between small and large countries. Bräutigam and Woolcock (2001), for example, used a cut-off point of 5 million persons; Easterly and Kray (2000) used thresholds of less than 1 million; the Commonwealth and World Bank use a threshold of 1.5 million, while thresholds as high as 10 million (Streeten, 1993) and as low as 0.1 to 2 million (Saldanha, 2003) are employed in the literature.

As a point of departure, we compare the list of small countries proposed by the Commonwealth Secretariat (*www.thecommonwealth.org*), Downes (1988) Carter (1997), Brigulio (1995) and the World Bank (See **Table 1**).

Table 1: Comprehensive List of Small Countries

Common wealth	Carter (1997)	Downes (1988)	Brigulio (1995)	Small Island Developing States	World Bank
Caribbean and Americas					
Antigua and Barbuda		Antigua and Barbuda	Antigua and Barbuda	Antigua and Barbuda	Antigua and Barbuda
Bahamas, The		Bahamas, The	Bahamas	Bahamas, The	Bahamas, The
-	-	-	Bahrain	-	-
Barbados	Barbados	Barbados	Barbados	Barbados	Barbados
Belize	Belize	Belize	-	Belize	Belize
-	-	-	Cape Verde	-	-
		-	Comoros		Comoros
-	-	-	-	Cuba	-
-	-	-	Cyprus	-	-
Dominica	-	Dominica	Dominica	Dominica	Dominica
Grenada	-	Grenada	Grenada	Grenada	Grenada
Guyana	-	Guyana	-		Guyana
-	-	-	-	Haiti	-
Jamaica	Jamaica	Jamaica		Jamaica	Jamaica
Saint Kitts and Nevis	-	Saint Kitts and Nevis	Saint Kitts and Nevis	Saint Kitts and Nevis	Saint Kitts and Nevis
Saint Lucia	-	Saint Lucia	Saint Lucia	Saint Lucia	Saint Lucia
Caribbean and					
Americas					
-	-	-	-	Suriname	Suriname
Trinidad and Tobago	Trinidad and Tobago	Trinidad and Tobago	Trinidad and Tobago	Trinidad and Tobago	Trinidad and Tobago
Pacific Islands					
-	-	-	-	Cook Islands	-
Fiji	Fiji	-	Fiji	Fiji	Fiji
Kiribati		-	Kiribati	Kiribati	Kiribati
-	-	-	-	Marshall Islands	Marshall Islands

-	-	-	-	Micronesia, Federated States of	Micronesia, Federated States of
Nauru		-	-	Nauru	-
-	-	-	-	Nivea	-
-	-	-	-	Palau	Palau
-	-	-	-	Papau New Guinea	-
Samoa	-	-	-	Samoa	Samoa
Solomon Islands		-	-	Solomon Islands	Solomon Islands
-	-	-	-	Timor-Leste	Timor-Leste
Tonga	Tonga	-	Tonga	Tonga	Tonga
Tuvalu	-	-		Tuvalu	Tuvalu
Vanuatu	-	-	Vanuatu	Vanuatu	Vanuatu
Europe					
Cyprus	Cyprus	-	-	-	-
Malta	Malta	Malta	Malta	-	-
Asia					
-	Costa Rica	Costa Rica	-	-	-
Brunei Darussalam	-	-			
Maldives	-	-	Maldives	Maldives	Maldives
Africa					
Mauritius	-	-	Mauritius	Mauritius	Mauritius
Seychelles	-	-	Seychelles	Seychelles	Seychelles
Swaziland	-	-	-	-	Swaziland
Africa, Indian Ocean and South China Sea					
-	-	-	-	Cape Verde	
-				Comoros	-
				Guinea-Bissau	Guinea-Bissau
-	-	-	-	São Tomé and Principe	São Tomé and Principe
-	-	-	-	Singapore	-
Other Small States					
	El Salvador				Bhutan
	Honduras				Botswana
	Iceland				Cape Verde

	Jordan				Djibouti
	Nicaragua				Equatorial Guinea
	Panama				Gabon
	Paraguay				Gambia, The
					Lesotho
					Montenegro
					Namibia

There is a rich literature that we draw on in crafting the potential for competitive devaluation, which is the focus of this paper.[2] These include (Briguglio, 1995), on the narrowness of efficient domestic production of tradables resulting from their limited ability to attain economies of scale, the limited supply of specialised skills, and, in most cases, limited material resources.

Armstrong and Read (1998) add that since currency markets in small states are relatively thin, exchange rates may be volatile and this volatility is likely to feed through to the domestic economy and impact on production costs and overall price stability. Exchange rate variations can also result in a redistribution of income, as devaluation tends to benefit exporters and disadvantage the purchasers of imported goods, while an appreciation negatively affects the local currency returns of domestic exporters and moderates the prices faced by the consumers of imported goods.

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[2] The literature on small size includes research that focuses on factors other than exchange rate policy. Studies include research on monetary policy and inflation (Laubach & Mishkin, 2001); (Downes, 1985; Downes et al., 1991); (Moore & Williams, 2008); and (Worrell, 1987).

The concept of a contractionary devaluation is not new or limited to small states. Calvo (1981), for example, argues that a devaluation puts downward pressure on consumption, and if consumption falls below income, there is a deterioration in the fiscal deficit and further pressure to devalue and a worsening of the trade balance. Similarly, Ahmed et al. (2002) estimate a six variable vector auto-regression in a panel setting in order to compare the responses to devaluation of developing economies and two types (fixed and floating exchange rates) of industrial economies. The authors report that in industrialised economies, devaluations appeared to have expansionary effects. In contrast, competitive devaluations in developing countries seemed to have contractionary effects. Yap (1988) also notes that in most developing countries, the price elasticity of demand for exports is relatively low. When this feature is combined with the other characteristics of developing countries (i.e. large amounts of external debt and a heavy dependence on imports for investment and production purposes) exchange rate declines normally result in an unambiguous decline in income (Kalyoncu, Tezekici, Ozturk, Artan, 2008).

The impact of a devaluation on a small economy relative to a large economy may differ owing to differences in trade, production and consumption. Carter (1997), for example, reports that openness and the degree of export concentration are two other factors that help define the economic size of a country. Size can also pose a number of disadvantages on the supply-side. Briguglio (1995) used the production function to emphasize that size is associated with higher production cost per unit, which impedes competitiveness and the attainment of economies of scale. Additionally, these countries tend to have limited natural resources, which limits their ability to engage in product

diversification, and leading to high import content in an attempt to meet domestic consumption (Carter, 1997).

Exchange rate devaluations can also have differential effects depending on the amount of external debt a country holds. If a country has borrowed extensively from foreign countries, a devaluation would make it more expensive for loans to be serviced in local currency, and the devaluation therefore aggravates fiscal challenges. Moreover, efforts to attain fiscal consolidation targets may worsen the recession. In the event that the fiscal strategy is undermined, money creation may increase foreign exchange demand, and a currency crisis may occur when reserves decline to a level at which investors realize that if they wait any longer to trade in their domestic currency for foreign, there won't be enough to go around (Edwards, 2002). In the light of the above, a fall in reserves would trigger the perception of investors that a devaluation is likely which would lead to speculative attacks where speculators would sell the domestic currency in exchange for the country's foreign reserves, thereby depleting the money supply. Bird and Rajan (2003) note that a devaluation may also contribute to capital outflows, and an associated loss of liquidity that both directly and indirectly may cause recession.

