

Before and After the Global Financial Crisis

Evaluating the Caribbean's Synchronization with Global Engines of Growth

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Abstract

In spite of the United States' recovery, most Caribbean nations are still struggling in the aftermath of the 2007–08 global financial crisis. This paper examines this slow growth recovery through the analysis of how the Caribbean's growth relates to that of key drivers of the global economy. The paper explores whether the region's links with some important global partners could be behind the sluggish post-crisis recovery. The paper analyzes the economic growth of Caribbean countries as a function of the growth in key global partners and of country-specific characteristics.

The findings attribute an important role to the European Union and the United States in the outcomes for the region, especially in services-oriented economies. The findings show that when these nations grow, or when they are in an expansionary cycle, the Caribbean's growth responds positively but less than proportionally. Consequently, the slow recovery in the Caribbean region is attributed to the persistent sluggishness in the European Union and the fact that the U.S. recovery is still nascent and not quite robust.

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**Before and After the Global Financial Crisis:
Evaluating the Caribbean's Synchronization with Global Engines of Growth¹**

by

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F1 Trade

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I. Introduction

The Caribbean region was hit hard by the 2007-08 global financial crisis. The downturn and recovery in the region exhibit two main features. First, many Caribbean nations contracted more than the epicenter of the global financial crisis, the United States. Second, unlike the United States, most Caribbean countries did not show signs of recovery in 2010. In contrast, they had zero growth in the first year of the recovery phase; they achieved only very modest growth in 2011; and started showing signs of recovery only in 2012. Even then, their recovery has been rather subdued.

In this paper we try to explain why Caribbean countries have not been benefiting from the recovery in the United States. One explanation could lie in the Caribbean's linkages with other global growth poles and the fact that there is still limited economic dynamism in some of these growth poles, especially the European Union. In our paper we follow two approaches to help us understand the Caribbean's growth performance. First, under a fixed effects panel data framework we model the growth of each individual Caribbean country as a function of the growth of the main global economies and of domestic country characteristics. Second, under the same type of econometric modeling we estimate the elasticity of the economic cycle in the Caribbean to changes in the cycle of global partners.

We separate economic activity series in two parts: the original (unfiltered) series and the cycle series. The objective of doing this is to achieve a view of short-term developments in the Caribbean by analyzing the cycle series. Since we do not have quarterly growth for most Caribbean countries, this approach is the closest approximation we suggest to capture short-term developments in the region. When evaluating the growth of the cycle we are basically trying to assess how shocks to a global partner that affect its own economic cycle transmit to the Caribbean. This is an important model for our paper as it helps us understand the short-term impact of the global financial crisis. However, it should be noted that analyzing annual cycle series does not provide as much information as if we had high frequency (quarterly) economic activity data.

In our previous work, Kouamé and Reyes (2012), we had limited the analysis to bilateral economic cycle relations without controlling for domestic characteristics. This work shared features with that of Sun and Samuel's 2009 research analyzing common trends and common cycles of the Caribbean and the US within a bilateral framework. As some of the results in Sun and Samuel (2009) our previous model predicted an over-amplification of the US cycle in some Caribbean nations.

In this paper we go beyond bilateral growth relations of the cycle and enrich the study by evaluating the Caribbean within a fixed effects panel regression model. We gain two things by doing this: (i) precision

in the estimation of how the Caribbean relates to key partners and to domestic factors, by pooling several time periods across the Caribbean nations; (ii) consistent estimation by capturing the heterogeneity among Caribbean nations using the fixed effects estimator.³

A final innovation of our analysis is that, similarly to Kandil (2009), we take into account the potential asymmetry of the Caribbean when experiencing a crisis period versus periods of expansion or stable growth. However, we incorporate asymmetries in a different way than in Kandil (2009). Rather than analyzing asymmetries in the growth response when the region faces a domestic shock, we explore what occurs when economic decelerations occur in the US or the EU. We do this by having interaction parameters that capture how different is the response of the Caribbean region when positive or negative shocks occur in the US or the EU.

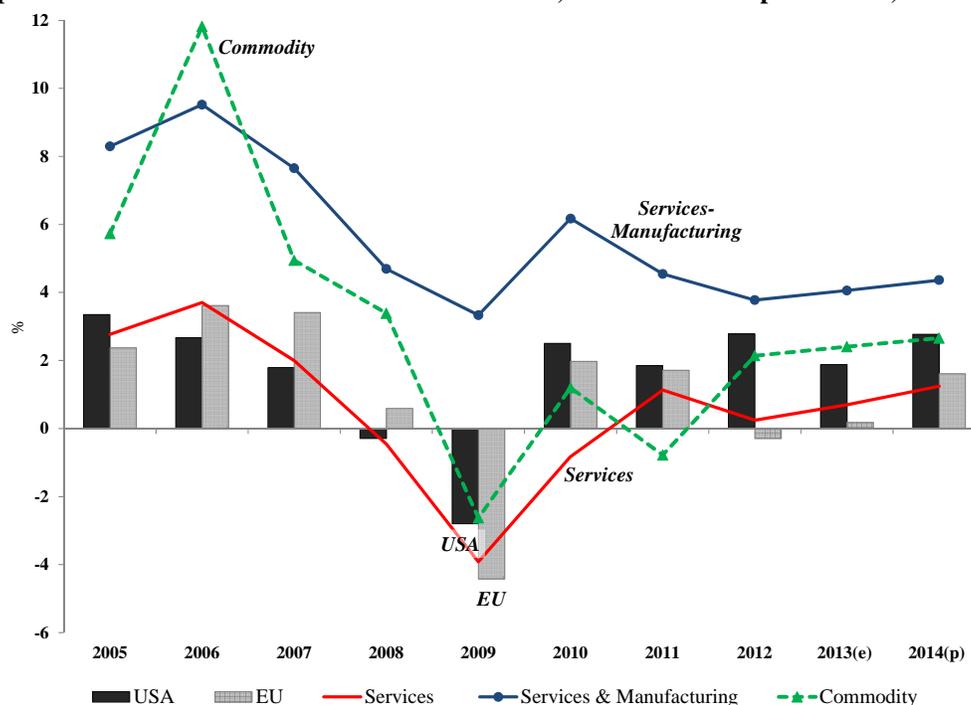
The paper is structured as follows. Section II presents recent developments on growth in the Caribbean. Section III presents a review of the relevant literature analyzing the impact of growth poles in the Caribbean. Section IV discusses the methodology and data used for analyzing the response of the Caribbean to the recent crisis. Section V presents the results of the analysis conducted in the paper. Finally, we present our conclusions in Section VI.

³ We are working under the assumption that Caribbean fixed effects are time invariant.

