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The Caribbean and Its Linkages with the World: A GVAR Model Approach

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Abstract

Using data from 1980-2017, this paper estimates a Global VAR (GVAR) model taylored for the Caribbean region which includes its major trading partners, representing altogether around 60 percent of the global economy. We provide stilyzed facts of the main interrelations between the Caribbean region and the rest of the world, and then we quantify the impact of external shocks on Caribbean countries through the application of two case studies: i) a change in the international price of oil, and ii) an increase in the U.S. GDP. We confirmed that Caribbean countries are highly exposed to external factors, and that a fall in oil prices and an increase in the U.S. GDP have a positive and large impact on most of them after controlling for financial variables, exchange rate fluctuations and overall price changes. The results from the model help to disentangle effects from various channels that interact at the same time, such as flows of tourists, trade of goods, and changes in economic conditions in the largest economies of the globe.

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I. INTRODUCTION

Global spillovers are a central element in international economics, and Caribbean countries are as acutely exposed to them as many others. Production and trade in goods and services, and financial flows depend not only on internal market supply and demand forces, but also on competitiveness and world growth. During the past decades, many small and large countries have leaned towards trade openness and financial liberalization and some evidence suggests that this might benefit their economies (Edwards, 1997; Meissner, 2014). Notwithstanding, a strong degree of integration poses additional risks to small open economies that may suffer disproportionately from shifting economic conditions in the largest economies of the globe, as they are less able to diversify away from the sectors in which they have comparative advantages; that is the case for most Caribbean countries which are highly internationally integrated, especially through tourism flows—a sector often hit hard by downturns in larger economies.

To quantify the strength of macroeconomic linkages between Caribbean countries and the rest of the world, we introduce a Caribbean-tailored Global Vector Auto-regressive (GVAR) model. GVAR models were first introduced by Pesaran, Schuermann, and Weinner (2004) and further developed by Dees, di Mauro, Pesaran, and Smith (2007). Our GVAR model features 45 developing, emerging market, and advanced economies, of which 15 are Caribbean. The analysis focusses on specific spillovers for Caribbean countries, such as the effect of an expansionary policy in the United States or an oil price drop. One of the main advantages of implementing a GVAR model to assess macroeconomic impacts of external shocks is that it allows to internalize second round effects that are usually considered as exogenous or static in less sophisticated models. In a GVAR model, an external shock and its dynamics can be included endogenously in the final model.

Our paper is linked to various companion papers that have utilized GVAR models to gauge the effect of global and country-specific shock scenarios and investigates macroeconomic linkages between selected countries and the region and the rest of the world. In this context, Galesi and Lombardi (2009) investigate the effects of oil and food prices shocks on inflation and find that the inflationary effects of oil price shocks are more sizable on developed countries than on emerging economies. Using a GVAR model of global trade flows, Bussiere, Chudik, and Sestieri (2012) measure the effect on trade flows of various shocks and conclude that changes in domestic and foreign demand have a much stronger effect on trade flows as compared with changes in relative trade prices.

An additional advantage of the GVAR methodology is that it allows the inclusion of global variables, such as oil or raw material prices, in a unified framework to account for its effects on particular countries or regions. Oil and other commodity prices are an important observed common factor in GVAR models examining the factors affecting growth dynamics. Chudik and Fidora (2012) investigate the impact that supply-induced oil price increases have on aggregate output and real effective exchange rates and find that adverse oil supply shocks have considerable negative effects on real output growth of oil importers (and that emerging economies are more affected than advanced economies). They also conclude

that oil supply shocks tend to cause an appreciation (depreciation) of oil exporters' (oil importers') real effective exchange rates and an appreciation of the U.S. dollar. Similarly, in the midst of large fluctuations in commodity prices and ongoing structural changes relating to globalization, Anderton et al. (2010) utilized a GVAR model to investigate how oil price shocks feed through core and headline inflation and conclude that there seem to be significant pressures on global trade prices and labor markets associated with structural factors that are partly due to globalization.

The GVAR approach has been applied as well to highlight regional or country-specific scenarios. [2] Cesa-Bianchi, Pesaran, Rebucci, and Xu (2011) focus on the emergence of China as a key player in the global economy and investigate how fluctuations in trade patterns between China and the rest of the world may have altered the transmission mechanisms of the international business cycle to Latin America. They find that the long-term impact of a China GDP shock on the typical Latin American country has tripled since the mid-1990s, while the long-run effect of a U.S. GDP shock has halved. On a similar regional approach, Han and Hee Ng (2011) implement a GVAR model to examine macroeconomic forecasts for the ASEAN-5 countries[3]. They find that GVAR forecasts tend to outperform forecasts based on the benchmark country-specific models, especially for short-term interest rates and real equity prices.

This paper is organized as follows: in Section II we present stylized facts of the main linkages between Caribbean countries and the largest economies in the world. Section III briefly describes the GVAR methodology and the dataset. Our main results and case studies are explained in Section IV. Finally, Section V concludes and proposes potential further developments.

II. STYLIZED FACTS

Caribbean countries are integrated into the global economy mainly through their dependence on tourist arrivals and/or their position as goods exporters. Within our sample of 15 Caribbean economies, we classify Antigua and Barbuda, the Bahamas, Barbados, Belize, Dominica, Dominican Republic, Grenada, Jamaica, St. Kitts and Nevis, St. Lucia, and St. Vincent and the Grenadines as tourism-dependent countries, while Haiti, Guyana, Suriname, and Trinidad and Tobago are classified as goods exporters.

Although most Caribbean countries depend heavily on tourist flows, just three of them account for three-quarters of all tourist arrivals.[4] As of 2015, the Dominican Republic, Jamaica, and the Bahamas received almost 74 percent of the total number of visitors to the

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[2] Some other studies apply a simplification of the GVAR methodology. For instance, Mohaddes and Raissi (2011), as a first stage toward a full GVAR model, provide a cointegrating VARX analysis of the Jordanian economy in a global context and find evidence that the price of oil is one of the main long-term drivers of real output in Jordan, primarily through its impact on external income and capital accumulation.

[3] Refers to the original five ASEAN members: Indonesia, Malaysia, Philippines, Singapore, and Thailand.

[4] Calculated as the number of stay-over arrivals by air.

region. On the other hand, Dominica, St. Vincent and the Grenadines, and St. Kitts and Nevis have a share of tourist arrivals of just 2.1 percent of the regional total. In 2015, 78 percent of tourists arrived from Europe, Canada, and the U.S., while the remaining 22 percent include a significant proportion of intraregional visitors. In terms of single countries, the United States is the most important source of visitors to the Caribbean, accounting for 42 percent of total stay-over tourists.

Figure 1. Tourism Flows to Caribbean Countries (2015)

USA: 5,900,162

Canada: 1,729,649

Europe: 2,418,282

Other: 2,877,298

The Bahamas: 1,886,025

Jamaica: 2,123,042

Belize: 341,124

Dominican Republic: 5,599,859

Haiti: 515,768

St. Kitts and Nevis: 117,928

St. Lucia: 344,908

Antigua and Barbuda: 250,450

Trinidad and Tobago: 439,749

Barbados: 591,872

Guyana: 206,819

St. Vincent and the Grenadines: 75,381

Grenada: 140,735

Dominica: 74,474

Suriname: 217,257
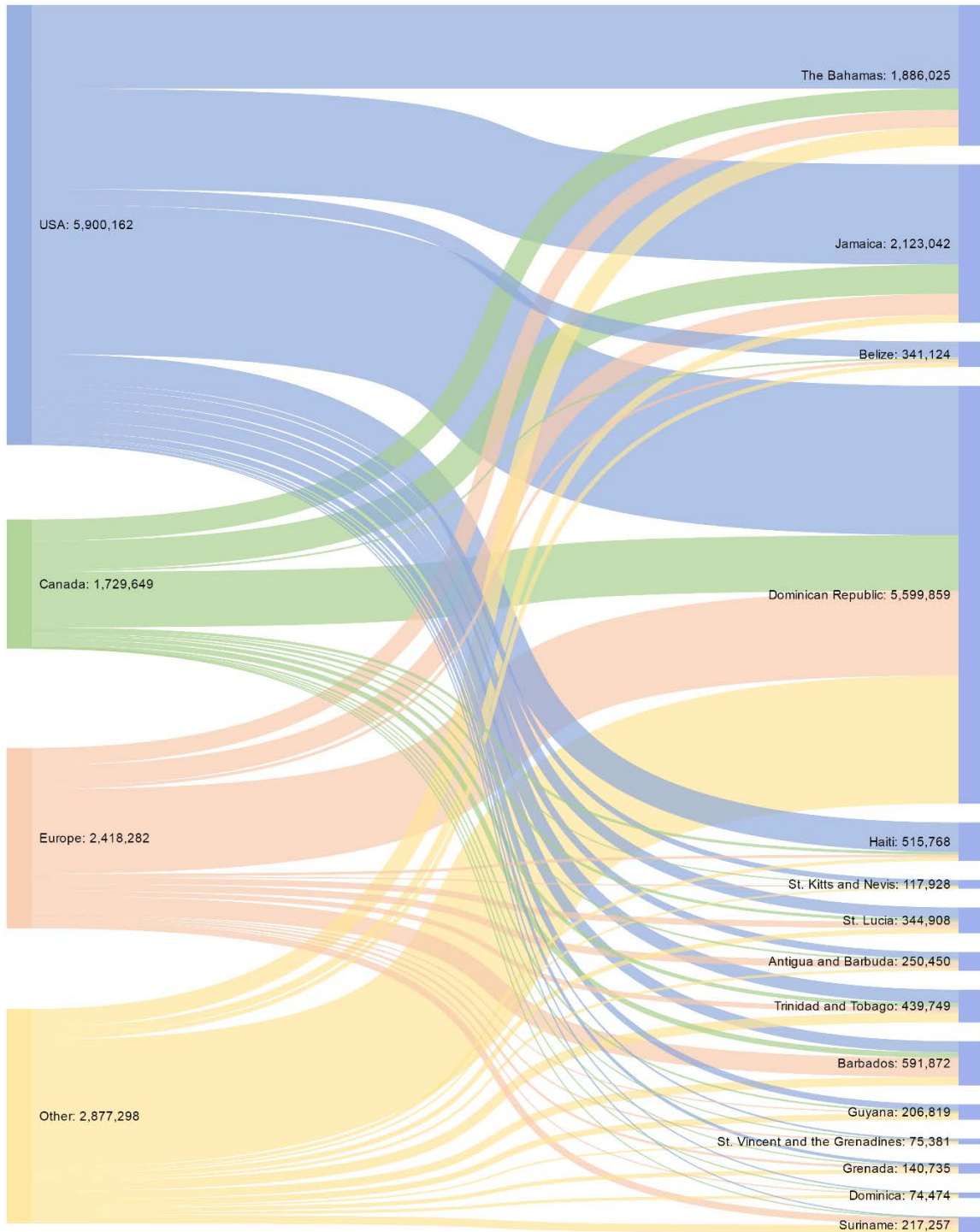
Source: Caribbean Tourism Organization. It reports the number of Stay-Over Visitors By Air.

Caribbean tourism-dependent countries face broad and recurrent merchandise trade deficits that are to some extent counterbalanced by positive net services flows. By end-2017,

Figure 2. Current Account and Trade of Goods and Services
(as percent of GDP, 2017)
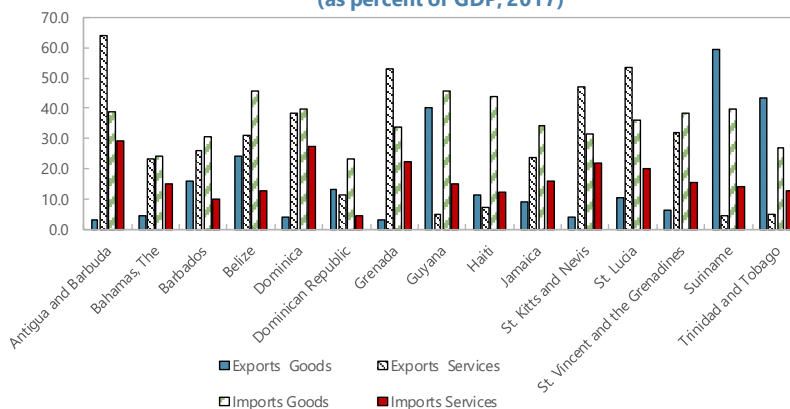
Source: IMF staff estimates based on WEO.

tourism-dependent countries average exports of goods reached 9.0 percent of GDP, well below their average exports of services which represented 36.7 percent. Moreover, Caribbean countries' imports of goods were relatively high, exceeding the 30 percent of GDP in most of the cases.

Commodity exporter countries clearly depend less on their export of s*ervices* **and more heavily on their** *exports of goods;* the top export destination of this group are OECD countries (and Latin America and the Caribbean (LAC) in the case of Trinidad and Tobago). The average exports of goods for the group of commodity-exporter countries is 38.7 percent of GDP, while its average exports of services are around 5.4 percent.