3   Defining Economic Size

The central structural reality of small economies is their openness, and the fact that they have limited potential for diversification of production of goods and services for export. We may use these factors to set the threshold that distinguishes "large" from "small". In the end we draw the line between large and small on the basis of the extent of export

diversification, because that plays the crucial role in determining the outcome of devaluation.

Following Carter (1997), we started with three indicators of size; population, land area and GDP, classifying countries into four quartiles, as was done by Carter (1997) and Crowards (2002).

Countries that fell into the first and second quartiles were classified as small while countries within the third and fourth quartile were classified as large. By this classification there are countries that are "large" by one or two criteria, but "small" by the others. In these cases we selected the category based on two of the three factors which coincided. Using this approach, we identified 33 small countries and 32 large countries within the sample.

On average, small countries tend to have relatively higher export concentration ratios (**Table 2**). The average proportion of total exports accounted for by the top five categories of goods or services was 77 percent, compared to 53 percent in larger economies. Five of the smaller states (Antigua and Barbuda, Guinea-Bissau, Cabo Verde, Sao Tome and Principe, Comoros and Maldives) had concentration ratios of 90 percent or higher, compared to only one larger state (Gabon). Moreover, only seven of the 33 small countries identified in the table had export concentration ratios below 70 percent, a range that includes the most of the large countries.

Table 2: Concentration Ratio for Top Five Export Goods and Services (2013)[3]

| Small Countries	Concentration Ratio	Large Countries	Concentration Ratio
Mauritius	49%	France	34%
Swaziland	52%	Sweden	35%
Cyprus	60%	USA	37%
Guyana	64%	Italy	38%
Luxembourg	64%	Finland	39%
St Vincent and the Grenadines	67%	Spain	39%
Fiji	68%	Netherlands	39%
Kiribati	70%	Belgium	40%
Bhutan	71%	United Kingdom	41%
Djibouti	72%	Austria	42%
St Lucia	73%	Portugal	42%
Malta	74%	Bulgaria	43%
Montenegro	74%	Estonia	43%
Belize	75%	Switzerland	44%
Seychelles	76%	Germany	45%
Tonga	77%	Canada	47%
Gambia, The	78%	Hungary	48%
Dominica	78%	Denmark	49%
Jamaica	79%	New Zealand	52%
Solomon Islands	80%	Ireland	53%
St Kitts and Nevis	80%	Japan	55%
Samoa	82%	Jordan	55%
Bahamas, The	84%	Czech Republic	55%
Barbados	85%	Namibia	64%
Small Countries	**Concentration Ratio**	**Large Countries**	**Concentration Ratio**
Vanuatu	86%	Australia	66%
Bahrain	86%	Greece	68%
Suriname	88%	Norway	74%
Antigua and Barbuda	90%	Iceland	78%
Guinea-Bissau	90%	Lesotho	79%

[3] The UN Comtrade and The International Trade Centre databases were the two main sources used. The UN Comtrade's database stores standardised official annual trade statistics reported by countries and provides international merchandise flows (imports and exports) detailed by commodity. The International Trade Centre (ITC) provides detailed indicators on the export performance or level of imports of each country as well as the country's alternative and competitive markets. ITC was the primary source used to collect services data for each country. The data collected from both sources is in US dollars.

Cabo Verde	94%	Trinidad and Tobago	83%
Sao Tome and Principe	94%	Botswana	87%
Comoros	95%	Gabon	98%
Maldives	96%		
AVERAGE	**77%**	**AVERAGE**	**53%**

Source: International Trade Centre and UN Comtrade, own calculations

The link between size and concentration, illustrated in Figure 1, allows us to define a size threshold that distinguishes small and large states. The figure shows the relationship between size and export concentration for small and large countries, (as defined by population) and it appears that countries with a population above a threshold of 1.2 million people have a more diversified export base; below 1.2 million persons, small size manifests itself via a higher export concentration ratio. Very few countries with that size of population or smaller have low export concentration ratios, while the majority of larger countries do have low ratios. Countries with population sizes falling below 1.2 million persons had concentration ratios averaging 77 percent. On the other hand, for large countries in our sample the concentration ratios averaged 53 percent.

Figure 1: Population and Export Concentration[4]


$y = 2.5991x^{-0.479}$

$y = 333.81x^{-2.344}$
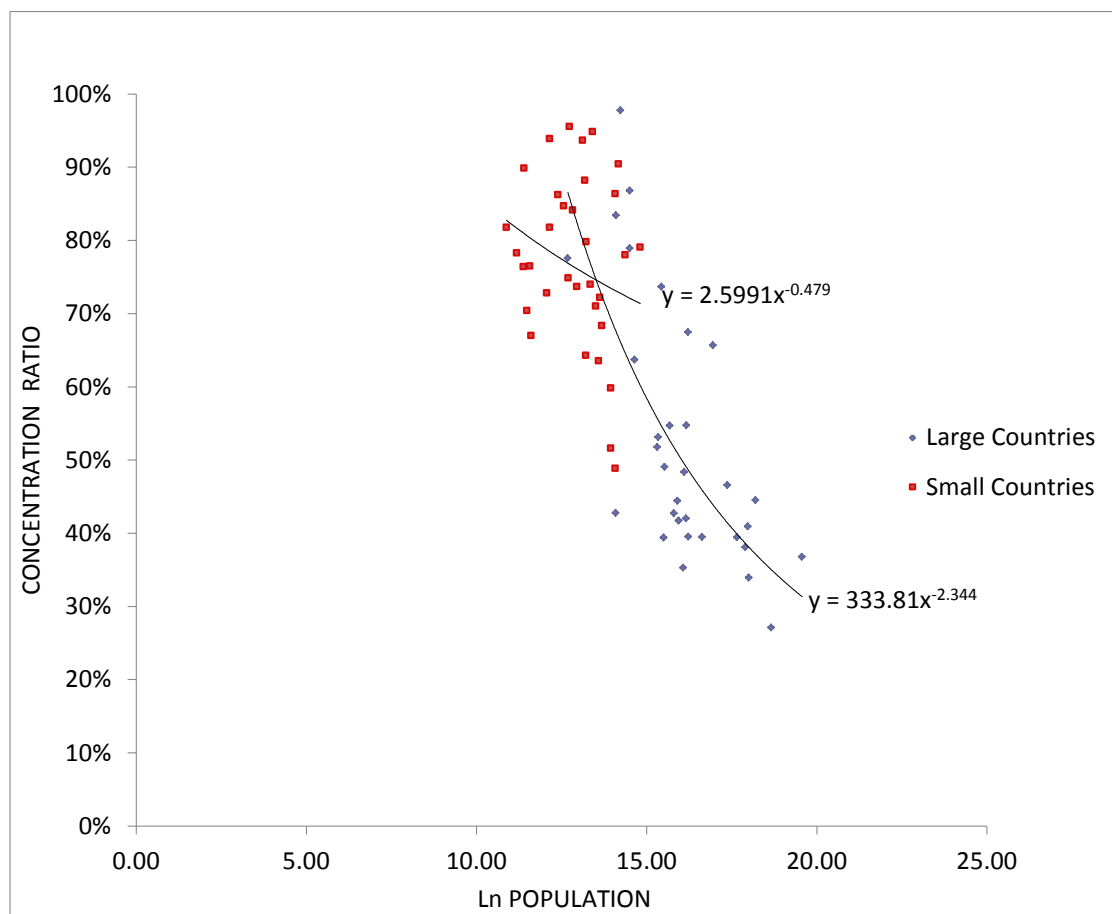
Source: International Trade Centre and UN Comtrade, own calculations.