II. The Caribbean: Before, During and After the Global Financial Crisis

Our study considers 15 Caribbean countries classified under an export oriented approach which captures the similarities of export composition in the region.⁴ Under this classification, Caribbean nations fall into one of the following groups: Services Oriented; Services and Manufacturing Oriented; and Commodity Oriented Caribbean countries.⁵

Graph 1: Annual Economic Growth in the Caribbean, the US and European Union, 1990-2014(p)



Note: Averages are weighted by nominal GDP.

Source: Based on data from World Development Indicators and IMF WEO as of April 2014.

Graph 1 above shows the economic growth path of the three Caribbean groups, the United States and the European Union since 2005. The V-shaped growth path as a result of the global financial crisis is evident in all the economic groups. However, the Services & Manufacturing oriented Caribbean countries had a very moderate growth deceleration during the crisis. This was not the case of the Commodity and the Services oriented Caribbean, which are more dependent on global conditions through commodity exports and tourism, respectively.

⁴ The Caribbean definition followed in this paper includes the 15 nations that are part of the IBRD's portfolio.

⁵ The Services Oriented Caribbean is composed of: Antigua & Barbuda, the Bahamas, Barbados, Dominica, Grenada, Jamaica, St. Kitts & Nevis, St. Lucia and St. Vincent & the Grenadines. The Services-Manufacturing Oriented nations are composed of: Belize, Dominican Republic and Haiti. The Commodity Oriented countries are composed of: Guyana, Suriname and Trinidad & Tobago.

Table 1 provides more detailed information on the growth in the Caribbean and shows how the crisis deepened in the Services countries leading to an average growth of -2.2 percent per year during 2008-09 (in line with a -1.5 percent average annual decline in the US and a -1.9 percent average annual decline in the EU). The recovery period has been very modest in the Services oriented nations, with an average annual growth of only 0.3 percent during 2010-13. This contrasts with the dynamic Services-Manufacturing nations' growth of 4.6 over this period (15 times higher) or the modest but four times higher rate of 1.2 percent annual growth of the Commodity countries in response to a strong deceleration in Trinidad & Tobago.

Table 1: Annual Average Economic Growth Rate in the Caribbean

	1981-1990	1991-2000	2001-07	2008-09	2010-13(e)	2014 (p)
Caribbean	1.3	3.8	4.5	1.5	2.7	3.2
Services oriented	3.2	1.8	2.1	-2.2	0.3	1.2
Antigua and Barbuda	5.9	3.5	4.9	-4.6	-1.9	1.6
Bahamas, The	2.9	3.0	1.8	-3.2	1.6	2.3
Barbados	1.0	1.0	1.8	-1.9	0.1	-1.2
Dominica	4.4	2.1	2.7	3.3	0.3	1.7
Grenada	5.4	4.2	3.7	-2.8	0.0	1.1
Jamaica	3.2	0.9	1.7	-2.1	0.0	1.3
St. Kitts and Nevis	6.2	4.4	3.4	-0.2	-1.2	2.7
St. Lucia	8.2	2.7	2.3	2.3	-0.5	0.3
St. Vincent and the Grenadines	6.0	3.1	4.5	-1.2	0.4	2.3
Services & Manufacturing oriented	2.2	4.6	4.7	4.0	4.6	4.4
Belize	7.5	6.1	4.7	2.1	2.7	2.5
Dominican Republic	2.4	6.1	5.3	4.4	5.1	4.5
Haiti	-0.3	0.5	0.4	2.0	1.8	4.0
Commodity oriented	-2.1	4.1	7.7	0.4	1.2	2.7
Guyana	-3.2	5.0	2.1	2.6	4.9	4.3
Suriname	-1.3	0.7	5.4	3.6	4.7	4.0
Trinidad and Tobago	-2.3	4.6	8.4	-0.5	0.1	2.2
Memo:						
USA	3.4	3.5	2.4	-1.5	2.3	2.8
European Union	2.4	2.3	2.5	-1.9	0.9	1.6

Note: All averages are weighted by nominal gross domestic product.

Source: Based on data from WB WDI and IMF WEO as of April 2014.

In the case of nations like Guyana, Suriname and Trinidad & Tobago, falling international commodity prices as a result of the slower global demand, likely played an important role in the economic deceleration.⁶ The hardest hit country was Trinidad & Tobago, an economy that relies heavily on exports

⁶ For Suriname the most important exports of commodities are bauxite, oil, gold, rice and bananas. For Guyana rice, sugar, gold, timber and shrimp. For Trinidad & Tobago oil and gas.

of oil and natural gas. Graphs A.2 (a)-(b) show the evolution of the main commodities exported by Guyana, Suriname and Trinidad & Tobago. The real prices of crude oil, natural gas and aluminum fell considerably in 2009 and that of the last two minerals remained at lower levels than in 2008. Similarly, the prices of rice, bananas and sugar are at lower levels in 2013 than their 2008 position.

The Services oriented countries are strongly dependent on international conditions. More than 60 percent of their income from exports comes from tourism and travel services.⁷ Moreover, in nations like Antigua & Barbuda, Dominica, Grenada and St. Kitts & Nevis this ratio slightly surpasses 80 percent of exports. As traveling for tourism is a luxury good⁸ it is not surprising that it drops considerably during harsh global conditions. In addition, the Services oriented countries include the nations with the highest dependence on remittances. As many of the migrant workers are concentrated in developed nations that were affected by the global financial crisis, this is likely an important channel that helps explain the transmission of the global economic slowdown to the region.

The Services & Manufacturing oriented Caribbean nations are the ones that coped best with the global financial crisis. There are two potential explanations to this. The first one is the fact that two of the largest markets in the region, Haiti and the Dominican Republic, are among these countries. The existence of a larger domestic economy provides space for higher domestic demand and dependence of country idiosyncratic conditions which balance out the predominance of external factors as an engine for economic growth. The second explanation is the fact that both the Dominican Republic and Haiti have a more evenly distributed export composition between exports of services, manufactures and primary commodities. This diversification makes the two economies less vulnerable to shocks that affect strongly the tourism industry. Belize is an economy with a hybrid export structure but that is still a small market and does not have an evenly diversified structure of exports. Even though it also coped well during the global financial crisis, its slower performance when compared to the Dominican Republic and Haiti could be due to its still high concentration of exports in services.

After the global financial crisis the main two global partners of the Caribbean have had two very different recovery patterns. The United States has had a positive but moderate growth averaging only 2.3 percent per year during 2010-13 and is experiencing stronger growth in 2014-15. The European Union has experienced a sluggish performance, growing at a pace of 0.9 percent during the same period and providing no signs of stronger growth in 2014-15. At first glance the recovery in some Caribbean areas resembles more that of the European Union (Graph 1). This could signal that the lack of dynamism in the region is

⁷ From Stylized Facts chapter.

⁸ For the average household.

driven by a combination of poor performance in the European Union (and to a lesser extent the fact that the recovery in the United States may not yet have taken hold), rather than a structural break in the relation with the US.