Table 1. Current Account and Trade of Goods and Services (as percent of GDP, 2017)

	Current Account Balance	Goods Balance	Services Balance	Exports		Imports	
				Goods	Services	Goods	Services
Caribbean average a\	-5.5	-18.6	11.7	16.9	28.3	35.5	16.6
Tourism-Dependent average a\	-7.5	-25.2	19.0	9.0	36.7	34.2	17.7
Commodity Exporter average a\	-0.1	-0.3	-8.1	38.7	5.4	39.0	13.5

Source: IMF estimates based on WEO.

a\ Unweighted averages.

The current account balance has been persistently negative in Caribbean countries, especially for the tourism-dependent countries. Current account deficits represented 5.5 percent of GDP in 2017 for tourism-dependent countries, while for commodity-exporter countries the current account is almost balanced at -0.1 percent of GDP. As a result of a low degree of diversification across the region, total imports represented around 52 percent of

GDP with no significant differences between tourism-dependent and commodity-exporter groups.

Figure 3. Trade Flows to/from Caribbean Countries (2015)
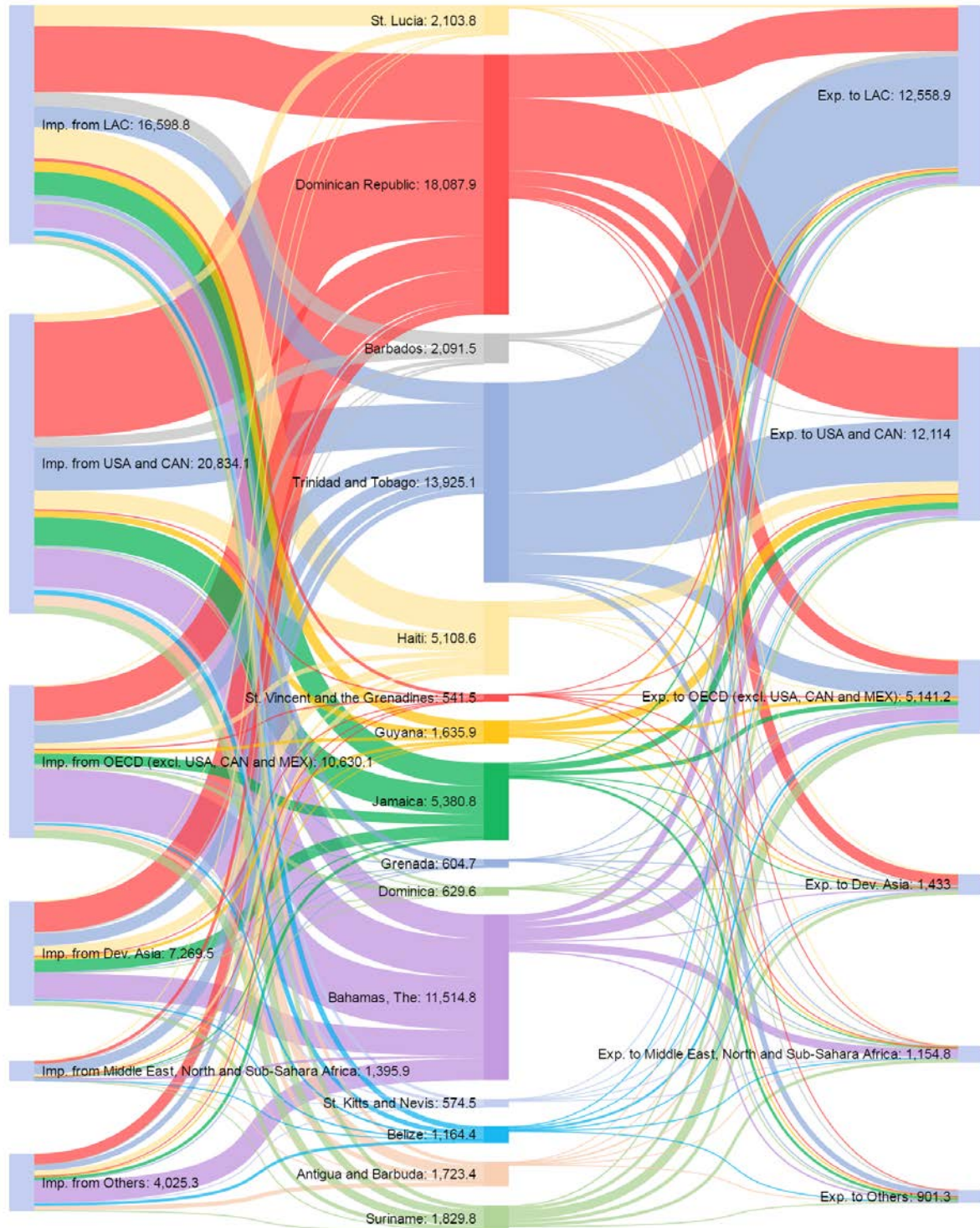
Source: Staff estimates based on IMF's Direction of Trade Statistics.

In light of strong external linkages, it is not surprising that Caribbean economic activity fluctuates in tandem with that of its trading partners. Indeed, at least 9 out of the 15 Caribbean countries show a strong and positive correlation of their GDP growth with that of Canada, the United States and/or the United Kingdom (see Figure 4), with The Bahamas, Barbados, and Antigua and Barbuda being the most dependent. On the other hand, three countries that have faced important episodes of natural disasters in recent years, possibly distorting the link, show the weakest association (namely: Haiti, Guyana, and Dominica).

Figure 4. Real GDP Growth - Correlations (1990-2016)
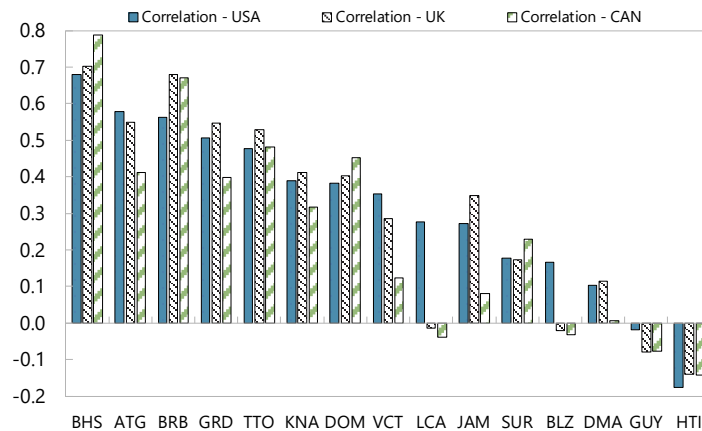
Sources: IMF staff estimates.

III. METHODOLOGY AND DATA

Methodology

We tailored the Smith and Galesi (2014) GVAR Matlab toolbox to fit Caribbean countries' characteristics and data availability. The GVAR methodology can be summarized in a couple of intuitive steps; however, to be implemented numerically, it requires complex coding and programming of large datasets that are not yet incorporated in any econometric software. Smith and Galesi (2014) developed a Matlab toolbox that has provided support to various related empirical applications, including in this research.

A GVAR model tackles the dimensionality problem of including more than one country in an econometric system by following a two-stage procedure Working with more than one country in an integrated context usually faces the infeasibility of specifying a unique Vector Autoregressive (VAR) model including all of them in a unified system. The implementation of the following two steps avoids this problem: i) estimating separate models for each country, and ii) linking them through their trade relationships in a global and integrated model.

The first step consists on estimating several individual VAR-X models, more precisely, one for each of the countries included in the sample. Thus, for country i with $i = 0, 1, 2..N$ (where country 0 is considered as a reference country), our benchmark VAR-X model is specified as:

$$x_{i,t} = a_{i0} + a_{i1}t + \Phi_{i1}x_{i,t-1} + ... + \Phi_{ip}x_{i,t-p_i} + \Lambda_{i0}x_{i,t}^* + \Lambda_{iq}x_{i,t-1}^* + ... + \Lambda_{iq}x_{i,t-q_i}^* + u_{i,t} \tag{1}$$

$$x_{i,t} : k_i \times 1 \text{ vector of domestic variables}$$

$$x_{i,t}^* : k_i^* \times 1 \text{ vector of foreign variables}$$

Where p and q represent the lag order of the domestic and foreign variables, respectively. In addition, foreign variables are defined as weighted averages of each country's trading-partners:

$$x_{i,t}^* = \sum_{j=0}^{N} w_{i,j}x_{j,t} \qquad w_{i,i} = 0$$

With $w_{i,j}$, $j = 0, 1, ..., N$ stand for the weights such that $\sum_{j=0}^{N} w_{i,j} = 1$.

While the second stage involves the specification of a global system based on the estimates of the individual VARX models, and the matrix of trade weights. Since all the variables are endogenous to the system as a whole, then the model can be solved in terms of a $k \times 1$ global variable vector $\left(k = \sum_{i=0}^{N} k_i \right)$, thus we define:

$$z_{i,t} = \begin{pmatrix} x_{i,t} \\ x_{i,t}^* \end{pmatrix}$$

For didactic purposes, we can assume that $p = q$, in which case equation (1) can be expressed as:

$$A_{i0}z_{i,t} = a_{i0} + a_{i1}t + A_{i1}z_{i,t-1} + ... + A_{i,p_i}z_{i,t-p_i} + u_{i,t} \tag{2}$$

Where

$$A_{io} = \left(I_{k_i} - \Lambda_{i0} \right), \qquad A_{i,j} = \left(\Phi_{i,j}, \Lambda_{i,j} \right) \quad \text{for } j = 1, ..., p_i$$

It can be proved that, for each country i, a matrix W_i composed by trade weights $w_{i,j}$ exists such that the following identity holds:

$$z_{i,t} = \left(x_{it}', x_{it}^{*}{}' \right)' = W_i \mathbf{x}_t \tag{3}$$

Where $\mathbf{x}_t = \left(x_{0t}', x_{1t}', ..., x_{Nt}' \right)'$ is the $k \times 1$ vector containing all the endogenous variables of the system and W_i is a $\left(k_i + k_i^* \right) \times k$ matrix. Replacing (3) in (2) we obtain:

$$A_{i0}W_i\mathbf{x}_t = a_{i0} + a_{i1}t + A_{i1}W_i\mathbf{x}_{t-1} + ... + A_{ip_i}W_i\mathbf{x}_{t-p_i} + u_{it}, \quad \text{for } i = 0,1,2,...,N \tag{4}$$

Stacking the *N+1* models:

$$G_0\mathbf{x}_t = a_0 + a_1t + G_1\mathbf{x}_{t-1} + ... + G_p\mathbf{x}_{t-p} + \mathbf{u}_t \tag{5}$$

Where:

$$G_0 = \begin{pmatrix} A_{00}W_0 \\ A_{10}W_1 \\ \mathbf{M} \\ A_{N0}W_N \end{pmatrix}, \quad G_j = \begin{pmatrix} A_{0j}W_0 \\ A_{1j}W_1 \\ \mathbf{M} \\ A_{Nj}W_N \end{pmatrix} \quad \text{for } j = 1,...,p$$

$$a_0 = \begin{pmatrix} a_{00} \\ a_{10} \\ \mathbf{M} \\ a_{N0} \end{pmatrix}, \quad a_1 = \begin{pmatrix} a_{01} \\ a_{11} \\ \mathbf{M} \\ a_{N1} \end{pmatrix}, \quad \mathbf{u}_t = \begin{pmatrix} u_{0t} \\ u_{1t} \\ \mathbf{M} \\ u_{Nt} \end{pmatrix}$$

And $p = \max p_i$ across all i. G_0 is a matrix which depends on trade weights and the parameter estimates from each individual VAR-X model. Then, (5) can be re-expressed as a standard VAR model:[5]

$$\mathbf{x}_t = b_0 + b_1t + F_1\mathbf{x}_{t-1} + ... + F_p\mathbf{x}_{t-p} + \varepsilon_t \tag{6}$$

Where

$$b_0 = G_0^{-1}a_0, \quad b_1 = G_0^{-1}a_1$$
$$F_j = G_0^{-1}G_j, \quad j = 1,...,p, \quad \varepsilon_t = G_0^{-1}\mathbf{u}_t$$

DATA AND MODEL SPECIFICATION

We propose a GVAR model based on annual data for 44 countries, of which 15 belong to the Caribbean region. [6] The choice of annual frequency, between 1980 and 2017, corresponds to shortfalls of quarterly information in several Caribbean countries. The database contains four country-specific variables: real gross domestic product (GDP, $y_{i,t}$), real exchange rate $(rer_{i,t})$, interest rates $(r_{i,t})$ and inflation $(\pi_{i,t})$; two global variables, namely, oil price ($poil_t$) and price of raw materials $(pmat_t)$; and a set of exports $(\exp_{i,j,t})$

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[5] As described in Chudik and Pesaran (2016), the system can be easily extended to include common factors in the country models.
[6] The full list of countries is in Annex 1.

and imports $\left(imp_{i,j,t}\right)$ for each country i disaggregated by origin and destination from/to the other remaining j countries.