Similar results are also obtained if one examines the link between size measured using GDP, and export concentration. Figure 2 compares export concentration with GDP for the group of small and large countries identified by GDP. The threshold defining "small" is a GDP of less than US$8 billion. A majority of countries with GDP below the threshold have high export concentration ratios, in contrast to countries with a GDP greater than US$ 8 billion, a majority of whom have relatively low concentration ratios.

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[4] Ln (5) = 148; Ln(10) = 22,026; Ln (15) = 3,269,017; Ln (20) = 485,165,195

Figure 2: GDP and Export Concentration[5]
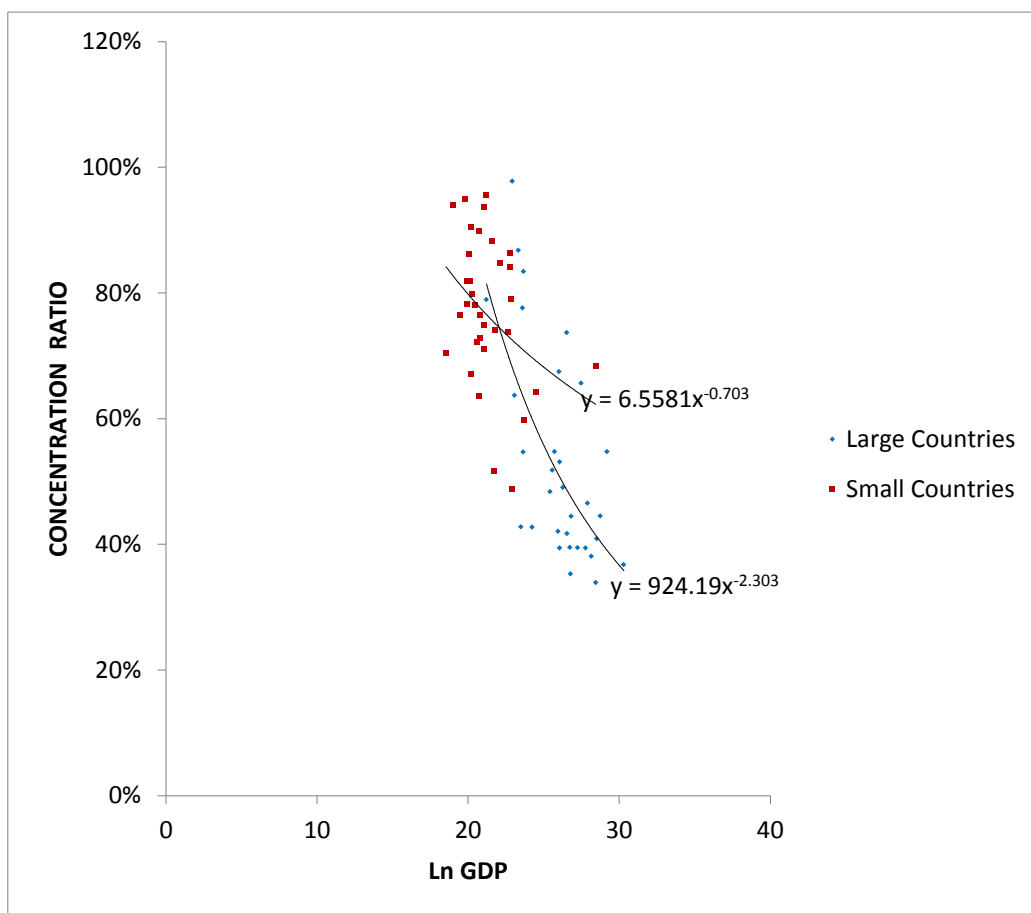
Source: International Trade Centre and UN Comtrade, own calculations.

Countries with a large land area have a much greater potential for export diversification, even if their populations are quite small. Unlike the previous two benchmarks considered (GDP and population), **Figure 3** suggests that there is no clear threshold in relation to land size.

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[5] Ln(10) = $22,026; Ln(20) = $485,165,195; Ln(30)=$10,686,474,581,524

Based on the fact that population size and GDP enable us to find threshold values to distinguish "small" and "large", we classify as "small" all countries with a population size of 1.2 million or less, and an annual GDP of US$ 8 billion or less.

Figure 3: Land Area and Export Concentration[6]
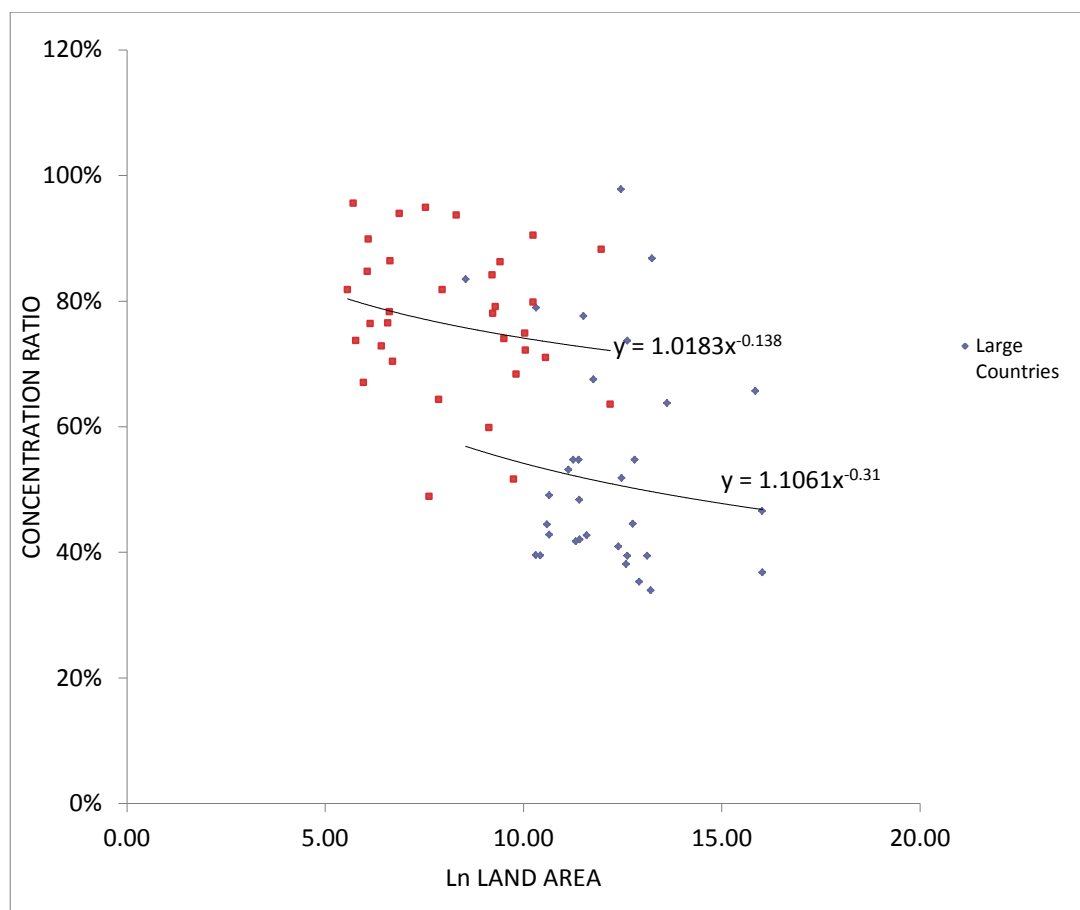
Source: International Trade Centre and UN Comtrade, own calculations.