In this paper we want to account for the relevance that key drivers of global growth have in the performance of the Caribbean. At the same time we want to assess the differential growth prospects that the post-crisis period has represented for the region. We do this by first pinning down which are the idiosyncratic factors that determine growth in the Caribbean and then including the role of the global partners' growth in the region. In particular we put emphasis on the two main partners of the Caribbean, the United States and the European Union. We also include the role of Canada and of two new important drivers of growth in Latin America and the world: Brazil and China.

These last two nations showed resilience during the global financial crisis, especially in the case of China which maintained an impressive growth performance. During 2010-13 Brazil kept an annual economic growth rate of 3.4 per year while China grew at 8.8 per year. Even though the Caribbean is weakly integrated with these two emerging growth poles, we include them in the model to capture the potential role of competition with these emerging growth poles. Alternatively, their inclusion could help explain the potential loss of growth in the Caribbean from not building stronger economic ties, direct or indirect, with emerging growth poles.

III. Previous Work

Our analysis relies on a previous work conducted in 2012 where we tried to understand the causes behind the strong shock during the global financial crisis and the slow recovery during 2008-10. In our previous work (Kouamé and Reyes, 2012) we evaluated how the cycle of key macroeconomic aggregates for the Caribbean nations related to that of the United States and other global engines of growth. We also contrasted the linkages of the Caribbean cycles and the cycles of key partners against other sub-regions of Latin America. Our findings pointed towards a strong linkage of the English Speaking Caribbean countries' cycles with those of the United States. And we found that, contrary to other sub-groups in Latin America, the Caribbean did not have strong linkages with new growth poles like China in terms of linkages of GDP growth cycles. This helped us understand that one of the channels of the deep contagion the Caribbean suffered was not only its strong linkage to the US, the epicenter of the crisis, but also its weak linkage to the cycle of other key world economies.

However, we did find some linkages of the Caribbean with other growth poles like China. In particular we found a positive relationship between the cycle of remittances and the cycles of Chinese and Brazilian GDP. Our previous analysis predicted that a one unit expansion in the US economic cycle will

generate a more than proportional expansion in the cycle of the English Speaking Caribbean countries. Nevertheless, this has not occurred as evidenced by the slow recovery in the Caribbean countries despite the recovery in the US. We have four possible explanations for this. First, since our model is based on the cycles of macroeconomic variables the lack of response the English Speaking Caribbean shows could be due to the United States growing but not expanding beyond its trend growth. This will occur if the US cycle is in fact expanding very moderately in spite of actual growth figures showing a positive path.⁹ Second, our previous results might have been very influenced by 2008 data showing an over-reaction to the growth in the US cycle. Third, the Caribbean might be experiencing a break in the relationship with the US after the global financial crisis. Fourth, the pattern that we are seeing now in the region might just be a manifestation of how the Caribbean seems to react positively to demand booms but over-react to demand downturns (see Kandil (2009)). We address these points by expanding our regression analysis to the year 2013, with this taking into account the post-crisis effects. We also take into account in the analysis the role that structural breaks play and the fact that time series variables might not be stationary in the presence of structural breaks.

In spite of the lack of quarterly time series data in the Caribbean several empirical researchers have looked at the business cycle in the region and its response to short-term shocks. A similar work to Kouamé and Reyes (2012) was developed by Sun and Samuel in 2009 analyzing the ECCU¹⁰ economies. They study the business cycles fluctuations following the common trends and common cycles approach. This framework assumes that fluctuations in the trend and cycle of a region can share a common path, respectively, as those of a partner economy. Their findings show that the ECCU cycle is affected by the US cycle with an elasticity of 0.92, while the ECCU trend is affected with an elasticity of 0.94. They also evaluate the effects of the cycle and trend of the US on those of other Caribbean economies. From this analysis they find that the elasticity of trend growth in Belize is 1.09 with respect to that of the US cycle growth. For Barbados they find a cycle to cycle elasticity of 1 *vis-à-vis* the US, while the country's trend to trend elasticity *vis-à-vis* the US is -1.35, indicating an opposite relation. They also find positive but inelastic results of the cycle of Jamaica to that of the US. And they find a negative elasticity to the US cycle for Trinidad & Tobago's cycle. Their main contribution is to identify a strong heterogeneity in the results, showing that some Caribbean nations follow a common trend and cycle path as that of the US (like

⁹ In the appendix we include our estimation of the US trend. Graph A.3 shows that the US is still in a contractionary cycle.

¹⁰ The ECCU refers to the Eastern Caribbean Currency Union, which comprises six Caribbean countries: Antigua & Barbuda, Dominica, Grenada, St. Kitts & Nevis, St. Lucia and St. Vincent & the Grenadines.

the ECCU economies) while others follow a different trend but are affected by the US cycles (like Guyana and Jamaica).

Sun and Samuel (2009) is the most similar work to the analysis we conduct in this paper. Our study differs in that we do not put emphasis in the common trend but analyze the influence of the cycle of the partner economy. Our different approach follows from the current global financial crisis and our interest in understanding growth dynamics off the trend path. Also, our study extends that of Sun and Samuel (2009) to include a larger group of Caribbean nations.

An interesting explanation for the slow recovery of the Caribbean during downturns is found in the work of Kandil (2009). She studies the effects on real output of domestic demand and oil price anticipated shocks in previous periods, as well as differentiating how real output reacts to positive or negative shocks. She finds asymmetric results in output growth when some Caribbean nations experience a positive rather than a negative shock. In particular, she finds that in the case of Antigua & Barbuda, Barbados, Belize, Dominica, Grenada, St. Lucia, Suriname and Trinidad & Tobago negative shocks have stronger effects on real output than positive shocks. With this she finds evidence of a kinked supply curve, which she explains as one in which positive demand shocks feed mostly into prices while negative ones mainly affect output (Kandil, 2009). The explanation for this outcome in some Caribbean nations is related to price rigidity during downturns, which makes the nations exacerbate real adjustments during these periods.

Similarly to Kandil (2009) we incorporated in the analysis the possibility of asymmetries in the shock transmission in the Caribbean. The difference of our approach from that of Kandil (2009) is that rather than capturing the effects of positive or negative domestic shocks we focus on international shocks. More specifically, we measure the asymmetric impact in Caribbean growth of positive versus negative growth dynamics in the United States and the European Union.

IV. The Model

The main interest of our study is to quantify the extent to which global economic developments influence growth in the Caribbean and to measure growth developments in the short-term to differentiate the impact of periods of distress like the global financial crisis of 2007-08. To this end, we develop a model of economic growth in the Caribbean as a function of that of global drivers¹¹ of growth and country characteristics. Ideally, the analysis requires high frequency business cycle data (quarterly or monthly). However, such data is not available in the region. To address this issue we evaluate the cycles of annual

¹¹ A global driver in this paper refers to a large and open economy that can affect global demand or supply.

economic activity using filtering techniques. Because these cycles are deviations from the annual trend they can serve as a proxy to account for short-term developments in the region.