Specifically, each of the above variables are defined for each country i and year t as:

$y_{i,t} = \ln\left(\text{Real}\_GDP_{i,t}\right)$: $\text{Real}\_GDP_{i,t}$ is the real GDP in dollars (base year 2010)

$rer_{i,t} = e_{i,t} - p_{i,t}$

$e_{i,t} = \ln\left(E_{i,t}\right)$: $E_{i,t}$ is the Exchange Rate (National currency per U.S. dollar)

$p_{i,t} = \ln\left(CPI_{i,t}\right)$: $CPI_{i,t}$ is the Consumer price index (base year 2010).

$r_{i,t} = R_{i,t}/100$: $R_{i,t}$ is the interest rate in percent per year.

$\pi_{i,t} = p_{i,t} - p_{i,t-1}$

$poil_{i,t} = \ln\left(WTI_{i,t}\right)$: $WTI_{i,t}$ is the WTI oil price in U.S. dollars.

$pmat_{i,t} = \ln\left(Raw\_materials\_price\_index_{i,t}\right)$

$\exp_{i,j,t}$: Value of Exports from country i to country j in period t

$imp_{i,j,t}$: Value of Imports to country i from country j in period t.

Then, the general specification for each country specific VAR-X model considers:

$$x_{i,t} = \left(y_{i,t}, rer_{i,t}, r_{i,t}, \pi_{i,t}\right)$$
$$x_{i,t}^* = \left(y_{i,t}^*, rer_{i,t}^*, r_{i,t}^*, \pi_{i,t}^*, poil, pmat\right)$$

IV. RESULTS

ESTIMATES AND TESTS

Several statistical and economic considerations should be taken into account for a proper specification of a GVAR model. Since this global model uses the estimates of each individual country's VARX as inputs, ensuring compliance of certain desirable statistical and economic properties is needed. The benchmark specification, which includes lags of all the variables in the system, was adjusted according to stability and statistical significance of each specific model. In practical terms, one of the main reasons to exclude a variable of a particular country's model was to avoid its negative impact on country-specifics and global stability (e.g. nominal variables in countries that experienced large inflation episodes). As a result, not every individual model includes the same set of variables or lags.

Weak exogeneity assumption of foreign variables is central to allow country models to be estimated individually. A formal test of this assumption for country-specific foreign variables and global variables in each of the individual VARX models was conducted along the lines described in Johansen (1992) and Harbo et al. (1998). The results, shown in the

Annex, Table A1, suggest that weak exogeneity hypothesis could not be rejected for most of the variables included in the sub-systems; indeed, only 5 out of 212 exogeneity tests performed reject the weak exogeneity hypothesis.

CASE STUDIES

We applied our Caribbean-tailored GVAR model to two case studies. In the first one, we quantify the impact of the recent drop in oil prices on countries in the Eastern Caribbean Currency Union (ECCU), a group of net oil importers, contrasting, at the same time, the impact on their major tourism source markets, which are oil producers; the second study case estimates the implication of an expansionary policy in the U.S. by assuming a positive shock on the U.S. GDP. In this case, we describe potential channels of transmission and quantify the short- and medium-term effects on economic activity in the Caribbean countries.

A. Oil price spillovers to ECCU countries.

Oil price variations might remold the global scenario and shift benefits and costs between countries and regions. Most studies agree that the effects of oil price shocks on economic activity vary according to several elements. Monetary policy and whether the shock is positive or negative, or supply or demand-driven matter (Hamilton, 1996; Bernanke et al., 1997), as well as the condition of a country as a net oil-importer or exporter, or its degree of diversification (Ferderer, 1996).

ECCU countries are characterized by being net oil importers, dependent on tourism and are not very diversified. Thus, a variation in a global variable, such as the decline in oil prices observed since mid-2014, represents fertile ground to analyze its impact on GDP. On the one hand, cheaper oil prices would benefit net oil-importer economies in terms of lower costs of imports, price of energy and transport, and thus higher household real income. On the other hand, lower oil prices might negatively affect economic activity in tourism source countries that are oil exporters (e.g. U.S., Canada, and U.K.) and are not much diversified (e.g. Trinidad and Tobago[7]). Together, this could ultimately weaken the demand for tourism services and therefore lead to lower GDP levels in ECCU countries.

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[7] For a particular analysis of the potential effect of the level of economic activity of Trinidad and Tobago on ECCU countries, see IMF Country Report No. 16/333 (Annex III)

Figure 5 - ECCB: Import of Fuels and Oil Price

- Imports of Mineral Fuels/Total Imports (percent)
- Imports of Mineral Fuels/GDP (percent)
- Petroleum spot price (US$/bbl, right axis)
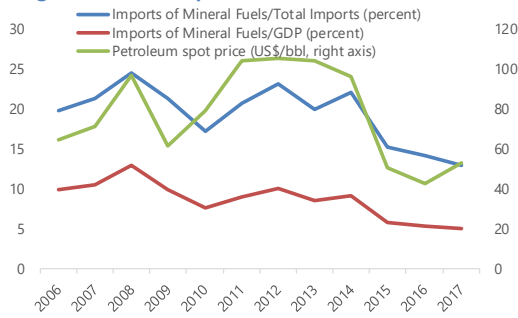
Figure 6 - ECCU: Consumer Price Index
(2010=100)

- Inflation Rate (end of period %, rhs)
- Fuel and light CPI
- All Items CPI
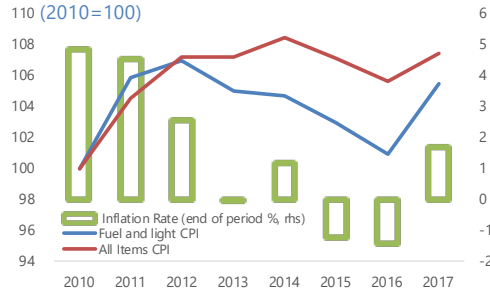
Source: ECCB and IMF staff calculations.

As expected, the fall in oil prices since mid-2014 benefitted ECCU countries by pulling down both the value of imports and fuel inflation. Imports of oil in the region were reduced by about 4 percentage points of GDP, improving current account balances. In the same direction, energy prices were clearly contained between 2014-2016. A lower oil price affected not only the price of fuel, but also the price of electricity which follows best practice

Figure 7 - ECCU: GDP Growth Rate and Oil Price

- GDP Growth Rate
- Oil Price (right axis, reversed)

Source: ECCB and IMF staff calculations.

by passing fuel costs on to consumers[8]. In general, ECCU countries adjust fuel prices to end-consumers monthly by taking into account an average of the past three-months, therefore there is a certain lag to reflect current variations of prices in the import market. While not the only mechanism in place, the fall of oil prices could represent an income transfer from oil exporter countries to net oil importers, thus leading to an increase in consumption spending in ECCU countries and an expansion of aggregate demand.

The impact of lower oil prices on activity of the main ECCU tourism source markets was mixed. Economic growth of net oil-exporter countries, such as Trinidad and Tobago and Canada, was affected in 2015 and 2016[9]. After a slowdown in the GDP growth rate from 2.5 percent in 2014 to 1.2 in 2015, Canada managed the situation by implementing accommodative fiscal and monetary policies, including exchange rate depreciation. In the case of Trinidad of Tobago, the impact of lower oil prices was stronger within the energy sector, which represents one quarter of the economy. This led to a recession of about 10 percent in 2016 in that sector, implying a negative overall growth in 2016 and 2017 of -6.1 and -2.6 percent, respectively. The effect on other important ECCU tourism source markets,

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[8] As McIntyre et al. (2016) report, in 2011-2012, fuel costs accounted for around 70 percent of the average cost of electricity in countries where there is almost universal dependence on fuel oil for electricity generation. ECCU countries adjust periodically fuel prices based on lagged averages of oil price. At the same time, electricity prices are affected through a flexible tariff structure that incorporates a fuel surcharge. While the mechanisms are common in ECCU countries, specific rules are not necessarily the same. For instance, St. Vincent uses a 3-month average to determine fuel prices while Grenada uses a 13-month average.

[9] For Canada, see IMF Country Report No. 15/22. For Trinidad and Tobago, see IMF Country reports No. 18/285.

which are more diversified, such as the United States or the United Kingdom was less clear. The UK, despite being a net oil importer, is the third largest producer of oil and gas in Europe just after the Russian Federation and Norway. Notwithstanding the direct negative effect of lower oil prices on the oil and gas extraction sector, other UK economic sectors such as agriculture, air transport, refined petroleum, and oil-intensive manufacturing sectors (PWC, 2015) were expected to outweigh the initial negative impact, with uncertain net benefits for the overall economy. A similar ambiguous scenario occurred in the U.S. where oil investments were cut in half between the period 2014 and 2017, and it's not clear if a boost to consumption and non-oil investment was fully enough to outweigh the negative impact on investment in the energy sector (IMF, 2016).

With regard to tourist flows to ECCU countries, growth of stay-over arrivals from the main tourism source countries slowed but stayed at positive rates, except those from Canada. Indeed, the fall in the oil price coincided with a pronounced drop of 11 percent (y-o-y) of Canadian tourist arrivals to the ECCU region in 2015.

Results from our GVAR model suggest that an oil price drop positively affects economic activity in the ECCU region. The GVAR model is helpful to gauge the overall impact of an oil price drop on economic activity in the ECCU countries after controlling for the mechanisms described in previous paragraphs. The model is capable of simulating GDP changes due to a global shock affecting all of the countries included in it, while capturing contagious effects through the use of trading partner weights. The Figure below shows the Impulse-Response functions of a negative oil price shock equivalent to 20 percent in its price. A positive response of GDP is expected in all ECCU countries but Dominica, whose results might be sensitive to the recent large natural disasters. Indeed, owing to the impact of Tropical storm Erika (2015) and hurricane Maria (2017), Dominica's economy collapsed precisely during the same time-span of the latest fall of oil prices (2014-2017)[10]. The model also predicts an initial negative impact on tourism source economies, which diminishes over time. The ECCU tourism source country that is expected to be negatively affected the most is Trinidad and Tobago, where an oil shock would hit the economy in a big way, by about 2 percent of GDP in the medium term. This magnitude coincides with the decline observed in 2016-2017.

Figure 8 - ECCU: Stay-Over Visitors by Source (yoy growth rate)

Source: ECCB and IMF staff calculations.

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[10] Another structural factor that might be cushioning the effect of oil prices on Dominica's economic activity is that about 25 percent of its energy generation comes from hydroelectric plants (most of the other ECCU countries rely almost entirely on diesel/oil generation).

Figure 9. Impulse Response Function of GDP to a Negative Oil Price Shock
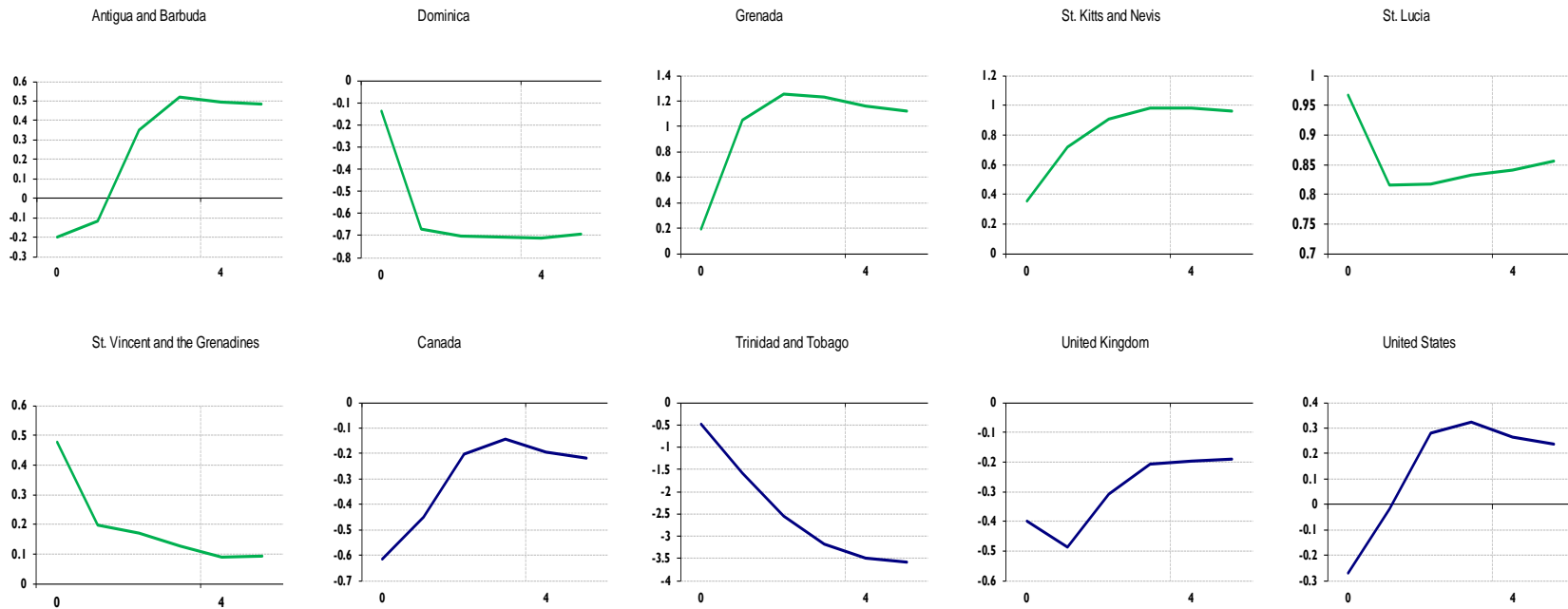
Source: Authors' calculations.
The chart shows the response to a one standard deviation shock.