4   Size and Economic Structure

4.1   Share of World Market Exports of Goods and Services

Small countries are atomistic producers of goods and services on the international

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[6] Ln (5) = 148km sq; Ln(10) = 22,026km sq; Ln (15) = 3,269,017km sq; Ln (20) = 485,165,195km sq

market, and their output has no effect on the prices at which they sell. At the ruling international prices, they may sell everything they can profitably produce. Figures 4 and 5 document the market shares for fuels and tourism for the top ten small and large countries, using the joint threshold of 1.2 million population and US$8 billion GDP as our size criterion developed earlier. The contrast is immediately apparent between large and small countries. For each small country, the five largest exports of goods and services accounts for only a minuscule amount of world import demand for each item. On average, exports from these countries account for less than 2 percent of world exports, and the single largest good or service exported by each country was just over half of a percent. For the total of the top five goods or service exports, small countries tend to have a total world market share of between zero percent to 27 percent. Larger countries typically account for a greater share of the world market. The average market share of the top five exports for these countries was on average 20 percent of world demand and 6 percent for the single largest good or service.

Figure 4:Mineral Fuel Export World Market Share
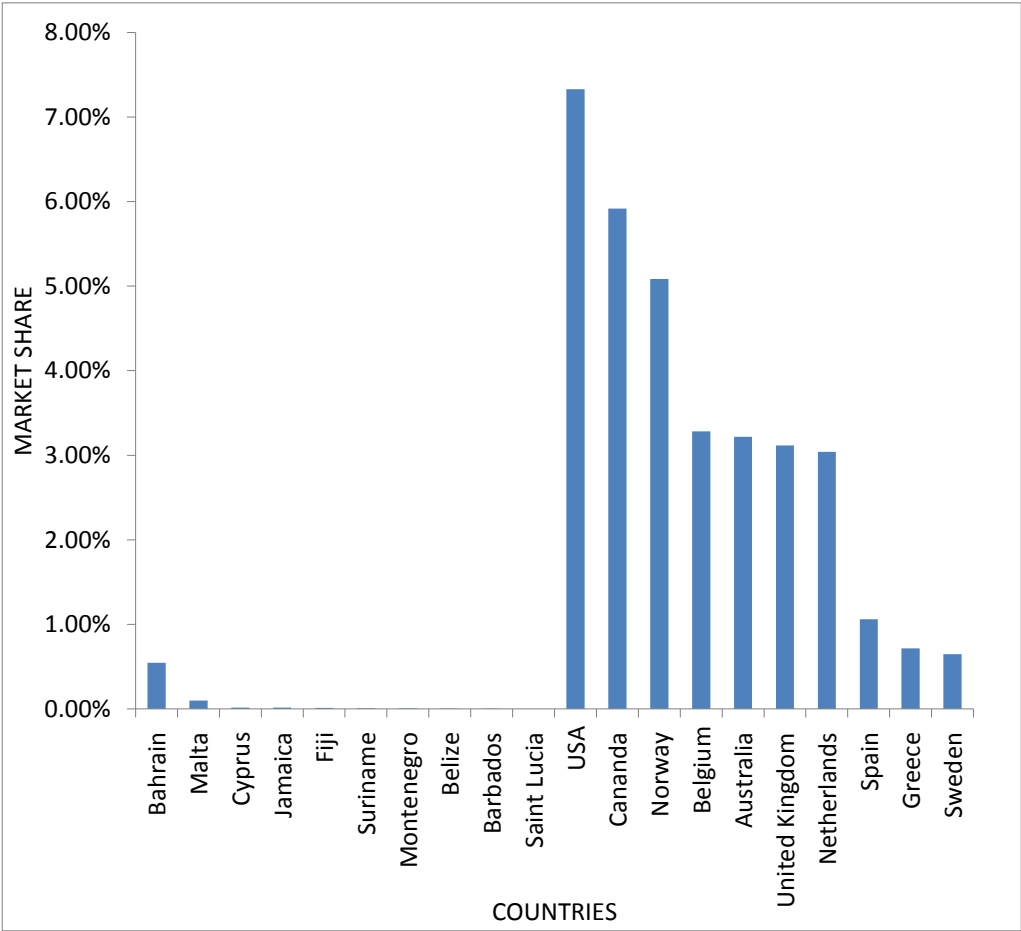
Source: International Trade Centre and UN Comtrade, own calculations.

Figure 5: Travel Export World Market Share
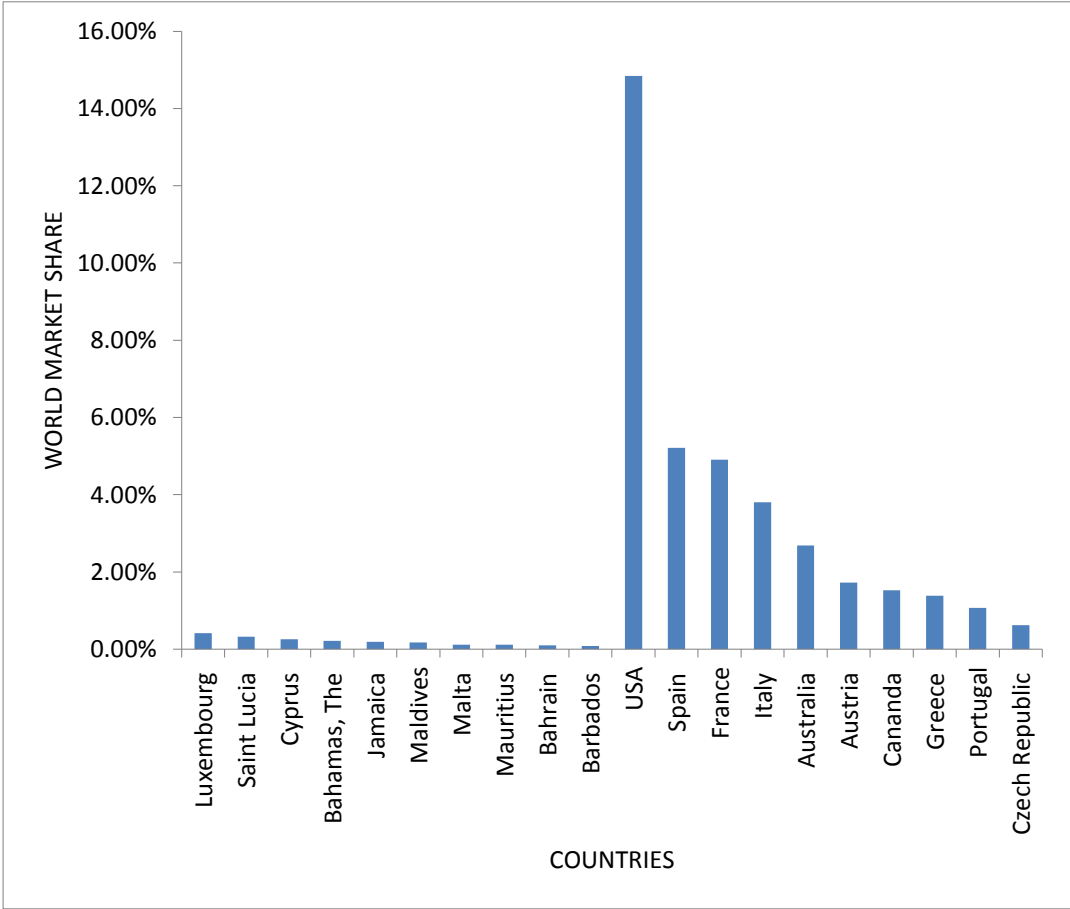
Source: International Trade Centre and UN Comtrade, own calculations.