Consequently, we construct two models to capture growth (long and short-term effects) and movements in economic cycles (short-term effects). Both of them are in panel data form and follow a fixed effects approach to account for heterogeneity among Caribbean nations. The first model analyzes the effects of the growth of key partners of the region on the growth of each Caribbean nation. The second model analyzes the effects of changes in the economic cycle of key partners on that of the cycle of Caribbean countries.

The key global partners included in the analysis are the United States, the European Union, Canada, China and Brazil. The term key partner is used arbitrarily in the paper to indicate a nation that has an important global incidence, as it can be a relevant driver of global demand or supply. Among these global drivers of growth, the United States, the European Union and Canada are important trade and financial partners of Caribbean nations. While China and Brazil are not necessarily important trading partners, their influence in the global economy or in the Latin American region could have indirect effects in the Caribbean.

We use a model in natural logarithm form to describe the economic cycle. Consequently, this model captures the elasticity or extent to which the economic cycle in Caribbean nations responds to changes in the economic cycle of partner economies controlling for domestic characteristics. Since the economic cycles have been built from the available period, 1980-2013, this model is conditioned on the particular fluctuations Caribbean nations have experienced during this time frame.

From now on we will refer to the two models in this paper as the growth and the log-log models. In the first one the growth rate of the original Gross Domestic Product is the dependent variable. In the second one the natural logarithm of the cycle of GDP is the dependent variable. The GDP of global partners will be in the same functional form as that of the dependent variable in each model. This is a simplified assumption that supposes GDP developments in global partners affect Caribbean GDP, while updates in the GDP cycle of these partners affects the cycle of the Caribbean (but not the trend).¹²

Specifically, we suggest a model of the following form to represent both the growth and the log-log models:

¹² While we could have assumed that the cycles and trends of partners can affect the cycle of countries in the Caribbean, the assumption makes the econometric modeling feasible.

$$Y_{it}^C = Y_t^{F,j} \beta^j + Z_{it-1}^{C,r} \Gamma^r + Z_t^{F,q} \Psi^q + \alpha_i + v_{it}, \quad v_{it} \sim N(0, \sigma^2) \quad (1)$$

Where:

Y_{it}^C represents the measure of economic activity in a Caribbean (C) economy i during time t . This measure of economic activity will be either the growth rate of GDP, for the growth model or the log of the cycle of Gross Domestic Product, for the log-log cycle model.

$Y_t^{F,j}$ refers to the measure of economic activity in a foreign economy j during time t . The measure will be homologous to that of the Caribbean.

$Z_{it-1}^{C,r}$, is a matrix of domestic controls for each Caribbean nation. The index r denotes the number of controls included in each version of the model. The domestic controls are lagged one period to avoid endogeneity.

$Z_t^{F,q}$, is a matrix of global controls. The index q denotes the number of global controls.

α_i , is the fixed effects parameter which captures country specific characteristics in each Caribbean country.

v_{it} , represents the errors in the model. The errors are assumed to follow a normal distribution with mean zero and constant variance.

In these two types of models there are a total of 15 Caribbean countries with data on economic growth ranging from 1981 to 2013.¹³ We test the relation of growth in the Caribbean with that of five global partners: the United States, the European Union, Canada, China and Brazil. The United States, Canada and the European Union have been selected for their close interaction in terms of export demand and supply of FDI and remittances to the Caribbean. Brazil has been selected to test the relation with emerging economies and potential competitors with the Caribbean within Latin America. And China is included in the model to capture any potential relation with this new giant in the world economy.

An ideal model specification would have the economic cycle or the growth series in the Caribbean explained by annual and country variations in the global partners, not only by annual changes. This could be captured via shares of bilateral trade in goods and services, remittances, foreign direct investment or migration between each nation and the global partners. The ‘ideal’ functional form could be something like:

¹³ In some cases the period of analysis covers only until 2012 due to the availability of data for some control variables. Data on growth exists prior to 1981, however due to the limitation of control variables we have decided to avoid including the pre-1980 period.

$$Y_{it}^C = \phi_{ij} Y_{it}^{F,j} \beta^j + Z_{it-1}^{C,r} \Gamma^r + Z_t^{F,q} \Psi^q + \alpha_i + v_{it} \quad (1')$$

Where model (1) above is modified by adding the index i to the global partner and a parameter ϕ_{ij} that accounts for the economic and financial magnitude of the relation between a Caribbean nation and its partner j . However, there is not available time series data for doing such an exercise. In the theoretical framework we present in equation (1) we are bound to measure the effects of global partners in annual frequency, but not in annual-country form. Therefore we cannot capture the effective linkages, how much the US demands from each nation or vice versa, between the global partners and the Caribbean countries. This limits our analysis and constrains it to a fixed effect type of approach in which each Caribbean country is modeled as being affected by the same annual development in a partner. An approach that captures the cross country interaction but under a cross-sectional approach rather than a panel was developed by Calderon et al. (2003). Such a model explains the trade partner linkages without accounting for the evolution over time which is our main goal.

In spite of our data limitations in this work we contribute to the literature by evaluating the region as a whole while at the same time considering its heterogeneity. This is a great effort as it addresses two main problems that have been affecting the way researchers and policy makers address the Caribbean. The first is that the nations are not part of most studies on Latin America and often get bundled up in policy recommendations as if they were similar to South American or Central American nations when they clearly have different structural conditions. The second is that when analyzed the Caribbean is typically seen as a whole. The Caribbean is instead a heterogeneous region both from the economic size and economic structure points of view.

In this paper we expect to find a strong influence of global partners in the economic cycle and growth of the Caribbean. Primarily, we expect that the United States, Canada and the European Union play an important role in explaining the growth of the region. Given the Caribbean's slow response after the global financial crisis, the main test is to evaluate if there is a new path that these countries are following after the crisis. The Caribbean region is not connected to China via strong trade or financial linkages, however, the increasing importance of this country in industries that might affect the Caribbean could be a relevant channel of transmission. A similar case could occur with developments of Brazil, which are also closely related to those of China. Consequently, we decided to test if there were any identifiable influences of growth developments in these two important and new growth poles of the world.

In our models we include domestic control variables to capture the importance of country characteristics.¹⁴ Among the control variables are the real exchange rate, the ratios of exports to GDP, foreign direct investment-to-GDP ratio and remittances-to-GDP ratio. Since the Caribbean is characterized by an over-appreciated real exchange rate we expect the lack of competitiveness that this generates to lead towards lower economic growth. On the contrary, as the region is more integrated with the global economy through higher exports of goods and services, as well as higher levels of FDI and remittances, we expect to see positive effects in terms of economic growth. In addition to the above domestic control variables, we include an estimation of natural disaster losses as a percentage of GDP. We expect that Caribbean countries will grow more after a natural disaster as they are facing a recovery episode. All domestic controls enter the model in lagged form to avoid endogeneity with contemporary growth.