B. The Potential Impact of an Expansionary Policy Stance in the U.S.

The relative weight of the United States in the global economy has weakened slightly during the past four decades, mainly due to the strong growth of China, India, and other emerging economies. Nonetheless, in 2017, the U.S. economy represented 24.3 percent of global GDP and around 12 percent of global trade. The U.S. impact on the global system is not limited to its predominance in production and trade; indeed it might be magnified by its central role in the International Monetary System (Gourinchas and Rey, 2007). Contrasting with the relevance of the United States in global terms, the Caribbean aggregated GDP fluctuated between 0.12 and 0.29 percent of world GDP since 1980, and was around 0.2 percent in 2017—a small economy, even when considered as a region.

Figure 10. Composition of World GDP
(In percent)

Legend: US, China + India, Euro, Other, Caribbean (right axis)
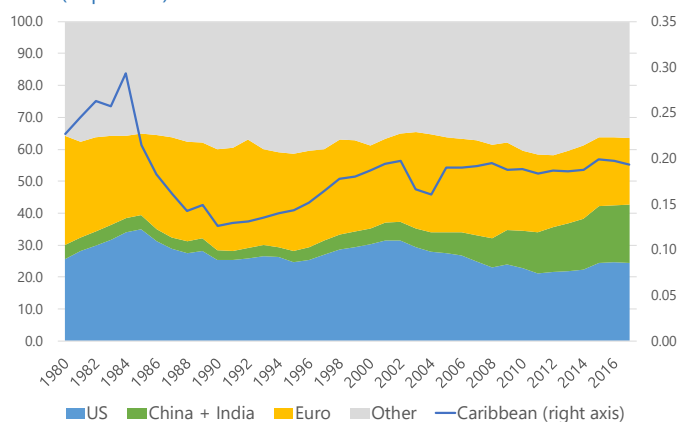
Figure 11. Caribbean Tourism-Dependent Countries - Composition of Tourists Flows to the Caribbean from the U.S. and Other Regions

Legend: from US, from the rest of the World
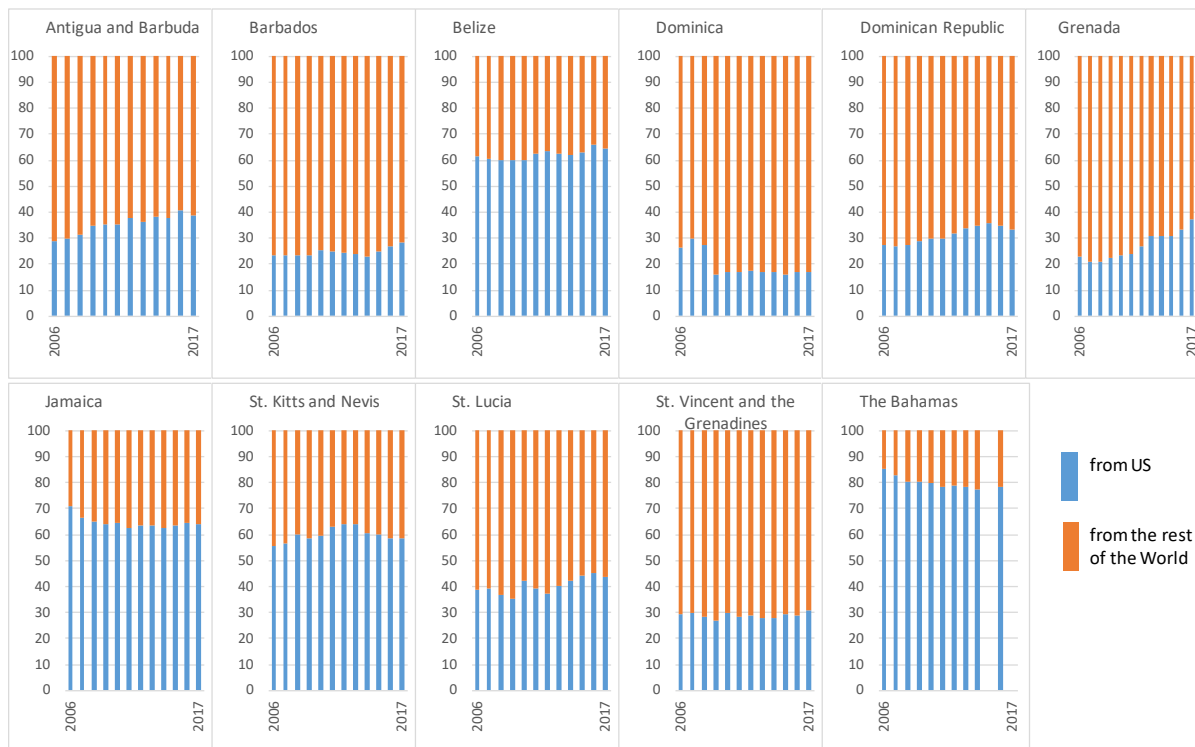
U.S. tourists are very important for Caribbean tourism-dependent countries. Forty-seven percent of total tourists to the region arrived from the U.S. in 2016. As a region, this share has

been stable since 2006 and corresponds mainly to a large number of tourists visiting Belize, the Dominican Republic, and The Bahamas. In addition to those countries, U.S. visitors are relatively more important for the tourism sector in St. Kitts and Nevis, even though tourist arrivals from the U.S. to this country are relatively low in absolute terms.

Figure 12. Caribbean Goods Exporters: Exports and Imports Composition to/from U.S.
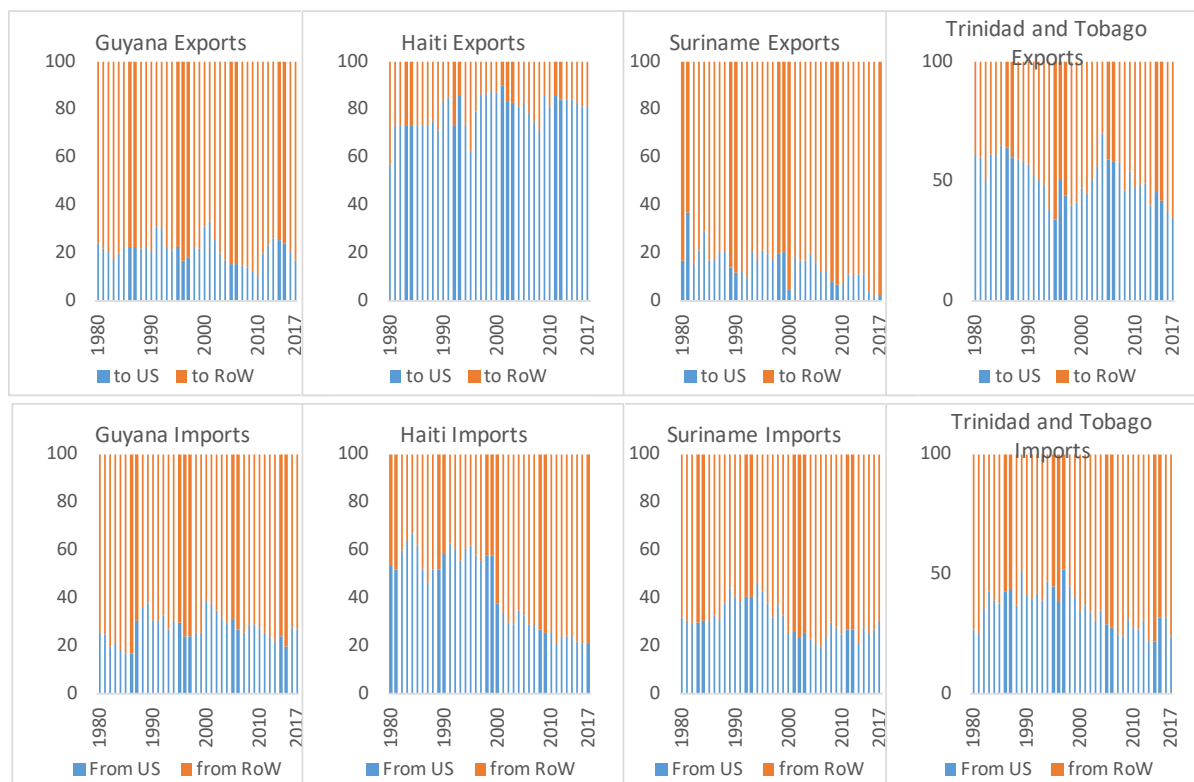
Among goods-exporting Caribbean countries, trade with the U.S. is important as well. The U.S. has been the main destination of Haitian and Trinidad and Tobago exports, representing, on average between 1980 and 2017, 79 and 51 percent of their total exports, respectively. With regards to imports from the United States in the set of goods-exporter countries, they have been decreasing somewhat as a share of total imports since the early 2000s, yet they represented about 20-30 percent of their total imports in 2017.

Notwithstanding its global influence, U.S. GDP, tourists, and trade are not the only channels affecting Caribbean economies; exchange rate regimes and interest rate parity matter as well. Most Caribbean countries have pegged or relatively rigid exchange rate regimes with respect to the U.S. dollar (see Figure 2a). A stronger U.S. dollar would increase the cost of Caribbean country exports, including tourism, for non-U.S. countries; thereby adversely affecting tourists to CARICOM countries who as a whole are mainly non-U.S. Additionally, Caribbean imports from countries that are not pegged to the U.S. dollar might become more competitive, widening further the recurrent deficits in their trade balances. With regard to interest rates, the link between domestic and foreign interest rates in the Caribbean seems to be elusive, at least for ECCU countries. According to Myrvoda and Reynaud (2018),

and IMF (2018), ECCU interest rates may not respond significantly to variations in external interest rates. Statistical results from the GVAR model support those findings.

After controlling for the various transmission mechanisms from the U.S. to the rest of the world, our GVAR model suggests that the Caribbean countries would highly benefit from an expansionary policy stance in the U.S. All tourism-dependent Caribbean countries would increase their level of GDP in response to a positive shock in economic activity in the U.S., a few of them even more than proportionally to the change in the U.S. GDP. On the other hand, the size of the impact could be marginally null or negative for some good-exporters, including Trinidad and Tobago[11] and Haiti while it is expected to be positive for Suriname and Guyana. Although Haiti and Trinidad and Tobago show a larger exposure to trade flows with the U.S. than other countries such as Suriname, the model predicts a lower response of those two countries to a U.S. GDP positive shock. This apparently counterintuitive result is explained by a larger response of those countries to real exchange rate fluctuations that accompany the initial GDP shock, and spread to all other countries, partially reverting the initial trade effect.

Figure 13. Impulse Response Function of GDP to a 1 pp increase in the U.S. GDP

Source: Authors' estimates.
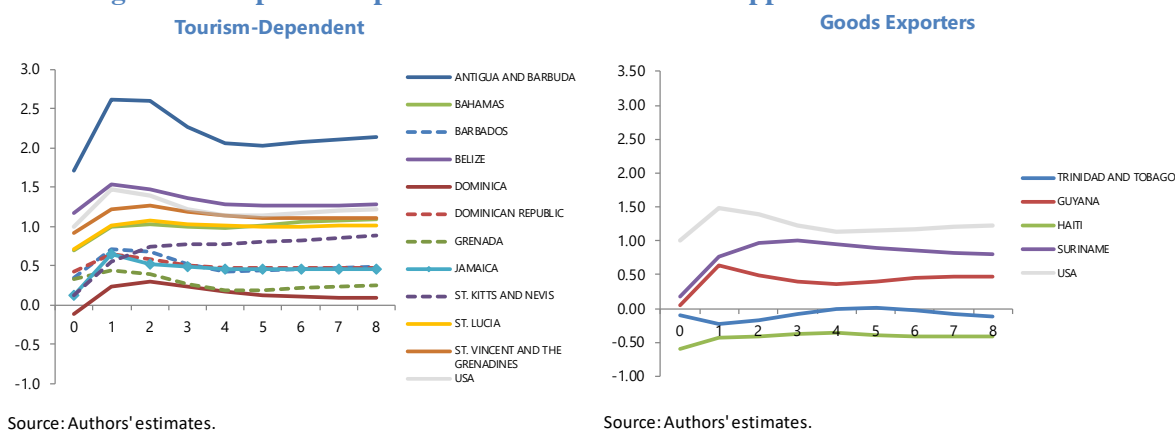
V. Conclusions and Policy Implications

Measuring linkages between different regions of the globe is a challenge. However, the GVAR methodology shows itself to be useful to condense large amounts of information in a way that permits researchers to isolate global shocks or country-specific shocks and gauge their impact across the board.

Given its size and large dependence of external markets, the Caribbean region is particularly sensitive to policy changes or shocks in large trading partners, such as the U.S., Canada, or the U.K. While most of the Caribbean countries can be classified as tourism dependent, a few others are also affected by external conditions due to the significant size of their trade in goods.

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[11] Trinidad and Tobago recently terminated its refining operations and is currently shifting from oil to gas production which will likely change some of the impacts estimated in this paper.