4.2 Potential for Import Substitution

Two calculations are made for each country to estimate the maximum potential for export substitution. First we identify the value of the five largest exports of goods and services, then we explore the overlap between exports and imports, starting with a comparison with the five largest import commodities (goods and services). The question of interest is: how much does the country produce in each category that might be diverted to satisfy local demand in the case of a devaluation? The maximum potential for import substitution of these items is estimated as the export production, up to a maximum of total imports of the item.[7]

Table 3: Maximum Import Substitution for Barbados in 2013

Country	$ Value in millions Import Value	% of Total	$ value in Millions Export Value	$ value in millions Max Import Subs. Value
Barbados (2012)	$		$	$
Mineral fuels	482.8	20	152.5	152.5
Travel	199.7	8	944.3	199.7
Machinery and mechanical appliances	126.4	5	9.7	9.7
Electrical machinery and equipment	120.9	5	9.0	9.0
Vehicles	69.4	3	1.3	1.3
TOTAL	2,457.9	41		372.2

Source: International Trade Centre and UN Comtrade, own calculations.

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[7] This follows from our assumption that the country is an efficient exporter, and is producing and exporting to its maximum potential, at the ruling international price, to an infinitely large market.

The procedure is illustrated in some detail in Table 3, which gives the calculation for Barbados. Table 3 ranks the top five import items and their corresponding export values. In the case of mineral fuels only $153 million can be used to substitute imports of $483 million, or approximately 32% of total imports for Mineral Fuels. Similar results can be seen in the case of machinery and mechanical appliances, electrical machinery, and vehicles where exports are not substantial enough to provide for the diversion from imports to domestically produced goods and services. Overall, the country is able to substitute only 15 percent of the total domestic import bill from these items.

Table 4: Maximum Import Substitution for Belgium in 2013

Country	Import Value $ Billions	% of Total	Export Value $ Billions	Max Import Subs. Value $ Billions	Max Import Substitutes as a % of Total Imports
Belgium (2013)	$		$	$	
Mineral fuels	91.7	16	66.5	66.5	
Vehicles	48.8	8	48.9	48.8	
Pharmaceutical products	41.0	7	50.3	41.0	
Organic chemicals	37.6	6	40.8	37.6	
Mechanical appliances	36.6	6	36.6	36.6	
TOTAL	584.7	44		230.4	39

Source: International Trade Centre and UN Comtrade, own calculations.

In the case of larger economies, there is a closer export match for the largest import items, as can be seen from the example of Belgium in Table 4, where 39 percent of the import bill could in theory be replaced by domestic substitutes from the top five import

category items. Table 5 gives results for all the countries in our sample, computed on a

similar basis. Small countries tend to have smaller import substitution possibilities

averaging about 16 percent, while larger countries averaged 28 percent.

Table 5: Maximum Import Substitutes as a percentage of Total Imports

| Small Countries	Max M-Sub as a % of Total Imports	Large Countries	Max M-Sub as a % of Total Imports
Sao Tome and Principe	1%	Lesotho	6%
Guinea-Bissau	1%	Gabon	7%
Kiribati	2%	Jordan	8%
Swaziland	3%	Ireland	14%
Saint Vincent and the Grenadines	4%	New Zealand	15%
Guyana	4%	Namibia	19%
Dominica	7%	Norway	21%
Comoros	8%	Japan	22%
Tonga	9%	Iceland	24%
Jamaica	11%	Bulgaria	25%
Belize	11%	Italy	26%
Mauritius	11%	Greece	26%
Samoa	11%	France	26%
Gambia, The	11%	Australia	27%
Montenegro	12%	USA	27%
Saint Lucia	13%	Germany	27%
Suriname	13%	Botswana	28%
Bhutan	14%	Spain	28%
Maldives	14%	Finland	28%
Bahamas, The	15%	Portugal	30%
Barbados	15%	Switzerland	30%
Solomon Islands	15%	Canada	30%
Saint Kitts and Nevis	16%	United Kingdom	31%
Vanuatu	16%	Austria	33%
Seychelles	19%	Sweden	36%
Cabo Verde	21%	Netherlands	37%
Antigua and Barbuda	25%	Estonia	37%
Djibouti	28%	Belgium	39%
Fiji	29%	Denmark	41%
Cyprus	32%	Czech Republic	43%
Malta	39%	Hungary	46%
Luxembourg	43%	Trinidad and Tobago	47%
Bahrain	51%		
AVERAGE	**16%**	**AVERAGE**	**28%**

Source: International Trade Centre and UN Comtrade, own calculations.

4.3   Indicators of the Impact of Devaluation on Export Profitability

The main factors that determine the impact of devaluation on the profitability of producing exports are the percentage of imported goods used in the production of exports; the country's import propensity; and the pass-through of international prices to domestic inflation, of consumer and producer goods (Goldberg et al., 2010; Engel, 2006). The higher the proportion of imported inputs used in domestic production, the smaller will be the potential to benefit from a devaluation (Faini, 1994). Whatever potential benefit there may be from the relative increase in foreign prices resulting from a devaluation, stands to be eroded to the extent that the costs of domestic goods and services, and wage costs, are driven up by the devaluation (Barbone, 1987). We employ proxies for these effects in the absence of direct measures for all the countries in our sample: imports as a ratio to GDP; importance of food and fuel price inflation; and, the correlation between exchange rate changes and domestic price changes.