We have also included an additional domestic control variable to capture the level of export concentration. This variable has been constructed as a Herfindhal index of concentration in products exported. Caribbean countries are very concentrated in both products and destination of their exports. This concentration can be a source of gains or losses depending on how it affects the generation of income in the region. A higher Herfindhal index represents a stronger concentration and we expect that during periods of high growth of global partners it will generate growth gains for Caribbean nations, while the opposite occurs in periods of low growth. The latter expectation is related to how the lack of product and market diversification of the Caribbean could hinder its capability to cope with crises that occur in the main partners of the region.

We include two international control variables. The first one is the real price of oil which captures the influence of higher production costs for the non-oil producer nations and the higher income in those that do produce it. Consequently, we expect to find a negative incidence of the price of oil in the real economic growth of services and manufacturing countries. The second international control variable is one mostly related to labor market developments in the United States, the unemployment rate in this country. Not only the unemployment rate of the United States grew considerably during the global financial crisis, but it did not fall fast in the early phases of the recovery of real production. We test if this slow pace of the unemployment rate reduction during the recovery could provide an explanation of the sluggish recovery in the Caribbean.

¹⁴ For more details about the variables please refer to the appendix.

We also try to contrast how the Caribbean reacts to the economic growth in the United States or the European Union when this growth is beyond the average in these countries. Our idea is that there might be some asymmetric responses in the Caribbean leading the region to over-react when its main partners face a downturn and to not react as much when they are experiencing an economic boom. This asymmetric test is based on the work developed by Kandil (2009), who proposes a model explaining how the Caribbean region is rigid during downturns and its lack of flexible local adjustments makes it go through deeper crisis when demand falls below a certain threshold. We define the asymmetric measure as the periods in which the United States, or the European Union, grows one standard deviation faster (or slower) than its average growth during 1981-2013.¹⁵

The data for this paper comes from the World Bank's World Development Indicators Database, from the International Monetary Fund's World Economic Outlook and Direction of Trade Statistics databases, and from the United Nations.

V. Empirical Results

The main findings of the growth and log-log models are the following: (i) the growth and cycle of the Caribbean are closely interconnected to those of the European Union and the US; (ii) the services oriented countries are the ones mostly affected by cycle changes in the EU and the US; (iii) there is evidence of a structural break after the crisis only in the cycle models; and (iv) the country characteristics that matter for growth and cycles are remittances and exports of goods and services. Tables 2 through 5 summarize the results of the econometric analysis. Below we present and discuss the findings.

V.A Growth of Economic Activity (GDP) in the Caribbean

There is a high correlation between the economic growth of the United States, Canada and the European Union that makes it impossible to extract the portion of growth in one of these nations that affects Caribbean nations and is not influenced by the growth in any of the other economies. We show in the appendix the correlation between the growth rates of these countries. Due to the high collinearity of the model we have conducted three alternative specifications for capturing the growth of economic activity in the Caribbean as a function of that of global partners. The first alternative includes all the global partners in spite of their high collinearity and is presented in the appendix but not discussed in the paper given the lack of significance in some of the parameters. The second alternative includes the United States, China

¹⁵ We also tested for periods in which growth was beyond the 1 and half standard deviation, and 2 standard deviations. Results did not change when running these alternative models.

and Brazil as their growth correlation is lower than the benchmarks required to avoid multicollinearity jeopardizing the significance of explanatory variables. The third alternative includes the European Union, China and Brazil, for similar reasons as the second alternative.

Tables 2 and 3 show that in all the alternative models there is no evidence of growth inertia in the Caribbean, as lagged growth is not statistically significant. Both the United States and the European Union have a positive influence on growth in the Caribbean. But this is not the case for China nor Brazil.

The real effective exchange rate does not have an influence on economic growth. We tested other alternatives for this indicator: changes in the real effective exchange rate, interactions with the crisis or with the different sub-region groups; likewise we tried an adjusted indicator relative to the real exchange rate of Mexico. This last indicator was intended to capture the influence that competition with Mexico could have in growth in the services oriented Caribbean countries, as Mexico has experienced real depreciations as opposed to these nations. None of the alternatives produced statistically significant results.

There was no evidence of foreign direct investment flows fostering economic growth. But we did find evidence indicating that exports of goods and services do influence economic growth positively. We found a similar result for remittances.

We did not find statistical evidence in favor of natural disaster damage having an influence on economic growth. The same result occurred with the price of oil. For this last indicator we tested also its interaction with country sub-groups but it was not statistically significant.

We tested the role of the unemployment rate of the United States as another alternative. It is included as an international factor intended to capture the incidence that higher unemployment in the US could have on Caribbean growth. The variable is entered in lagged form to avoid contemporary endogeneity with US growth. In almost all the variants of the models that we conducted the US unemployment rate has a significant negative effect in Caribbean growth.

For the specification of the model with all the global partners, none of the interaction terms resulted statistically significant. This contradicts our expectation of lower growth after the crisis and of higher growth of services countries when interacted with the US or the EU.

In summary, in this model, there is a clear influence of growth of the US and Europe in the Caribbean. This influence is positive and less than proportional. It can be seen that three main factors matter for growth in the Caribbean: remittances, exports and the unemployment rate of the US.

Table 2: Growth in the Caribbean, 1981-2013

Dependent Variable: Growth (L,t)