An oil price drop would benefit the economies of most ECCU countries. We applied our GVAR model to simulate a global oil price drop. The GVAR model IRFs suggest that an oil price shock might negatively affect important ECCU trading partners that are oil exporters, such the U.K., Canada, and Trinidad and Tobago, while an initial negative effect on GDP followed by a recovery in the medium term would be expected in the U.S. Overall, and given their condition as oil importers, our findings reveal that most ECCU economies would expect a positive impact on their GDP. Those results coincide with the outcome from the recent drop in oil prices in 2014.

Also, we found a strong impact from an expansionary policy in the U.S. on most Caribbean economies. Simulated by a positive shock on the domestic GDP of the U.S., an expansionary policy would strongly affect tourism-dependent economies while having mixed effects on the set of Caribbean goods exporters. The results are not surprising given the relevance of U.S. tourist flows for the region and contribute to confirming results from country-specific models while taking into account a richer set of interactions.

External shocks represent a large source of uncertainty and volatility to small states and structural policies might help to downgrade their impact. While the questions raised in this paper are not new to IMF's Staff Reports and research papers, the GVAR methodology represents an alternative way to tackle them in a more integrated fashion while including second round effects from the dynamics of trading partners. The observed large impact of external factors suggest that Caribbean countries may benefit from preventive measures such as increasing competitiveness, diversifying their economies and reducing their dependence on critical commodities and services, namely, oil-based energy and tourism. These policies might reduce exposure to external imbalances and, at the same time, promote economic growth.

The GVAR methodology is capable of providing responses to a broad range of questions. The model represents a promising avenue for empirical analysis and could be expanded to include more countries or idiosyncratic variables for particular countries. We leave this as a potential extension for future research.

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Annex

List of countries included in the model

1	Antigua and Barbuda
2	Austria
3	Bahamas
4	Barbados
5	Belgium
6	Belize
7	Bulgaria
8	Cameroon
9	Canada
10	China
11	Cyprus
12	Denmark
13	Dominica
14	Dominican Republic
15	Finland
16	France
17	Germany
18	Greece
19	Grenada
20	Guyana
21	Haiti
22	Hungary
23	India
24	Ireland
25	Italy
26	Jamaica
27	Japan
28	Luxembourg
29	Malta
30	Mexico
31	Netherlands
32	Poland
33	Portugal
34	Romania
35	Singapore
36	Spain
37	St. Kitts and Nevis
38	St. Lucia
39	St. Vincent and the Grenadines
40	Suriname
41	Sweden
42	Trinidad and Tobago
43	United Kingdom
44	United States

Figure A1. Total Trade (percent)
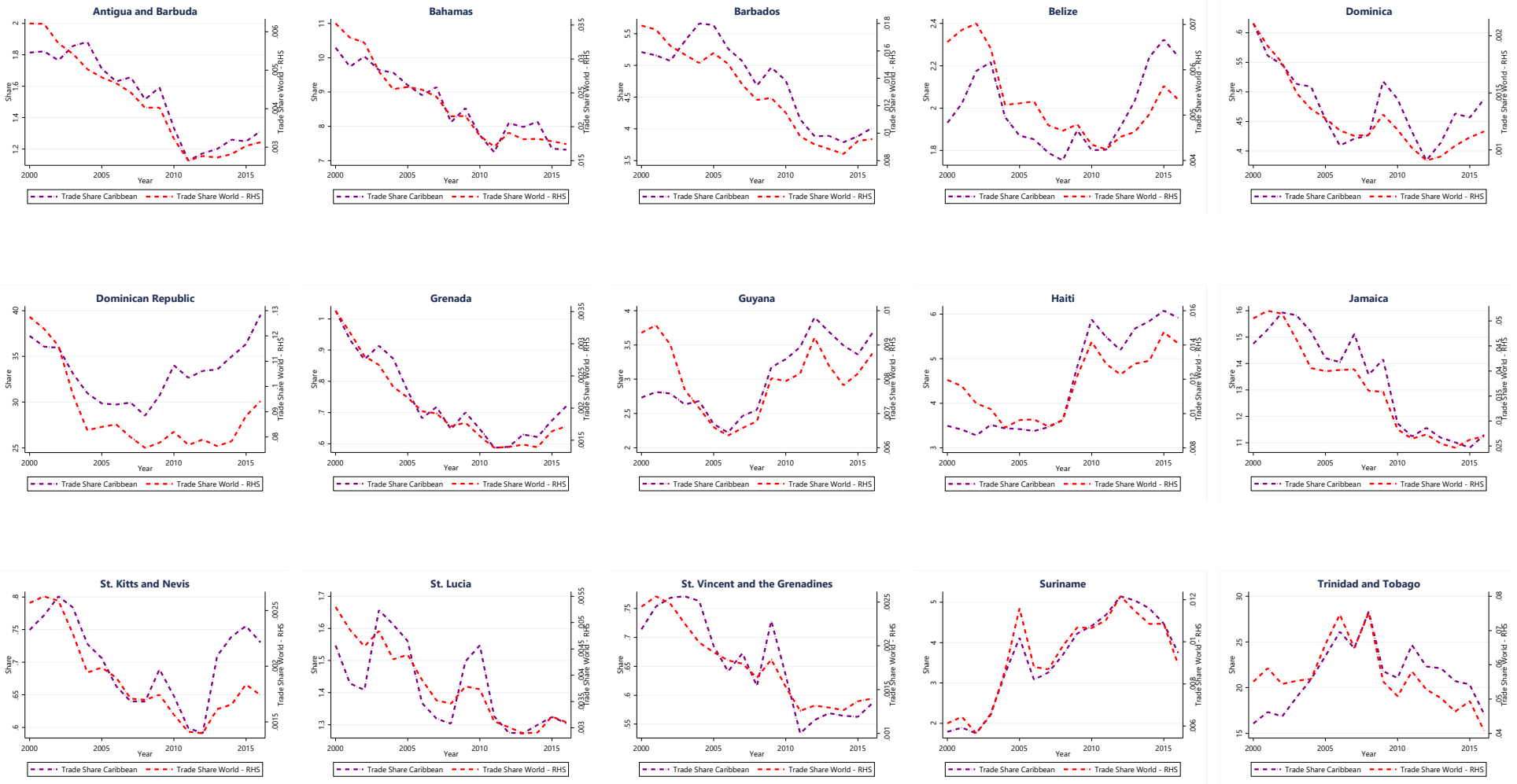
Figure A2. Real Effective Exchange Rate
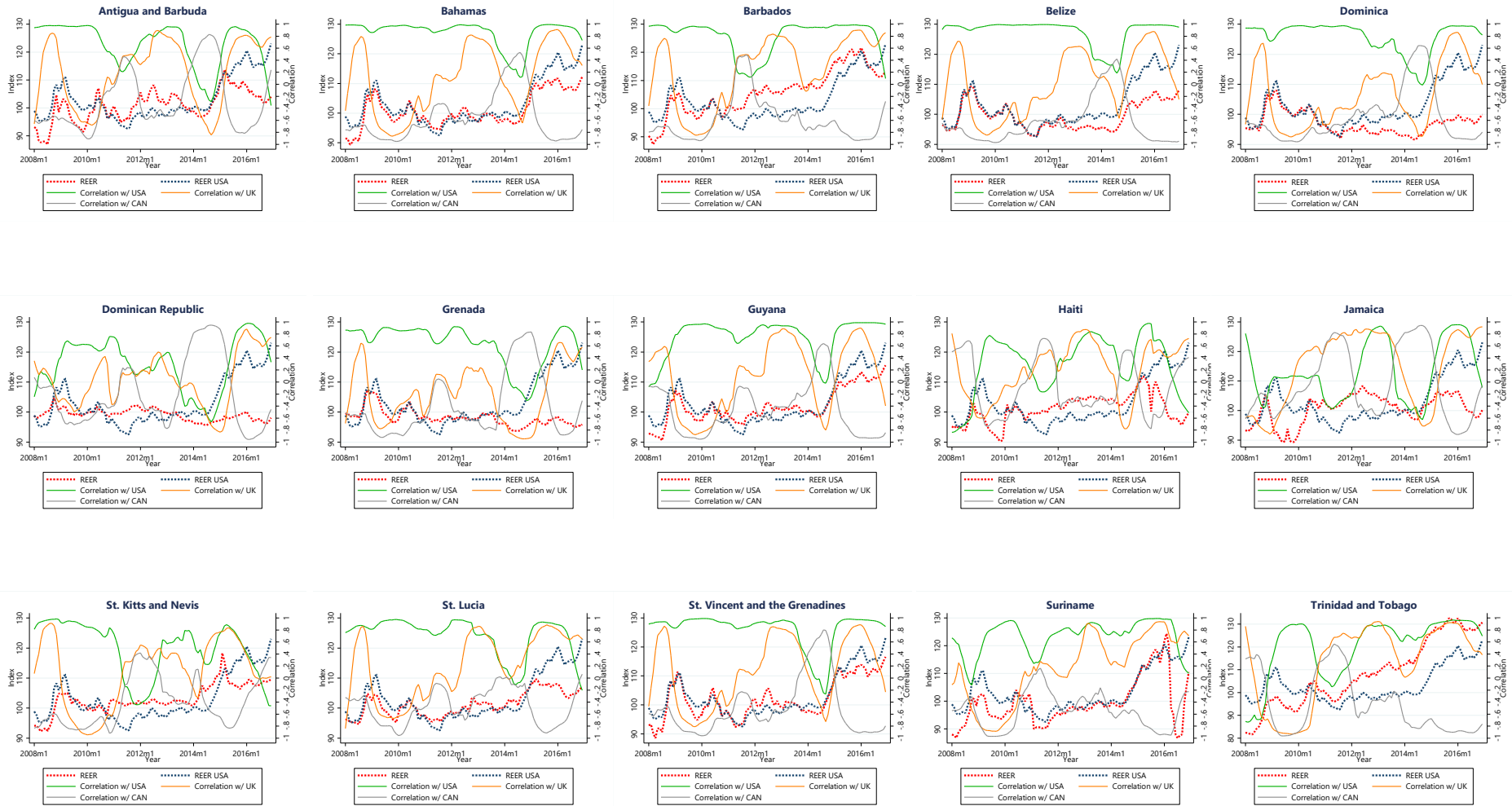
Table A1. Weak Exogeneity Test

Country	F test	Fcrit_0.05	gdps	Dps	eps	rs	poil
ANTIGUA AND BARBUDA	F(1,23)	4.28	1.24	2.42	0.01	0.26	0.92
AUSTRIA	F(1,22)	4.30	0.64		0.39	0.04	
BAHAMAS	F(1,23)	4.28	2.47	0.71	0.47	4.40	1.11
BARBADOS	F(1,23)	4.28	0.03	1.54	0.32	1.46	0.18
BELGIUM	F(1,22)	4.30	0.63	5.38	0.08	0.48	1.63
BELIZE	F(1,23)	4.28	0.02	0.44	0.00	0.15	0.15
BULGARIA	F(1,23)	4.28	1.24	0.65	0.41	0.37	0.01
CAMEROON	F(1,22)	4.30	0.96	0.23	0.03	0.05	0.56
CANADA	F(1,22)	4.30	0.43	1.14	0.41	1.38	0.02
CHINA	F(1,24)	4.26	0.24	1.04	0.66	0.28	1.31
CYPRUS	F(1,23)	4.28	0.21	0.12	1.54	0.01	0.00
DENMARK	F(1,22)	4.30	1.30	0.91	0.61	0.06	0.05
DOMINICA	F(1,23)	4.28	3.25	0.12	0.30	0.41	0.81
DOMINICAN REPUBLIC	F(1,23)	4.28	0.98	0.29	0.02	0.07	0.07
FINLAND	F(1,22)	4.30	0.49	3.14	0.82	2.09	0.11
FRANCE	F(1,22)	4.30	1.23	0.71	0.08	0.99	1.42
GERMANY	F(1,22)	4.30	0.38	0.14	0.32	0.20	1.62
GREECE	F(1,22)	4.30	3.52	0.97	0.00	1.87	
GRENADA	F(1,23)	4.28	0.00	0.41	0.52	1.39	0.11
GUYANA	F(1,22)	4.30	2.17	0.54	0.60	3.07	0.52
HAITI	F(1,23)	4.28	0.73	0.13	0.51	1.61	0.28
HUNGARY	F(1,22)	4.30	0.37	0.07	0.03	0.46	1.71
INDIA	F(1,22)	4.30	0.01	0.00	0.20	0.92	0.42
IRELAND	F(1,22)	4.30	4.70	0.29	0.03	1.42	0.00
ITALY	F(1,22)	4.30	0.59	0.53	0.25	1.36	0.00
JAMAICA	F(1,22)	4.30	0.05	0.00	0.14	0.24	0.13
JAPAN	F(1,22)	4.30	0.38	0.96	0.03	0.62	3.44
LUXEMBOURG	F(1,22)	4.30	0.54	1.22	0.19	0.07	0.35
MALTA	F(1,23)	4.28	0.03			0.00	
MEXICO	F(1,23)	4.28	2.38	3.65	0.31	0.03	5.61
NETHERLANDS	F(1,22)	4.30	0.05	0.29	10.18	0.00	0.00
POLAND	F(1,23)	4.28	0.00	0.18	0.10	0.04	0.01
PORTUGAL	F(1,22)	4.30	0.21	0.01	0.22	0.07	0.28
ROMANIA	F(1,23)	4.28	0.01	0.02	0.06	0.28	0.17
SINGAPORE	F(1,22)	4.30	2.15	1.49	3.31	0.00	2.73
SPAIN	F(1,22)	4.30	2.66	0.05	0.00	0.01	
ST. KITTS AND NEVIS	F(1,23)	4.28	0.11	0.31	1.16	0.04	2.35
ST. LUCIA	F(1,23)	4.28	0.17	0.53	1.48	0.37	0.40
ST. VINCENT AND THE GRENADINES	F(1,23)	4.28	0.00	1.01	2.05	0.31	0.25
SURINAME	F(1,23)	4.28	1.37	2.62	0.26	1.00	0.05
SWEDEN	F(1,22)	4.30	0.32	1.53	0.13	0.06	0.04
TRINIDAD AND TOBAGO	F(1,22)	4.30	0.01	0.48	0.83	0.65	0.02
UNITED KINGDOM	F(1,22)	4.30	0.04	3.76	0.88	2.94	0.80
USA	F(1,23)	4.28	2.62	1.11	1.57	0.01	