The country's ratio of imports to GDP provides a rough indicator of the use of imports in production, both of exports and of domestic inputs to the export sector. If the ratio is very high (i.e. close to 100 percent), it suggests that imports have an important share of the consumer goods market. We compare ratios for (small) countries with population of 1.2 million or less and GDP of US$8 billion or less, with ratios for larger countries and the results are provided in Figure 6 and Figure 7.   In general, there is an inverse relationship between size (measured using population or GDP) and the import content of domestic production, indicating that smaller countries tend to depend more on imported inputs to satisfy consumption and production needs.   The average import to GDP ratio for small states was 64 percent compared to 48 percent for large states.
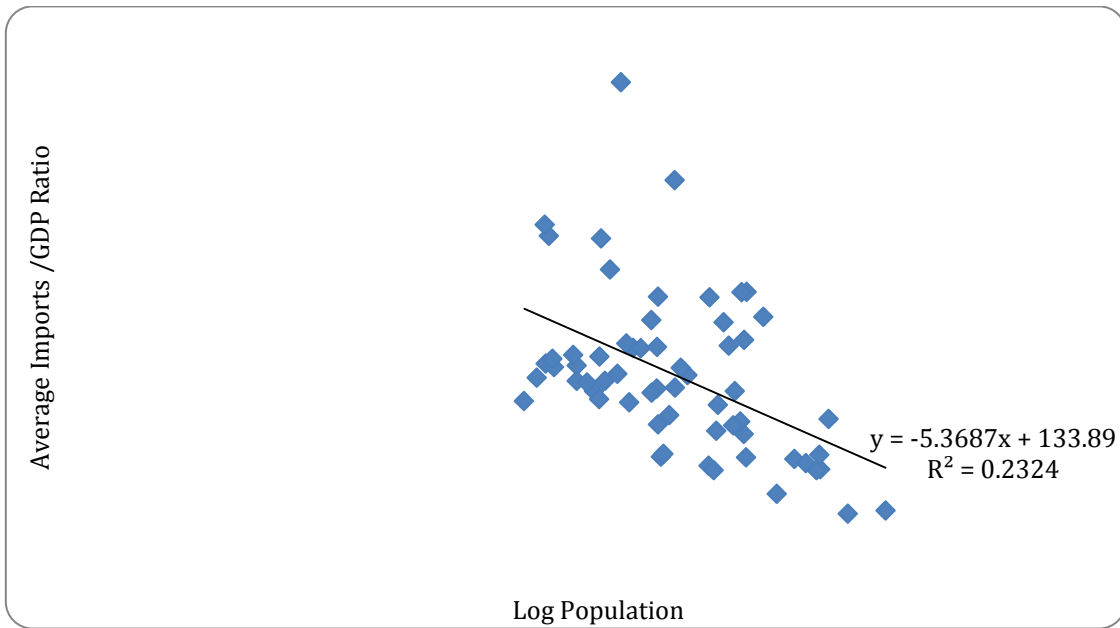
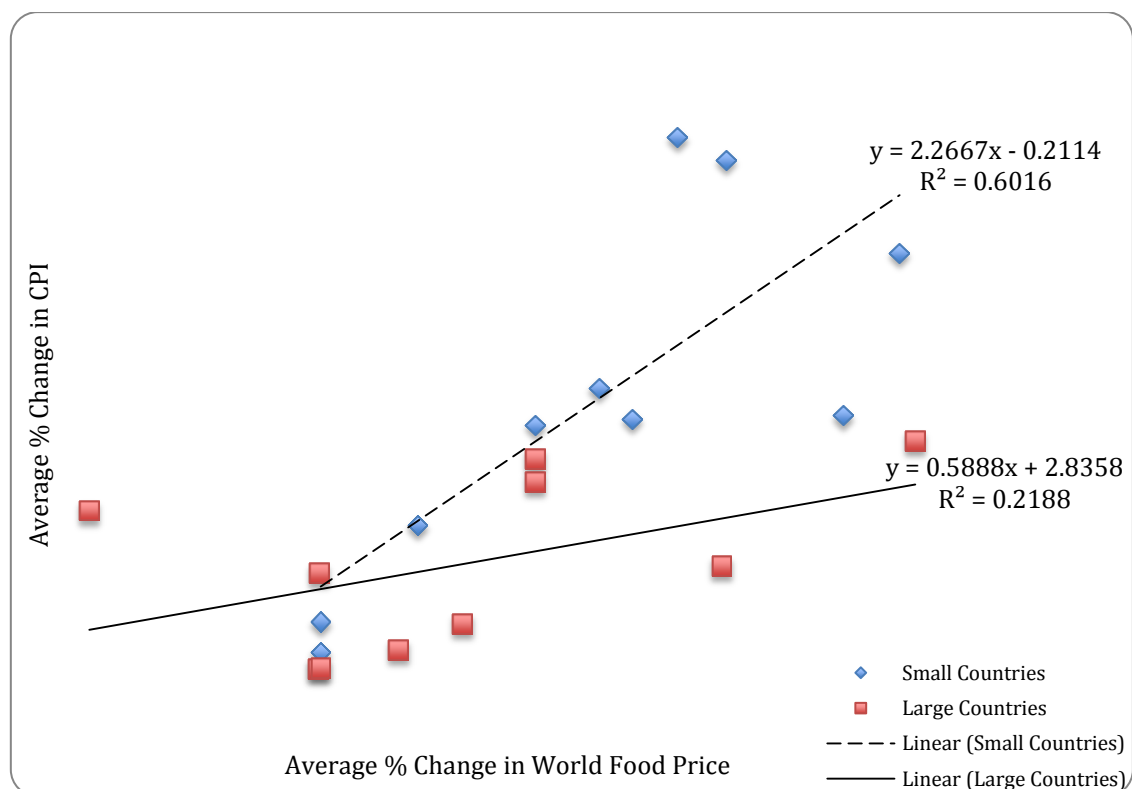Source: World Bank's World Development Indicators
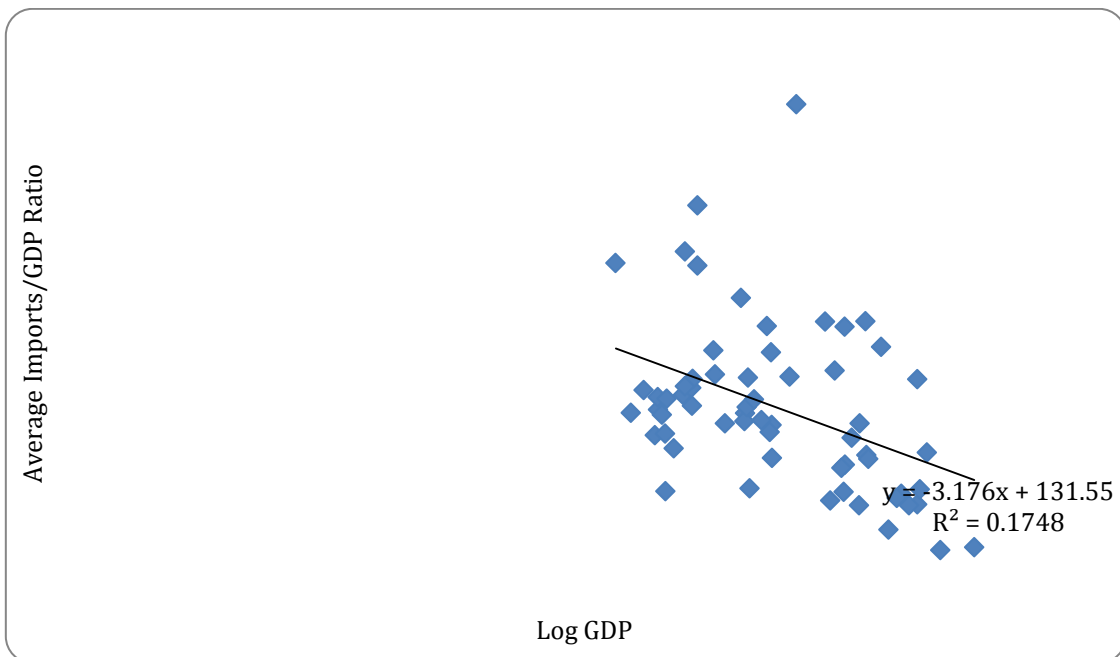
Source: World Bank's World Development Indicators

Another useful indicator is the pass-through of international prices to the domestic

markets. To develop a measure of pass-through that we may apply across our sample,

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we make is a comparison between the domestic rate of inflation on the one hand, and inflation of the two most influential international prices for many countries: the prices of food and fuel. The key question to be answered here is whether or not domestic inflation amplifies the inflationary effect of food and fuel prices, and is the amplification greater for small countries than for large? The results from this analysis are provided in Figure 8. The difference in slope for the trend line showing the link between world food price changes and domestic inflation suggests that a shock to food prices is likely to have greater effect on small states that larger countries. Comparing these slope coefficients suggests that the effect of a 1 unit shock to world food prices is likely to be almost 4 times greater in small states when compared to larger countries.