Only Effects of the United States

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Caribbean growth (i,t-1)	-0.005 [0.045]	-0.005 [0.045]	-0.027 [0.050]	-0.059 [0.050]	-0.064 [0.051]	-0.058 [0.050]	-0.091 [0.062]	-0.062 [0.050]	-0.064 [0.051]
USA growth (t)	0.393*** [0.132]	0.393*** [0.132]	0.280* [0.146]	0.364** [0.162]	-0.018 [0.383]	0.270 [0.182]	0.354* [0.193]	0.297* [0.169]	0.363** [0.162]
China growth (t)	-0.114 [0.116]	-0.114 [0.116]	-0.076 [0.123]	0.002 [0.124]	-0.002 [0.124]	0.071 [0.139]	-0.015 [0.158]	-0.108 [0.147]	0.005 [0.124]
Brazil growth (t)	0.089 [0.097]	0.089 [0.097]	0.111 [0.106]	0.086 [0.109]	0.085 [0.109]	0.063 [0.111]	0.061 [0.132]	0.109 [0.110]	0.085 [0.109]
REER (t-1)			-0.004 [0.003]	-0.003 [0.003]	-0.002 [0.003]	-0.003 [0.003]	0.021 [0.026]	-0.004 [0.003]	-0.003 [0.003]
FDI/GDP (t-1)			-0.030 [0.057]	-0.063 [0.060]	-0.051 [0.061]	-0.059 [0.060]	-0.020 [0.079]	-0.051 [0.061]	-0.073 [0.063]
XGS/GDP(t-1)			0.131*** [0.031]	0.126*** [0.031]	0.126*** [0.031]	0.125*** [0.031]	0.173*** [0.043]	0.125*** [0.031]	0.128*** [0.031]
Remittances/GDP (t-1)			0.183** [0.081]	0.151* [0.082]	0.141* [0.084]	0.148* [0.082]	0.088 [0.120]	0.161* [0.083]	0.152* [0.084]
Natural Disaster Damage/GDP (t-1)			0.005 [0.011]	0.005 [0.011]	0.005 [0.011]	0.005 [0.011]	0.003 [0.012]	0.004 [0.011]	0.003 [0.011]
Real Oil Price (t)				0.010 [0.014]	0.009 [0.014]	0.002 [0.015]	0.011 [0.017]	0.025 [0.018]	0.011 [0.014]
US Unemployment rate (t-1)				-0.566*** [0.188]	-0.568*** [0.188]	-0.683*** [0.215]	-0.425* [0.221]	-0.318 [0.259]	-0.553 [0.435]
Dummy Services*USA growth(t)					0.451 [0.415]				
Dummy Serv-Manuf*USAgrowth(t)					0.424 [0.473]				
Dummy Crisis*US growth(t)						0.446 [0.401]			
Herfindhal Index Export Product (t)							-3.866 [3.247]		
Dummy Crisis*US U rate (t-1)								-0.245 [0.177]	
Dummy Services*US U rate (t-1)									-0.163 [0.488]
Dummy Serv-Manuf*US U rate (t-1)									0.371 [0.550]
Constant	2.512** [1.055]	2.512** [1.055]	-3.310* [1.887]	-0.483 [2.131]	-0.499 [2.136]	0.125 [2.199]	-3.020 [4.204]	-1.169 [2.185]	-0.436 [2.204]
Observations	480	480	412	412	412	412	290	412	412
Number of countryid	15	15	14	14	14	14	14	14	14
R sq within	0.0219	0.0219	0.0796	0.102	0.105	0.105	0.0973	0.107	0.107

Standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Table 3: Growth in the Caribbean, 1981-2013, Dependent Variable: Growth (I,t), Only Effects of the European Union

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Caribbean growth (i,t-1)	-0.025 [0.045]	-0.025 [0.045]	-0.049 [0.050]	-0.066 [0.050]	-0.075 [0.050]	-0.067 [0.050]	-0.101* [0.061]	-0.067 [0.050]	-0.071 [0.050]
EU growth (t)	0.679*** [0.159]	0.679*** [0.159]	0.591*** [0.163]	0.530*** [0.178]	0.060 [0.419]	0.586** [0.262]	0.591*** [0.202]	0.466** [0.199]	0.527*** [0.178]
China growth (t)	-0.014 [0.113]	-0.014 [0.113]	-0.010 [0.121]	0.043 [0.124]	0.044 [0.123]	0.037 [0.126]	0.020 [0.157]	-0.023 [0.154]	0.046 [0.124]
Brazil growth (t)	0.006 [0.099]	0.006 [0.099]	0.022 [0.109]	0.021 [0.113]	0.020 [0.112]	0.025 [0.114]	-0.033 [0.137]	0.043 [0.117]	0.021 [0.113]
REER (t-1)			-0.004 [0.003]	-0.003 [0.003]	-0.003 [0.003]	-0.003 [0.003]	0.019 [0.025]	-0.004 [0.003]	-0.003 [0.003]
FDI/GDP (t-1)			-0.012 [0.056]	-0.046 [0.060]	-0.043 [0.060]	-0.046 [0.060]	0.014 [0.079]	-0.042 [0.061]	-0.055 [0.063]
XGS/GDP(t-1)			0.126*** [0.030]	0.124*** [0.031]	0.120*** [0.031]	0.124*** [0.031]	0.179*** [0.043]	0.124*** [0.031]	0.127*** [0.031]
Remittances/GDP (t-1)			0.173** [0.079]	0.146* [0.082]	0.115 [0.083]	0.145* [0.082]	0.096 [0.119]	0.152* [0.082]	0.149* [0.084]
Natural Disaster Damage/GDP (t-1)			0.005 [0.011]	0.005 [0.011]	0.005 [0.011]	0.005 [0.011]	0.003 [0.012]	0.005 [0.011]	0.004 [0.011]
Real Oil Price (t)				0.008 [0.013]	0.009 [0.013]	0.009 [0.014]	0.007 [0.015]	0.016 [0.017]	0.009 [0.013]
US Unemployment rate (t-1)				-0.373** [0.182]	-0.388** [0.181]	-0.345* [0.205]	-0.213 [0.219]	-0.255 [0.243]	-0.385 [0.429]
Dummy Services*Eugrowth(t)					0.710 [0.454]				
Dummy Serv-Manuf*Eugrowth(t)					0.061 [0.521]				
Dummy Crisis*EU growth (t)						-0.120 [0.416]			
Herfindhal Index Export Product (t)							-4.095 [3.216]		
Dummy Crisis*US U rate (t-1)								-0.137 [0.189]	
Dummy Services*US U rate (t-1)									-0.129 [0.486]
Dummy Serv-Manuf*US U rate (t-1)									0.390 [0.548]
Constant	1.573	1.573	-3.883**	-1.892	-1.494	-2.156	-4.630	-2.093	-1.869
Observations	480	480	412	412	412	412	290	412	412
Number of countryid	15	15	14	14	14	14	14	14	14
R sq within	0.0410	0.0410	0.101	0.111	0.121	0.111	0.115	0.112	0.115

Standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

V.B Economic Cycle – log log Model

As with the growth models there is a high correlation among the economic cycle of the main global partners. Consequently, we have also conducted three alternative models for capturing the economic cycle of the Caribbean. The alternatives are the same as with the growth models. The alternative including all the global partners is presented in the appendix.

Tables 4 and 5 show that in all the alternative models there is evidence of cycle inertia in the Caribbean, as the lagged cycle is statistically significant. This means that if a shock occurs in the Caribbean, positive or negative, it has persistence for at least one period.

As in the growth models, exports of goods and services have a positive and significant influence in the cycle. Both the cycle of the EU and the US are statistically significant indicating a positive and inelastic response of cycles in the Caribbean to those of these nations. The inelastic response is a very different result than that of our previous bilateral model where we found an elastic parameter for some of the Caribbean countries with respect to the US.