Table A2. Coefficients of the VECX Model

ANTIGUA AND BARBUDA

	R2	Intercept	gdp_1	Dp_1	r_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.47	0.23	0.00	-0.21	-0.17	-0.03	0.02	-0.01	-0.10	0.00	1.66	-0.16	-0.19	2.90	-0.05
dDp	0.77	1.49	0.03	-1.32	-1.04	-0.18	0.12	-0.05	-0.64	0.00	-0.26	0.09	-0.12	0.13	0.01
dr	0.09	-0.07	0.00	0.06	0.05	0.01	-0.01	0.00	0.03	0.00	-0.02	0.03	-0.01	-0.14	0.00

AUSTRIA

	R2	Intercept	gdp_1	Dp_1	ep_1	r_1	gdps_1	eps_1	rs_1	dgdps_0	deps_0	drs_0
dgdp	0.75	-0.71	-0.28	-0.35	0.16	0.08	0.31	-0.17	0.55	0.80	-0.01	0.24
dDp	0.40	-0.47	-0.18	-0.23	0.11	0.05	0.20	-0.11	0.36	0.36	0.01	0.35
dep	0.98	-0.90	-0.35	-0.44	0.20	0.10	0.38	-0.22	0.69	0.41	1.18	0.27
dr	0.75	-0.09	-0.03	-0.04	0.02	0.01	0.04	-0.02	0.07	-0.02	0.00	0.77

BAHAMAS

	R2	Intercept	gdp_1	Dp_1	r_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.41	0.47	0.06	-0.36	-0.30	-0.07	0.24	-0.02	0.16	0.00	0.76	-1.01	0.03	0.47	0.04
dDp	0.64	0.78	0.10	-0.58	-0.49	-0.11	0.38	-0.02	0.26	0.00	-0.25	0.96	-0.03	-0.21	-0.02
dr	0.30	0.24	0.03	-0.18	-0.15	-0.03	0.12	-0.01	0.08	0.00	-0.09	0.01	0.00	0.08	0.00

BARBADOS

	R2	Intercept	gdp_1	Dp_1	r_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.50	-0.11	-0.05	0.17	-0.51	0.02	-0.18	0.00	0.54	0.01	0.77	1.00	0.07	0.85	-0.03
dDp	0.53	0.43	0.19	-0.70	2.07	-0.09	0.74	-0.01	-2.19	-0.02	-0.16	0.50	-0.15	0.54	0.03
dr	0.71	-0.04	-0.02	0.06	-0.18	0.01	-0.06	0.00	0.19	0.00	0.01	-0.27	-0.09	0.78	0.01

BELGIUM

	R2	Intercept	gdp_1	Dp_1	ep_1	r_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.84	0.29	-0.31	0.21	-0.03	-0.04	0.22	-0.11	0.02	-0.03	0.00	0.67	0.16	-0.01	0.18	0.00
dDp	0.79	-0.57	0.61	-0.42	0.06	0.08	-0.43	0.22	-0.05	0.05	0.00	0.26	0.70	0.04	-0.30	0.01
dep	0.96	0.30	-0.32	0.22	-0.03	-0.04	0.22	-0.11	0.02	-0.03	0.00	-0.04	0.14	1.23	0.19	0.01
dr	0.64	-0.39	0.42	-0.29	0.04	0.05	-0.29	0.15	-0.03	0.04	0.00	0.21	0.48	0.01	0.48	-0.01

BELIZE

	R2	Intercept	gdp_1	Dp_1	r_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.39	0.55	0.14	-0.97	-0.15	-0.08	1.14	0.09	0.28	0.02	0.92	-0.12	-0.03	-1.23	0.03
dDp	0.79	0.40	0.11	-0.72	-0.11	-0.06	0.85	0.07	0.21	0.01	0.18	0.83	0.12	-0.23	0.04
dr	0.05	-0.03	-0.01	0.06	0.01	0.01	-0.07	-0.01	-0.02	0.00	-0.09	-0.05	-0.02	0.21	0.00

BULGARIA

	R2	Intercept	gdp_1	Dp_1	ep_1	r_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.87	-1.01	-0.06	0.03	-0.01	0.16	-0.48	0.18	-0.19	0.04		0.71	-0.43	0.02	1.25	0.02
dDp	0.20	3.01	0.19	-0.10	0.04	-0.49	1.48	-0.54	0.58	-0.13		3.69	5.96	0.91	-12.30	0.23
dep	0.09	0.80	0.04	-0.02	0.01	-0.10	0.29	-0.11	0.11	-0.02		-8.00	0.69	0.53	12.36	-0.18

CAMEROON

	R2	Intercept	gdp_1	Dp_1	ep_1	r_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.69	0.95	0.10	-0.14	0.31	0.51	-0.18	0.98	-0.35	-0.96	0.02	0.55	0.51	0.03	-1.80	0.01
dDp	0.12	0.05	0.00	0.00	0.01	0.01	-0.01	0.03	-0.01	-0.03	0.00	-0.33	0.18	-0.05	3.62	-0.06
dep	0.64	-0.97	-0.10	0.14	-0.31	-0.51	0.18	-1.00	0.36	0.98	-0.02	0.50	-0.03	1.40	0.77	0.01
dr	0.12	-0.10	-0.01	0.02	-0.04	-0.06	0.02	-0.11	0.04	0.11	0.00	-0.23	0.00	0.01	0.31	0.00

CANADA

	R2	Intercept	gdp_1	Dp_1	ep_1	r_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.81	0.19	0.14	-0.33	0.01	-0.16	-0.14	0.03	-0.03	0.19	0.00	0.94	0.28	0.03	-0.08	0.01
dDp	0.72	0.35	0.24	-0.56	0.01	-0.27	-0.23	0.05	-0.06	0.32	0.00	-0.32	0.48	0.00	0.15	0.00
dep	0.60	0.99	0.73	-1.68	0.04	-0.80	-0.70	0.16	-0.17	0.95	-0.01	0.26	-0.12	0.64	-1.40	-0.09
dr	0.75	0.36	0.26	-0.61	0.02	-0.29	-0.25	0.06	-0.06	0.34	0.00	-0.04	0.06	-0.03	0.71	0.00

CHINA

	R2	Intercept	gdp_1	ep_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.44	1.29	0.11	0.13	-0.28	0.32	0.02	0.10	0.02	0.54	-1.17	0.00	-0.58	0.03
dep	0.59	-7.75	-0.70	-0.83	1.74	-2.04	-0.15	-0.66	-0.12	1.51	-3.54	-0.82	0.07	-0.09

CYPRUS

	R2	Intercept	gdp_1	Dp_1	ep_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.60	-0.90	-0.18	0.83	-0.15	0.23	-0.43	0.10	0.32	-0.03	1.02	-0.21	-0.06	1.24	-0.02
dDp	0.71	0.65	0.13	-0.60	0.11	-0.17	0.32	-0.07	-0.23	0.02	0.20	0.12	0.02	0.28	0.03
dep	0.95	-0.40	-0.08	0.38	-0.07	0.11	-0.20	0.04	0.14	-0.01	-0.26	0.21	0.99	0.95	-0.03

DENMARK	R2	Intercept	gdp_1	Dp_1	ep_1	r_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.67	-0.14	-0.12	0.68	-0.05	-0.25	0.11	0.05	0.06	0.34	0.00	1.47	-0.26	0.00	-0.71	0.00
dDp	0.52	0.09	0.10	-0.53	0.04	0.20	-0.09	-0.04	-0.04	-0.27	0.00	-0.10	0.14	0.01	0.08	0.01
dep	0.96	-0.11	-0.10	0.55	-0.04	-0.20	0.09	0.04	0.05	0.28	0.00	0.68	-0.09	1.24	-0.29	0.04
dr	0.45	0.07	0.07	-0.36	0.03	0.14	-0.06	-0.03	-0.03	-0.18	0.00	-0.47	0.28	-0.02	0.92	0.00

DOMINICA	R2	Intercept	gdp_1	Dp_1	r_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.39	-0.69	-0.21	0.70	1.61	0.06	-0.61	-0.11	0.01	0.00	0.17	0.56	-0.50	0.39	-0.05
dDp	0.79	0.83	0.25	-0.85	-1.97	-0.07	0.74	0.13	-0.02	0.00	0.62	0.93	0.09	-1.10	0.01
dr	0.15	0.09	0.03	-0.09	-0.20	-0.01	0.08	0.01	0.00	0.00	-0.03	-0.15	0.02	-0.03	0.00

DOMINICAN REPUBLIC	R2	Intercept	gdp_1	Dp_1	ep_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.23	-0.73	-0.04	-0.16	0.09	0.10	0.37	-0.04	0.09	0.01	0.97	-0.71	-0.01	-0.04	0.01
dDp	0.17	-1.88	-0.11	-0.39	0.23	0.26	0.92	-0.10	0.22	0.02	1.35	2.77	0.31	-1.31	0.07
dep	0.21	3.29	0.19	0.70	-0.41	-0.46	-1.62	0.18	-0.39	-0.04	-1.19	3.45	0.36	-3.15	-0.06

FINLAND	R2	Intercept	gdp_1	Dp_1	ep_1	r_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.87	-0.07	0.05	0.26	0.07	-0.96	-0.03	-0.33	-0.03	0.91	0.01	1.33	0.68	0.00	-0.41	0.01
dDp	0.56	0.01	-0.02	-0.10	-0.03	0.36	0.01	0.12	0.01	-0.34	0.00	0.27	0.24	0.02	-0.41	0.02
dep	0.89	0.08	-0.09	-0.51	-0.14	1.85	0.06	0.64	0.05	-1.75	-0.01	1.01	-0.72	1.12	-2.85	0.05
dr	0.59	-0.01	0.01	0.04	0.01	-0.15	-0.01	-0.05	0.00	0.14	0.00	0.17	-0.24	0.00	0.98	0.01

FRANCE	R2	Intercept	gdp_1	Dp_1	ep_1	r_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.80	0.00	-0.04	0.17	-0.02	-0.28	0.04	-0.03	0.02	0.16	0.00	0.77	0.07	0.00	0.35	-0.01
dDp	0.45	0.00	0.18	-0.82	0.09	1.31	-0.19	0.14	-0.10	-0.77	0.01	-0.20	0.32	0.05	0.27	0.02
dep	0.98	0.00	-0.12	0.54	-0.06	-0.87	0.12	-0.10	0.07	0.51	0.00	0.33	-0.20	1.18	0.32	0.01
dr	0.43	0.00	-0.04	0.20	-0.02	-0.32	0.05	-0.04	0.03	0.19	0.00	0.03	-0.02	0.01	0.24	0.00

GERMANY	R2	Intercept	gdp_1	Dp_1	ep_1	r_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.80	-1.06	0.04	-0.66	-0.19	-0.28	0.09	0.48	0.28	0.31	0.03	0.95	0.14	0.00	0.93	0.00
dDp	0.49	-0.33	0.01	-0.20	-0.06	-0.09	0.03	0.15	0.09	0.10	0.01	0.14	0.08	0.01	0.23	0.02
dep	0.97	-1.62	0.06	-0.99	-0.29	-0.43	0.13	0.72	0.42	0.47	0.04	1.14	0.51	1.37	-1.74	0.05
dr	0.65	-0.26	0.01	-0.16	-0.05	-0.07	0.02	0.12	0.07	0.08	0.01	0.10	0.11	-0.01	0.21	0.00