Figure 8: Pass-through Effect from Food Price Changes to Inflation in Small and Large States (2008-2013)
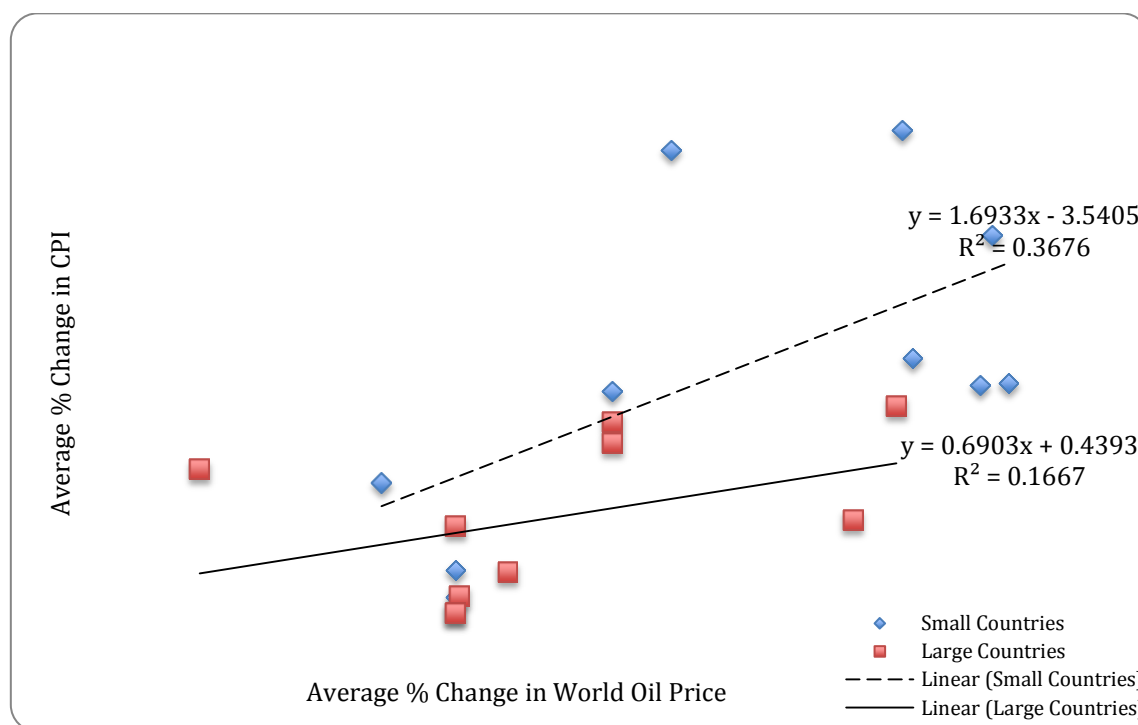

Source: World Bank's World Development Indicators

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One of the main reasons for this relatively greater transmission effect in small states is the comparatively large proportion of domestic food consumption obtained from imports (Headey & Fan, 2008). In larger states, a shock to world food prices can be partially offset by substituting away from relatively expensive imports to cheaper domestic substitutes. In small states, however, such substitution is not possible implying that international food price shocks are highly correlated with domestic food price shocks. When coupled with import duties imposed by governments in these states (Greenaway & Milner, 1991), the magnification of world food price shocks can be even greater.

A similar story emerges when one looks at the feed-through effects of international oil prices (Figure 9). On average, the effect of a similar shock to international oil prices is

Figure 9: Pass-through Effect from Oil Price Changes to Inflation in Small and Large States (2008-2013)
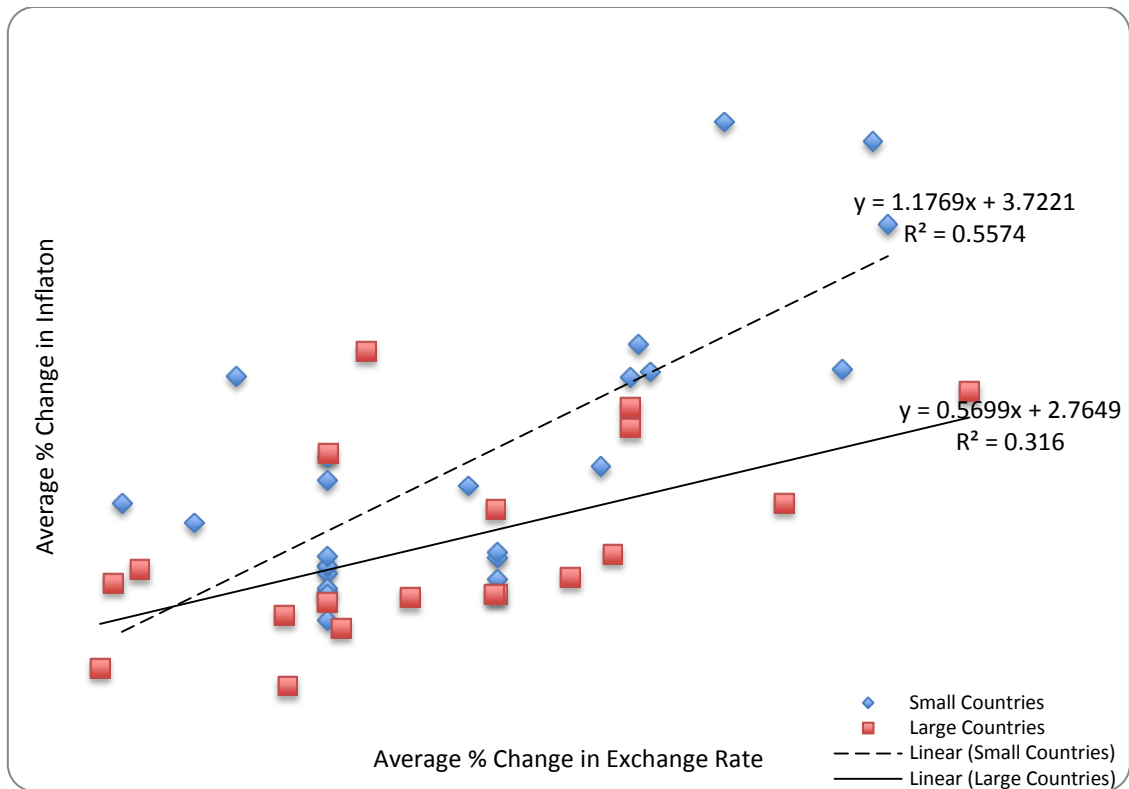

Source: World Bank's World Development Indicators

almost twice as large in small states relative to large countries. Similar to the situation with international food prices, most of the energy requirements demanded by small states are imported and there are limited opportunities for domestic substitution (Atkins et al., 2001). In addition to this dependence on import sources of energy, the cost of electricity generation, due to the characteristics of small states, is normally higher and therefore magnifies the effect of oil price shocks on the cost of domestic energy (Weisser, 2004).

Our third indicator is the extent of pass-through of exchange rate changes, if any, to domestic prices. We investigate this issue by comparing the extent of exchange rate changes in countries with some degree of exchange rate flexibility, with the rate of domestic inflation. The findings in Figure 9 as expected are in line with the results reported earlier that the pass-through from external nominal price shocks tends to be larger in small states relative to large countries.

Source: World Bank's World Development Indicators

The results provided in this section therefore suggest that a devaluation is unlikely to improve the profitability of exporters in small states. The relatively large import content in production, the limited opportunities for domestic substitution and the relatively larger pass through effect that characterizes small states, suggest that rather than a devaluation enhancing the profitability of exporters, it is more likely to reduce their profitability.