The interaction terms in the log-log models have the expected sign. The cycle of Services oriented Caribbean seems to be positively affected by that of the US and the EU in a magnitude higher than that of the rest of the region. The same happens when measuring the effects of unemployment in services oriented nations, as it seems to be evidence towards a lower growth in these countries when the United States unemployment rises.

The unemployment rate of the US also seems to have negatively affected the Caribbean cycle after the global financial crisis. This is one of the signs of a structural break that we find in the analysis. It indicates that since 2008 hikes in unemployment in the US have a higher and negative influence in the economic cycle of the region. Another sign of structural break is provided by the interaction between the crisis dummy and the US cycle. This result indicates that the influence of the US cycle is greater than in the pre-crisis period and the coefficient signals a higher elasticity, 0.6 versus 0.3-0.4 in the models with no interaction, after 2008. Under this result we can further understand how the fact that the US remains in a contractionary cycle has persistent detrimental effects in the economic cycle of the Caribbean countries.

We defined a dummy that interacts periods in which the United States, or the European Union, is in a contractionary (negative) cycle with the log of the cycle of the respective economy. This interaction term is denominated Dummy Negative Cycle*Log USA Cycle(t) or Dummy Negative Cycle*Log EU

Cycle(t), respectively. We expected that such an interaction term would help capture a different response in the region when a global partner is in a contractionary cycle. We did not find it to be statistically significant for either country. Similarly, we constructed an interaction term for periods in which the cycle in t-1 of a Caribbean country is in a contractionary phase (variable Dummy Negative Cycle*log GDP Cycle(t-1)). We did not find this indicator to be statistically significant. From our analysis it does not seem that a contractionary cycle in a partner economy nor in the local economy has any further negative repercussions in the region.

We explored the idea that the Caribbean cycle might respond differently to expansionary periods in global partners versus contractionary periods. For this we created interaction terms that defined an asymmetric response. The variables “Dummy 1STDHigh*log USA Cycle (t)” and “Dummy 1STDLow*log USA Cycle (t)” measure the periods in which the US cycle is expansionary (positive) and above its average of the period plus one standard deviation or contractionary (negative) and below its average minus one standard deviation, respectively. In such periods, however, we did not find a different response of growth in the Caribbean. A similar exercise was conducted for the European Union, but it did not show that Caribbean nations respond differently to amplification of the cycles in these economies towards the contractionary or expansionary phase.

Table 4: Cycles in the Caribbean, 1981-2013, Dependent Variable: GDP Cycle (i,t), Only Effects of the United States

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Log GDP Cycle (I, t-1)	0.694*** [0.031]	0.694*** [0.031]	0.708*** [0.034]	0.687*** [0.035]	0.673*** [0.035]	0.687*** [0.035]	0.688*** [0.035]	0.679*** [0.035]	0.653*** [0.042]	0.680*** [0.035]	0.675*** [0.035]	0.772*** [0.067]
Log USA Cycle (t)	0.420*** [0.075]	0.420*** [0.075]	0.363*** [0.077]	0.295*** [0.112]	-0.184 [0.226]	0.283 [0.242]	0.059 [0.196]	0.142 [0.127]	0.234* [0.133]	0.058 [0.137]	0.293*** [0.111]	0.326*** [0.113]
Log China Cycle (t)	-0.045 [0.081]	-0.045 [0.081]	-0.105 [0.087]	-0.088 [0.090]	-0.084 [0.089]	-0.089 [0.092]	-0.126 [0.095]	-0.123 [0.091]	-0.175 [0.113]	-0.137 [0.091]	-0.081 [0.090]	-0.100 [0.090]
Log Brazil Cycle (t)	0.106 [0.081]	0.106 [0.081]	0.162* [0.089]	0.148 [0.092]	0.142 [0.091]	0.147 [0.093]	0.205** [0.100]	0.206** [0.095]	0.215* [0.116]	0.283*** [0.102]	0.142 [0.092]	0.161* [0.093]
REER (t-1)			-0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]	0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]
FDI/GDP (t-1)			0.000 [0.000]	0.000 [0.001]	-0.000 [0.001]	0.000 [0.001]	0.000 [0.001]	0.000 [0.001]	0.000 [0.001]	0.000 [0.001]	-0.000 [0.001]	0.000 [0.001]
XGS/GDP(t-1)			0.001*** [0.000]	0.001*** [0.000]	0.001*** [0.000]	0.001*** [0.000]	0.001*** [0.000]	0.001*** [0.000]	0.001*** [0.000]	0.001*** [0.000]	0.001*** [0.000]	0.001*** [0.000]
Remittances/GDP (t-1)			-0.000 [0.001]	-0.000 [0.001]	-0.001 [0.001]	-0.000 [0.001]	-0.000 [0.001]	-0.000 [0.001]	-0.001 [0.001]	-0.000 [0.001]	-0.001 [0.001]	-0.000 [0.001]
Natural Disaster Damage/GDP (t-1)			0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]
Real Oil Price (t)				0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000** [0.000]	0.000 [0.000]	0.000 [0.000]
US Unemployment rate (t-1)				-0.002 [0.002]	-0.003 [0.002]	-0.002 [0.002]	-0.002 [0.002]	-0.001 [0.002]	-0.002 [0.003]	-0.002 [0.002]	0.004 [0.004]	-0.002 [0.002]
Dummy Services*Log USA Cycle (t)					0.653*** [0.231]							
Dummy Serv-Manuf*Log USA Cycle (t)					0.212 [0.264]							
Dummy Negative Cycle*Log USA Cycle(t)						0.023 [0.413]						
Dummy 1STDHigh*log USA Cycle (t)							0.331 [0.233]					
Dummy 1STDLow*log USA Cycle (t)							0.287 [0.295]					
Dummy Crisis*log USA Cycle (t)								0.610** [0.245]				
Herfindhal Index Export Product (t)									0.031 [0.028]			
Dummy Crisis*US U rate (t-1)										- 0.005*** [0.002]		
Dummy Services*US U rate (t-1)											-0.009** [0.004]	
Dummy Serv-Manuf*US U rate (t-1)											-0.003 [0.005]	
Dummy Negative Cycle*log GDP Cycle(t-1)												-0.174 [0.117]
Constant	-0.001 [0.002]	-0.001 [0.002]	-0.035*** [0.013]	-0.024 [0.020]	-0.015 [0.020]	-0.024 [0.020]	-0.023 [0.020]	-0.030 [0.019]	-0.087** [0.036]	-0.033* [0.020]	-0.015 [0.020]	-0.031 [0.020]
Observations	495	495	420	412	412	412	412	412	290	412	412	412
Number of countryid	15	15	14	14	14	14	14	14	14	14	14	14
R sq within	0.542	0.542	0.565	0.558	0.570	0.558	0.560	0.565	0.585	0.568	0.565	0.560

Standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Table 5: Cycles in the Caribbean, 1981-2013, Dependent Variable: GDP Cycle (i,t), only Effects of the EU