GREECE	R2	Intercept	gdp_1	Dp_1	ep_1	r_1	gdps_1	Dps_1	eps_1	rs_1	dgdps_0	dDps_0	deps_0	drs_0
dgdp	0.51	-1.98	0.09	-0.55	0.24	-0.82	0.20	0.19	-0.15	1.70	1.53	0.12	-0.03	-1.39
dDp	0.60	-1.88	0.09	-0.53	0.23	-0.79	0.19	0.18	-0.15	1.64	0.10	0.12	-0.01	0.27
dep	0.87	1.56	-0.07	0.45	-0.19	0.67	-0.17	-0.16	0.13	-1.39	1.23	-0.49	1.08	-1.02
dr	0.43	-0.12	0.01	-0.03	0.01	-0.05	0.01	0.01	-0.01	0.10	0.37	0.00	0.04	0.66

GRENADA	R2	Intercept	gdp_1	Dp_1	r_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.54	-5.61	-0.53	-1.32	-0.95	0.90	3.04	0.22	-0.02	-0.08	0.54	0.92	0.41	0.43	-0.01
dDp	0.51	-1.53	-0.14	-0.35	-0.25	0.24	0.81	0.06	0.00	-0.02	0.64	1.32	0.04	-0.39	-0.02
dr	0.23	-0.37	-0.03	-0.09	-0.06	0.06	0.20	0.01	0.00	-0.01	-0.05	-0.23	0.02	-0.14	0.00

GUYANA	R2	Intercept	gdp_1	Dp_1	ep_1	r_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.60	-0.69	-0.16	-0.37	-0.03	0.85	0.13	0.39	-0.11	0.08	0.00	0.62	-0.05	0.16	0.28	0.02
dDp	0.27	-0.71	-0.17	-0.40	-0.03	0.93	0.14	0.43	-0.12	0.09	0.00	-2.24	-0.04	-1.15	5.92	-0.01
dep	0.11	0.04	0.01	0.02	0.00	-0.04	-0.01	-0.02	0.01	0.00	0.00	-0.40	1.94	-0.15	1.06	-0.04
dr	0.52	0.39	0.09	0.20	0.02	-0.45	-0.07	-0.21	0.06	-0.04	0.00	-0.72	0.11	-0.01	1.21	0.01

HAITI	R2	Intercept	gdp_1	Dp_1	ep_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.40	1.54	0.09	0.24	-0.15	-0.19	-0.54	0.09	-0.18	0.01	-0.76	0.21	-0.26	0.93	-0.02
dDp	0.72	-4.62	-0.27	-0.73	0.47	0.60	1.66	-0.28	0.55	-0.02	0.87	1.93	0.34	-2.48	-0.04
dep	0.16	1.51	0.09	0.25	-0.16	-0.20	-0.57	0.10	-0.19	0.01	-0.11	-0.54	-0.13	-2.70	-0.04

HUNGARY	R2	Intercept	gdp_1	Dp_1	ep_1	r_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.76	1.50	-0.26	-0.51	-0.06	-0.07	-0.01	-0.07	-0.01	0.08	-0.02	0.87	0.14	-0.03	-0.97	0.01
dDp	0.33	0.22	-0.04	-0.07	-0.01	-0.01	0.00	-0.01	0.00	0.01	0.00	-0.23	0.07	-0.06	4.08	-0.04
dep	0.78	1.52	-0.26	-0.51	-0.06	-0.07	-0.01	-0.07	-0.01	0.08	-0.02	-0.49	-0.24	0.89	1.32	-0.07
dr	0.42	-0.45	0.08	0.16	0.02	0.02	0.00	0.02	0.00	-0.03	0.01	-0.68	0.19	-0.17	5.49	-0.06

INDIA

	R2	Intercept	gdp_1	Dp_1	ep_1	r_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.20	0.45	-0.02	-0.25	-0.01	-0.10	-0.03	-0.38	-0.08	0.32	-0.01	0.21	-0.59	-0.12	0.93	-0.01
dDp	0.58	1.69	-0.08	-1.07	-0.05	-0.41	-0.11	-1.61	-0.35	1.39	-0.02	0.26	-1.13	-0.22	-0.58	-0.02
dep	0.08	-0.99	0.04	0.63	0.03	0.24	0.07	0.94	0.21	-0.82	0.01	-0.65	0.74	0.22	0.21	-0.03
dr	0.15	-0.05	0.00	0.03	0.00	0.01	0.00	0.05	0.01	-0.04	0.00	-0.09	-0.40	-0.04	0.18	0.01

IRELAND

	R2	Intercept	gdp_1	Dp_1	ep_1	r_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0	dgdps_1	dDps_1	deps_1	drs_1	dpoil_1
dgdp	0.62	0.50	0.12	-0.91	0.54	-0.71	-0.16	0.90	-0.59	2.16	0.02	2.04	0.41	0.14	1.93	-0.09	-0.27	-0.46	-0.25	-0.92	-0.00923
dDp	0.77	0.19	0.05	-0.38	0.23	-0.30	-0.07	0.37	-0.25	0.90	0.01	0.35	0.65	-0.02	0.37	0.00	0.09	0.23	-0.08	-1.18	-0.00416
dep	0.94	-0.08	-0.02	0.15	-0.09	0.11	0.03	-0.14	0.10	-0.35	0.00	1.15	1.36	1.27	-0.10	-0.06	-1.10	0.91	-0.21	0.33	-0.0178
dr	0.58	0.25	0.06	-0.47	0.28	-0.36	-0.08	0.46	-0.30	1.11	0.01	-0.14	-0.17	-0.11	1.21	0.00	0.05	-0.94	-0.06	-0.52	0.019832

ITALY

	R2	Intercept	gdp_1	Dp_1	ep_1	r_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.96	0.70	-0.15	-0.09	0.01	-0.34	0.05	0.01	0.00	0.78	0.00	0.97	0.12	0.01	0.16	0.00
dDp	0.36	-0.34	0.07	0.04	-0.01	0.16	-0.02	-0.01	0.00	-0.37	0.00	0.12	-0.11	-0.01	0.85	0.01
dep	0.83	-1.20	0.25	0.15	-0.03	0.57	-0.09	-0.02	-0.01	-1.31	0.00	0.31	-0.46	1.17	1.64	-0.01
dr	0.47	-0.09	0.02	0.01	0.00	0.04	-0.01	0.00	0.00	-0.10	0.00	-0.02	-0.16	-0.01	1.65	0.00

JAMAICA

	R2	Intercept	gdp_1	Dp_1	ep_1	r_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.27	-0.34	-0.27	0.12	-0.08	0.17	0.13	0.12	0.11	-0.05	0.00	-0.01	0.40	-0.14	0.50	-0.01
dDp	0.45	1.66	1.33	-0.59	0.40	-0.83	-0.63	-0.60	-0.52	0.24	0.00	1.22	-2.76	-0.04	-4.64	0.12
dep	0.12	-0.14	-0.08	0.04	-0.02	0.05	0.04	0.04	0.03	-0.01	0.00	0.29	-1.89	0.67	-1.63	0.08
dr	0.31	0.63	0.50	-0.22	0.15	-0.31	-0.24	-0.23	-0.20	0.09	0.00	0.41	-1.05	0.21	-1.55	0.03

JAPAN

	R2	Intercept	gdp_1	Dp_1	ep_1	r_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.49	1.68	-0.30	0.79	-0.06	0.55	0.12	-0.34	0.09	0.22	-0.01	0.29	0.21	0.00	0.44	0.01
dDp	0.47	-0.63	0.11	-0.30	0.02	-0.21	-0.05	0.13	-0.03	-0.08	0.00	0.08	0.27	-0.01	0.04	0.01
dep	0.27	-3.30	0.61	-1.59	0.11	-1.11	-0.24	0.68	-0.18	-0.44	0.03	-1.24	-3.94	0.31	4.64	0.10
dr	0.46	-0.30	0.06	-0.14	0.01	-0.10	-0.02	0.06	-0.02	-0.04	0.00	-0.08	0.07	0.03	0.12	0.00

LUXEMBOURG

	R2	Intercept	gdp_1	Dp_1	ep_1	r_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.67	0.23	0.02	0.12	-0.02	0.10	-0.04	-0.01	0.02	-0.22	0.00	1.72	-0.93	0.01	1.25	-0.01
dDp	0.78	-2.04	-0.17	-1.07	0.19	-0.95	0.35	0.05	-0.19	1.99	0.02	0.54	0.46	0.03	-1.17	0.04
dep	0.96	0.37	0.03	0.19	-0.03	0.17	-0.06	-0.01	0.03	-0.35	0.00	-0.31	1.36	1.18	0.25	-0.03
dr	0.45	-0.11	-0.01	-0.06	0.01	-0.05	0.02	0.00	-0.01	0.11	0.00	-0.12	-0.25	0.00	1.04	0.00

MALTA

	R2	Intercept	gdp_1	Dp_1	ep_1	gdps_1	rs_1	dgdps_0	drs_0
dgdp	0.27	0.91	0.10	-0.58	-0.04	-0.14	0.32	0.23	0.59
dDp	0.44	0.97	0.11	-0.64	-0.04	-0.16	0.35	-0.06	0.63
dep	0.15	1.94	0.22	-1.28	-0.08	-0.32	0.71	-0.58	-1.84

MEXICO

	R2	Intercept	gdp_1	Dp_1	ep_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.71	-0.18	-0.25	-0.09	-0.05	0.21	1.33	-0.02	-0.21	-0.01	0.70	1.46	0.33	-0.63	0.01
dDp	0.67	1.34	1.67	-0.63	0.35	-1.44	-8.92	0.13	1.43	0.09	-3.74	-5.25	-0.90	2.65	0.09
dep	0.74	1.10	1.29	-0.49	0.27	-1.11	-6.90	0.10	1.10	0.07	-4.90	-5.40	-0.85	6.76	-0.10

NETHERLANDS

	R2	Intercept	gdp_1	Dp_1	ep_1	r_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.85	-0.34	0.07	-0.54	0.17	0.14	-0.02	0.26	-0.17	0.18	0.00	1.26	0.17	0.01	-0.41	0.00
dDp	0.63	-0.31	0.06	-0.51	0.16	0.13	-0.01	0.24	-0.16	0.16	0.00	0.10	0.39	0.03	0.00	0.00
dep	0.96	0.31	-0.07	0.55	-0.17	-0.14	0.02	-0.26	0.17	-0.18	0.00	0.68	0.38	1.29	-0.12	0.02
dr	0.10	-0.06	0.01	-0.08	0.03	0.02	0.00	0.04	-0.03	0.03	0.00	0.18	0.26	0.00	-0.76	0.00

POLAND

	R2	Intercept	gdp_1	Dp_1	ep_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.55	1.88	-0.03	-0.03	-0.05	-0.21	-0.10	-0.03	-1.08	-0.01	0.28	-0.13	0.00	-1.50	0.02
dDp	0.46	17.24	-0.27	-0.29	-0.43	-1.93	-0.89	-0.32	-9.84	-0.13	-9.33	-0.79	0.19	37.84	-0.22
dep	0.62	9.69	-0.15	-0.17	-0.24	-1.09	-0.50	-0.18	-5.57	-0.08	-5.56	2.78	0.08	7.72	-0.25

PORTUGAL

	R2	Intercept	gdp_1	Dp_1	ep_1	r_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.72	-0.14	0.08	0.17	0.21	-0.16	-0.03	0.42	-0.27	-0.14	-0.02	1.11	0.09	-0.03	0.44	-0.03
dDp	0.50	-0.05	0.03	0.07	0.08	-0.06	-0.01	0.16	-0.11	-0.06	-0.01	0.04	1.17	0.09	0.09	0.00
dep	0.98	0.25	-0.15	-0.31	-0.38	0.28	0.05	-0.77	0.49	0.26	0.04	0.05	-0.37	1.12	0.35	0.02
dr	0.34	-0.07	0.04	0.09	0.11	-0.08	-0.01	0.21	-0.14	-0.07	-0.01	-0.18	0.38	0.04	0.42	0.01

ROMANIA

	R2	Intercept	gdp_1	Dp_1	ep_1	r_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.16	-0.07	-0.01	0.00	0.01	0.01	0.02	-0.01	-0.01	0.00	1.03	0.21	-0.13	-1.83	0.03	
dDp	0.51	-3.94	-0.37	-0.21	0.81	0.73	1.27	-0.60	-1.88	0.17	-3.94	3.60	-0.05	4.03	-0.03	
dep	0.60	4.94	0.45	0.26	-0.99	-0.89	-1.56	0.73	2.30	-0.21	-1.36	0.78	0.56	-3.22	-0.07	

SINGAPORE

	R2	Intercept	gdp_1	Dp_1	ep_1	r_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.51	0.78	0.11	-0.13	0.02	-0.77	-0.16	0.31	-0.05	0.20	0.00	1.06	-0.87	-0.06	1.86	0.06
dDp	0.79	0.14	0.02	-0.02	0.00	-0.15	-0.03	0.06	-0.01	0.04	0.00	0.33	1.82	0.00	-0.55	0.01
dep	0.49	-1.76	-0.24	0.28	-0.05	1.74	0.37	-0.69	0.10	-0.45	0.00	0.06	0.31	0.39	-0.06	-0.09
dr	0.81	0.67	0.09	-0.11	0.02	-0.67	-0.14	0.26	-0.04	0.17	0.00	-0.08	0.62	0.02	0.29	-0.02