5   Conclusion

This study provides an empirical explanation of the reason why, in small economies, devaluation invariably causes high inflation and often results in economic contraction, rather than economic growth. We first provide easily quantifiable thresholds for defining small size on criteria that are appropriate to the question we address in this study, i.e., the effects of devaluation. Countries with a population below 1.2 million and GDP of US$ 8 billion or less than had significantly higher concentration ratios for large countries in our sample. We identified 33 small countries and 32 large countries within the sample.

The study demonstrates that the small economy has very limited prospects for import substitution, if there is an increase in the relative prices of imports relative to domestic production. Small countries tend to have smaller import substitution possibilities, averaging about 16 percent, while larger countries could on average substitute almost one-third of their imports with domestic production. The combination of high import content and exchange rate depreciation has a severe impact on inflation in the small open economy, far greater than the larger economies. The combination of high export concentration, limited import substitution potential, and a high import propensity, all of which appear from the data to be common characteristics of small economies, implies that devaluation in small economies is inflationary, and is not growth-promoting. There are insufficient domestic producers to substitute efficiently for imports, and therefore there is no possibility to mitigate the inflationary impact of devaluation or imports. Exports are constrained by supply because the country is an atomistic producer, domestic consumption of exportables offers no scope for expansion, and domestic

production of nontradeables become less productive with devaluation, so there will be

no expansion of output as a result of devaluation.

References

Ahmed, S., Gust, C., Kamin, S. & Hantley, J., 2002. 737 *Are Depreciations as Contractionary as Devaluations? A Comparison of Selected Emerging and Industrial Economies*. FRB International Finance Discussion Paper. Washington: Federal Reserve Board Federal Reserve Board.

Armstrong, H. & Read, R., 1998. Trade and Growth in Small States: The Impact of Global Trade Liberalisation. *World Economy* , 21(4), pp.563-85.

Atkins, J.P., Mazzi, S. & Easter, C., 2001. Small States: A Composite Vulnerability Index. In C. Secretariat, ed. *Small States in the Global Economy*. Commonwealth Secretariat. pp.53-92.

Bahmani-Oskooee, M. & Miteza, I., 2006. Are Devaluations Contractionary? Evidence from Panel Cointegration. *Economic Issues*, 11(1), pp.49-64.

Barbone, L., 1987. Foreign Capital and the Contrationary Impact of Currency Devaluation, with an Application to Jamaica. *Journal of Development Economics*, 26(1), pp.1-15.

Barbone, L. & Rivera-Batiz, F., 1987. Foreign Capital and the Contractionary Impact of Currency Devaluation, With an Application to Jamaica. *Journal of Development Economics*, 26(1), pp.1-15.

Bird, G. & Rajan, R., 2003. Too Much of a Good Thing? The Adequacy of International Reserves in the Aftermath of Crises. *World Economy*, 26(6), pp.873-91.

Bräutigam and Woolcock, 2001. Small States in a Global Economy: The Role of Institutions in Managing Vulnerability and Opportunity in Small Developing Countries. *World Institute for Development Economics*, p.1.

Briguglio, L., 1995. Small Island Developing States and their Economic Vulnerabilities. *World Development*, 43(9), pp.1615-32.

Calvo, 1981. Devaluation Levels Versus Rates. *Journal of International Economics 11*, pp.2-8.

Carter, A., 1997. Economic Size, Openess and Export Diversification a Statistical Analysis. pp.148-56.

Crowards, T., 2002. Defining the Category of Small States. *Journal of International Development*, pp.143-79.

Downes, A., 1985. Inlation in Barbados: An Econometric Investigation. *Economic Development and Cultural Change*, 33(2), pp.521-32.

Downes, A., 1988. On the Statistical Measurement of Smallness: A Principal Component Measure of Country Size. *Social and Economic Studies*, 37(3), pp.75-96.

Downes, A., Holder, C. & Leon, H., 1991. A Cointegration Approach to Modelling Inflation in a Small Open Economy. *Journal of Economic Development*, 16(1), pp.57-67.

Easterly and Kraay, 2000. Small States, Small Problems? Income, Growth, and Volatility in Small States. *World Development*, 28(11), p.2014.

Edwards, S., 2002. Does the Current Account Matter? In S. Edwards & J. Frankel, eds. *Preventing Currency Crises in Emerging Markets*. University of Chicago Press. pp.21-75.

Engel, C., 2006. Equivalence Results for Optimal Pass-Through, Optimal Indexing to Exchange Rates and Optimal Choice of Currency for Export Pricing. *Journal of the European Economic Association*, 4(6), pp.1249-60.

Faini, R., 1994. Export Supply, Capacity and Relative Prices. *Journal of Development Economics*, 45(1), pp.81-100.

Goldberg, P.K., Khandelwal, A.K., Pavcnik, N. & Topalova, P., 2010. Imported Intermediate Inputs and Domestic Product Growth: Evidence from India. *Quarterly Journal of Economics*, 125(4), pp.1727-67.

Greenaway, D. & Milner, C., 1991. Fiscal Dependence on Trade Taxes and Trade Policy Reform. *Journal of Development Studies*, 27(3), pp.95-132.

Headey, D. & Fan, S., 2008. Anatomy of a Crisis: The Causes and Consequences of Surging Food Prices. *Agricultural Economics*, 39(S1), pp.375-91.

Helleiner, G., 1982. Balance of Payments Problems and Macroeconomic Policy. In Jalan, B. *Problems and Policies in Small States*. Bechenham: Commonwealth Secretariat. pp.165-84.

Kalyoncu, Tezekici, Ozturk, Artan, 2008. Currency Devaluation and Output Growth: An Empirical Evidence from OECD Countries. *International Research Journal of Finance and Economics*, (14).

Laubach, T. & Mishkin, F.S., 2001. *Inflation Targeting: Lessons from the International Experience*. 2nd ed. Princeton: Princeton University Press.

Lizondo, J.S. & Montiel, P.J., 1989. Contractionary Devaluation in Developing Countries: An Analytical Overview. *IMF Staff Papers*, 36(1), pp.182-227. Available at SSRN: http://ssrn.com/abstract=884824.

Moore, W. & Williams, M., 2008. Evidence on the Sectoral Monetary Transmission Process Under a Fixed Exchange Rate Regime. *International Economic Journal*, 22(3), pp.387-98.

Rose, A.K., 1991. The Role of Exchange Rates in a Popular Model of International Trade: Does the Marshall–Lerner Condition Hold?. *Journal of International Economics*, 30(3), pp.301-16.

Saldanha, J.M., 2003. *Agriculture, small countries and globalisation*. Australian Centre for International Agricultural Research.

Srinivasan, T.N., 1985. The Costs and Benefits of Being a Small, Remote, Island, Landlocked or Mini-State Economy. *World Bank*, pp.8-27.

Straughn, R., 2003. Estimating Long Run Relationships Between the Trade Balance and the terms of trade in Selected CARICOM countries. pp.70-86.

Streeten, P., 1993. The Special Problems of Small Countries. *World Development*, 21(2), p.197.

Syed, Mahmud, Aman and Yucel, 2004. Testing Marshall-Lerner condition: a non-parametric approach. *Applied Economics Letters*, pp.231-36.

Weisser, D., 2004. On the Economics of Electricity Consumption in Small Island Developing States: A Role for Renewable Eenrgy Technologies. *Energy Policy*, 32(1), pp.127-40.

Worrell, D., 1987. Bank Behaviour and Monetary Policy in Small Open Economies with Reference to the Caribbean. *Social and Economic Studies*, 46(2/3), pp.59-74.

Yap, 1988. The Effect of an Exchange Rate Devaluation on a Small Open Economy with External Debt Overhang. pp.7-14.