SPAIN

	R2	Intercept	gdp_1	Dp_1	ep_1	r_1	gdps_1	Dps_1	eps_1	rs_1	dgdps_0	dDps_0	deps_0	drs_0
dgdp	0.64	0.00	0.00	-0.06	-0.02	-0.03	0.00	-0.03	0.02	0.10	1.28	0.06	-0.03	-0.07
dDp	0.48	0.02	-0.02	-0.31	-0.08	-0.18	0.02	-0.15	0.10	0.49	-0.01	0.18	0.00	1.23
dep	0.92	0.02	-0.02	-0.32	-0.09	-0.18	0.02	-0.15	0.10	0.49	-0.02	-0.68	1.28	-0.11
dr	0.40	0.08	-0.06	-1.01	-0.27	-0.57	0.05	-0.49	0.33	1.57	-0.22	0.26	-0.07	1.48

ST. KITTS AND NEVIS

	R2	Intercept	gdp_1	Dp_1	r_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.39	0.99	0.08	-0.97	1.03	-0.14	-0.49	-0.06	1.65	0.03	-0.01	-0.10	0.13	1.47	0.01
dDp	0.51	0.69	0.06	-0.70	0.75	-0.10	-0.36	-0.05	1.20	0.02	-0.32	-0.15	-0.01	1.22	0.04
dr	0.14	0.03	0.00	-0.03	0.03	0.00	-0.02	0.00	0.06	0.00	0.05	0.07	0.03	-0.03	0.00

ST. LUCIA

	R2	Intercept	gdp_1	Dp_1	r_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.22	0.24	0.03	-0.49	0.44	-0.04	0.18	-0.03	0.35	0.01	0.20	-0.38	-0.44	1.43	-0.06
dDp	0.78	0.43	0.05	-0.95	0.85	-0.08	0.36	-0.06	0.69	0.01	-0.40	0.97	-0.23	0.95	-0.01
dr	0.08	-0.01	0.00	0.02	-0.02	0.00	-0.01	0.00	-0.01	0.00	0.07	-0.23	0.04	-0.26	0.01

ST. VINCENT AND THE GR

	R2	Intercept	gdp_1	Dp_1	r_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.38	-0.02	0.00	0.03	0.06	0.00	0.00	0.00	-0.03	0.00	0.95	-0.37	-0.33	0.57	-0.05
dDp	0.69	0.49	0.07	-0.80	-1.84	-0.06	0.08	0.04	0.93	0.02	-0.02	0.79	-0.05	-0.02	0.02
dr	0.34	0.07	0.01	-0.12	-0.27	-0.01	0.01	0.01	0.14	0.00	-0.02	0.12	0.05	-0.01	0.00
S															

SURINAME

	R2	Intercept	gdp_1	Dp_1	ep_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.35	-0.08	-0.23	-0.13	-0.01	0.05	-0.95	0.00	-0.82	0.04	0.34	-1.35	-0.32	0.47	0.06
dDp	0.20	-0.17	-0.95	-0.54	-0.03	0.21	-3.88	0.01	-3.36	0.15	-3.38	-1.89	0.73	4.28	0.10
dep	0.25	0.23	0.58	0.33	0.02	-0.13	2.36	0.00	2.04	-0.09	0.65	-8.10	0.04	20.42	0.18

SWEDEN

	R2	Intercept	gdp_1	Dp_1	ep_1	r_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.81	0.19	-0.13	0.48	0.00	-0.16	0.08	-0.03	0.00	-0.41	0.00	1.17	-0.14	0.02	0.51	0.00
dDp	0.56	-0.35	0.22	-0.83	-0.01	0.27	-0.14	0.05	0.00	0.70	0.00	0.12	-0.04	0.07	0.20	0.01
dep	0.82	-0.31	0.23	-0.85	-0.01	0.28	-0.15	0.05	0.00	0.72	0.00	-1.06	0.39	1.14	0.39	-0.05
dr	0.62	0.14	-0.09	0.34	0.00	-0.11	0.06	-0.02	0.00	-0.29	0.00	-0.03	-0.19	0.01	2.07	0.00

TRINIDAD AND TOBAGO

	R2	Intercept	gdp_1	Dp_1	ep_1	r_1	gdps_1	Dps_1	eps_1	rs_1	poil_1	dgdps_0	dDps_0	deps_0	drs_0	dpoil_0
dgdp	0.59	-1.24	-0.07	-1.06	0.24	-0.27	0.15	0.22	-0.05	-0.68	0.08	0.09	0.22	0.02	0.00	0.02
dDp	0.30	-0.45	-0.02	-0.37	0.08	-0.09	0.05	0.08	-0.02	-0.24	0.03	0.43	0.24	0.02	-0.46	0.00
dep	0.37	0.26	0.02	0.29	-0.07	0.07	-0.04	-0.06	0.01	0.18	-0.02	1.15	-0.63	-0.66	0.37	-0.15
dr	0.21	0.09	0.01	0.08	-0.02	0.02	-0.01	-0.02	0.00	0.05	-0.01	0.45	-0.13	0.00	-0.18	0.01

UNITED KINGDOM

	R2	Intercept	gdp_1	Dp_1	ep_1	r_1	poil_1	gdps_1	Dps_1	eps_1	rs_1	dgdps_0	dDps_0	deps_0	drs_0
dgdp	0.71	0.57	-0.06	0.30	-0.09	-0.26	0.01	-0.01	-0.20	0.08	-0.25	0.97	0.24	-0.03	-1.01
dDp	0.68	-0.62	0.07	-0.31	0.10	0.27	-0.01	0.01	0.21	-0.08	0.26	0.18	0.39	-0.02	-0.01
dep	0.66	0.76	-0.08	0.35	-0.11	-0.31	0.01	-0.02	-0.24	0.09	-0.29	-2.25	0.67	0.74	-0.81
dr	0.28	0.37	-0.04	0.19	-0.06	-0.17	0.00	-0.01	-0.13	0.05	-0.16	0.26	0.24	0.00	0.41
dpoil	0.36	-1.68	0.19	-0.87	0.26	0.75	-0.02	0.04	0.58	-0.23	0.73	0.68	6.44	-0.36	9.88

USA

	R2	Intercept	gdp_1	Dp_1	r_1	Dps_1	eps_1	dDps_0	deps_0	dDps_1	deps_1	dgdp_1	dDp_1	dr_1
dgdp	0.60	0.30	-0.03	-0.52	-0.09	-0.02	0.00	-0.15	-0.04	0.10	0.02	0.45	-0.56	0.35
dDp	0.77	0.28	-0.03	-0.53	-0.10	-0.02	0.00	-0.01	-0.12	-0.03	-0.02	0.15	-0.17	0.25
dr	0.30	0.20	-0.02	-0.39	-0.07	-0.01	0.00	0.03	0.09	0.09	-0.15	0.16	-0.30	0.31

Table A2. Unit root tests for domestic variables 1\

Domestic Variables	Statistic	Antigua And Barbuda	Austria	Bahamas	Barbados	Belgium	Belize	Bulgaria	Cameroon	Canada	China	Cyprus	Denmark	Dominica	Dominican Republic	Finland	France	Germany	Greece	Grenada	Guyana	Haiti	Hungary
gdp (with trend)	ADF	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0
gdp (with trend)	WS	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
gdp (no trend)	ADF	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
gdp (no trend)	WS	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
Dgdp	ADF	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Not reject H0	Reject H0	Reject H0	Not reject H0
Dgdp	WS	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0
DDgdp	ADF	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
DDgdp	WS	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
Dp (with trend)	ADF	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0
Dp (with trend)	WS	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
Dp (no trend)	ADF	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0
Dp (no trend)	WS	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0
DDp	ADF	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
DDp	WS	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
DDDp	ADF	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
DDDp	WS	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
ep (with trend)	ADF	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0
ep (with trend)	WS	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0
ep (no trend)	ADF	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
ep (no trend)	WS	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
Dep	ADF	Not reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
Dep	WS	Not reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
DDep	ADF	Not reject H0	Reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
DDep	WS	Not reject H0	Reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0
r (with trend)	ADF	Reject H0	Not reject H0	Reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0
r (with trend)	WS	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
r (no trend)	ADF	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
r (no trend)	WS	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
Dr	ADF	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Not reject H0	Reject H0
Dr	WS	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0
DDr	ADF	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0
DDr	WS	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0

1\ H0: Unit root; at the 5% Significance Level

Source: Author's calculations.

Domestic Variables	Statistic	India	Ireland	Italy	Jamaica	Japan	Luxembourg	Malta	Mexico	Netherlands	Poland	Portugal	Romania	Singapore	Spain	St. Kitts And Nevis	St. Lucia	St. Vincent And The Grenadines	Suriname	Sweden	Trinidad And Tobago	United Kingdom	USA
gdp (with trend)	ADF	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0
gdp (with trend)	WS	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
gdp (no trend)	ADF	Not reject H0	Not reject H0	Not reject H0	Reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0
gdp (no trend)	WS	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
Dgdp	ADF	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Not reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Not reject H0
Dgdp	WS	Reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0
DDgdp	ADF	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
DDgdp	WS	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
Dp (with trend)	ADF	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
Dp (with trend)	WS	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Reject H0	Not reject H0	Reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0
Dp (no trend)	ADF	Not reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0
Dp (no trend)	WS	Reject H0	Not reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Not reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0
DDp	ADF	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
DDp	WS	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Not reject H0
DDDp	ADF	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
DDDp	WS	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
ep (with trend)	ADF	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
ep (with trend)	WS	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
ep (no trend)	ADF	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
ep (no trend)	WS	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
Dep	ADF	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0
Dep	WS	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0
DDep	ADF	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0
DDep	WS	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0
r (with trend)	ADF	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0
r (with trend)	WS	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Reject H0
r (no trend)	ADF	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
r (no trend)	WS	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
Dr	ADF	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Not reject H0	Not reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0
Dr	WS	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0
DDr	ADF	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0
DDr	WS	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0

1\ H0: Unit root; at the 5% Significance Level

Source: Author's calculations.

Table A3. Unit root tests for foreign variables 1\

Foreign Variables	Statistic	Antigua And Barbuda	Austria	Bahamas	Barbados	Belgium	Belize	Bulgaria	Cameroon	Canada	China	Cyprus	Denmark	Dominica	Dominican Republic	Finland	France	Germany	Greece	Grenada	Guyana	Haiti	Hungary
gdps (with trend)	ADF	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
gdps (with trend)	WS	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
gdps (no trend)	ADF	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0
gdps (no trend)	WS	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
Dgdps	ADF	Not reject H0	Reject H0	Not reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
Dgdps	WS	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
DDgdps	ADF	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
DDgdps	WS	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
Dps (with trend)	ADF	Not reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Not reject H0
Dps (with trend)	WS	Reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
Dps (no trend)	ADF	Not reject H0	Reject H0	Reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
Dps (no trend)	WS	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
DDps	ADF	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
DDps	WS	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
DDDps	ADF	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
DDDps	WS	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
eps (with trend)	ADF	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
eps (with trend)	WS	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
eps (no trend)	ADF	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
eps (no trend)	WS	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
Deps	ADF	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
Deps	WS	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
DDeps	ADF	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
DDeps	WS	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
rs (with trend)	ADF	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Not reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
rs (with trend)	WS	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Not reject H0	Reject H0	Reject H0	Not reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
rs (no trend)	ADF	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
rs (no trend)	WS	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
Drs	ADF	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
Drs	WS	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
DDrs	ADF	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
DDrs	WS	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0

1\ H0: Unit root; at the 5% Significance Level

Source: Author's calculations.

Foreign Variables	Statistic	India	Ireland	Italy	Jamaica	Japan	Luxembourg	Malta	Mexico	Netherlands	Poland	Portugal	Romania	Singapore	Spain	St. Kitts And Nevis	St. Lucia	St. Vincent And The Grenadines	Suriname	Sweden	Trinidad And Tobago	United Kingdom	USA
gdps (with trend)	ADF	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
gdps (with trend)	WS	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
gdps (no trend)	ADF	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0
gdps (no trend)	WS	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
Dgdps	ADF	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
Dgdps	WS	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
DDgdps	ADF	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
DDgdps	WS	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
Dps (with trend)	ADF	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Not reject H0
Dps (with trend)	WS	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
Dps (no trend)	ADF	Not reject H0	Reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Reject H0	Reject H0	Not reject H0	Not reject H0	Reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
Dps (no trend)	WS	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
DDps	ADF	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
DDps	WS	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
DDDps	ADF	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
DDDps	WS	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
eps (with trend)	ADF	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
eps (with trend)	WS	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
eps (no trend)	ADF	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
eps (no trend)	WS	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
Deps	ADF	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
Deps	WS	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
DDeps	ADF	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
DDeps	WS	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
rs (with trend)	ADF	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Not reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
rs (with trend)	WS	Not reject H0	Not reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
rs (no trend)	ADF	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
rs (no trend)	WS	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0	Not reject H0
Drs	ADF	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
Drs	WS	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
DDrs	ADF	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0
DDrs	WS	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0	Reject H0

1\ H0: Unit root; at the 5% Significance Level

Source: Author's calculations.

Figure A3. GDP Size of the 44 countries included in the GVAR Model