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Log GDP Cycle (i, t-1)	0.671*** [0.032]	0.671*** [0.032]	0.676*** [0.035]	0.660*** [0.035]	0.638*** [0.035]	0.660*** [0.035]	0.661*** [0.035]	0.660*** [0.035]	0.639*** [0.041]	0.670*** [0.035]	0.648*** [0.035]	0.726*** [0.065]
Log EU Cycle (t)	0.507*** [0.094]	0.507*** [0.094]	0.487*** [0.094]	0.479*** [0.139]	-0.096 [0.265]	0.438 [0.314]	0.294 [0.288]	0.502** [0.195]	0.511** [0.205]	0.206 [0.184]	0.485*** [0.138]	0.489*** [0.139]
Log China Cycle (t)	0.033 [0.083]	0.033 [0.083]	-0.043 [0.087]	-0.042 [0.090]	-0.022 [0.089]	-0.041 [0.090]	-0.144 [0.134]	-0.034 [0.100]	-0.114 [0.116]	-0.109 [0.094]	-0.034 [0.090]	-0.050 [0.090]
Log Brazil Cycle (t)	0.065 [0.082]	0.065 [0.082]	0.117 [0.089]	0.117 [0.092]	0.096 [0.091]	0.118 [0.092]	0.162 [0.101]	0.113 [0.096]	0.173 [0.117]	0.246** [0.108]	0.112 [0.091]	0.127 [0.092]
REER (t-1)			-0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]	0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]
FDI/GDP (t-1)			0.000 [0.000]	0.000 [0.001]	-0.000 [0.001]	0.000 [0.001]	0.000 [0.001]	0.000 [0.001]	0.000 [0.001]	0.000 [0.001]	-0.000 [0.001]	0.000 [0.001]
XGS/GDP(t-1)			0.001*** [0.000]									
Remittances/GDP (t-1)			-0.000 [0.001]	-0.000 [0.001]	-0.000 [0.001]	-0.000 [0.001]	-0.000 [0.001]	-0.000 [0.001]	-0.001 [0.001]	-0.000 [0.001]	-0.001 [0.001]	-0.000 [0.001]
Natural Disaster Damage/GDP (t-1)			0.000 [0.000]									
Real Oil Price (t)				-0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]	0.000* [0.000]	0.000 [0.000]	-0.000 [0.000]
US Unemployment rate (t-1)				-0.000 [0.002]	-0.001 [0.002]	-0.001 [0.002]	0.000 [0.002]	-0.000 [0.002]	0.001 [0.003]	-0.001 [0.002]	0.006 [0.004]	-0.000 [0.002]
Dummy Services*Log EU Cycle (t)					0.825*** [0.274]							
Dummy Serv-Manuf*Log EU Cycle (t)					0.227 [0.309]							
Dummy Negative Cycle*log EU Cycle (t)						0.077 [0.531]						
Dummy 1STDHigh*log EU Cycle (t)							0.547 [0.383]					
Dummy 1STDLow*log EU Cycle (t)							-0.042 [0.309]					
Dummy Crisis*log EU Cycle (t)								-0.042 [0.243]				
Herfindhal Index Export Product (t)									0.031 [0.028]			
Dummy Crisis*US U rate (t-1)										-0.004** [0.002]		
Dummy Services*US U rate (t-1)											-0.009** [0.004]	
Dummy Serv-Manuf*US U rate (t-1)											-0.003 [0.005]	
Dummy Negative Cycle*log GDP Cycle(t-1)												-0.138 [0.114]
Constant	-0.001	-0.001	-0.034***	-0.031	-0.023	-0.030	-0.026	-0.031	-0.103***	-0.036*	-0.021	-0.034*
Observations	495	495	420	412	412	412	412	412	290	412	412	412
Number of countryid	15	15	14	14	14	14	14	14	14	14	14	14
R sq within	0.540	0.540	0.570	0.563	0.578	0.563	0.567	0.563	0.590	0.569	0.571	0.565

Standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

VI. Conclusions

What then explains the sluggish recovery of some of the Caribbean countries despite signs of recovery in the US and other advanced economies? Our analysis suggests that the response lies in two main aspects. The first one is that the region is extremely linked to the US and now responds more strongly to it, so the crisis has left it more vulnerable to changes in the US. The second is that both the US and the EU are not growing above potential to provide enough boost for the Caribbean cycle.

As part of this analysis we also tested for the existence of a structural break that could explain if the Caribbean is now following a new path after the global financial crisis. We found evidence of a break that indicates shocks in the US are now felt more strongly in the Caribbean than before 2008. This could help explain why the region seems to not have bounced back after the global financial crisis. An example of this structural break is the Caribbean response to unemployment increases in the US which is stronger after 2008. It seems that labor market dynamics of the US have a significant effect in the region and we assume that an important channel for this is through remittances.

Furthermore, our econometric results indicate that the Caribbean region's response to shocks in the US, or the EU, is less than proportional (inelastic) and does not over-amplify shocks in global partners as our previous research had indicated. Our econometric extension, from a simple bilateral model to a multi-country one under the panel data, has provided more information to understand the effects of several partners and country specific characteristics in growth developments. In addition, the inclusion of recent data has helped evaluate with more precision the post-global financial crisis recovery phase. While shocks in the US and EU do not seem to be over-amplified in the Caribbean, under our recent results, they continue to have a strong correlation with those of the region.

Our study also finds that economic cycles in the region tend to have a strong persistence. This means that Caribbean countries tend to perpetuate positive or negative shocks for several periods, a factor that explains why global conditions tend to linger in the region.

In summary, this paper provides the following key lessons: (i) The Caribbean growth is affected by shocks in the US and the EU less than proportionally; (ii) the Caribbean business cycle is more sensitive to fluctuations in global partners than the economic trend; (iii) the US labor market has a role in impacting Caribbean growth (possibly through remittances); and, (iv) the region seems to be more vulnerable to the US labor market slowdown after the recent global financial crisis.

To enrich the analysis we tried to control for domestic conditions to capture the influence that the region's constraints could have during the crisis and recovery phase. We intended to capture the countries'

rigidity in terms of monetary policy and its fiscal and financial constraints, as these factors might be determinant for perpetuating slow recovery processes. However, this is an area where our research is limited by the data availability. We have therefore not been able to fully incorporate important domestic aspects that characterize the growth in the region.

Moving forward the region has the challenging task of diversifying its global relations. This way when the growth of a leading economy is in jeopardy the demand for Caribbean goods and services will not slow down as strongly. Beyond this, the region needs to strengthen its domestic policies (fiscal, monetary and institutional) so that it can absorb shocks in a timely manner and bounce back rapidly, without the strong real effects that they experience when in a downturn. Lastly, the Caribbean countries should continue improving their data collection and monitoring, which will allow for better policy diagnosis.

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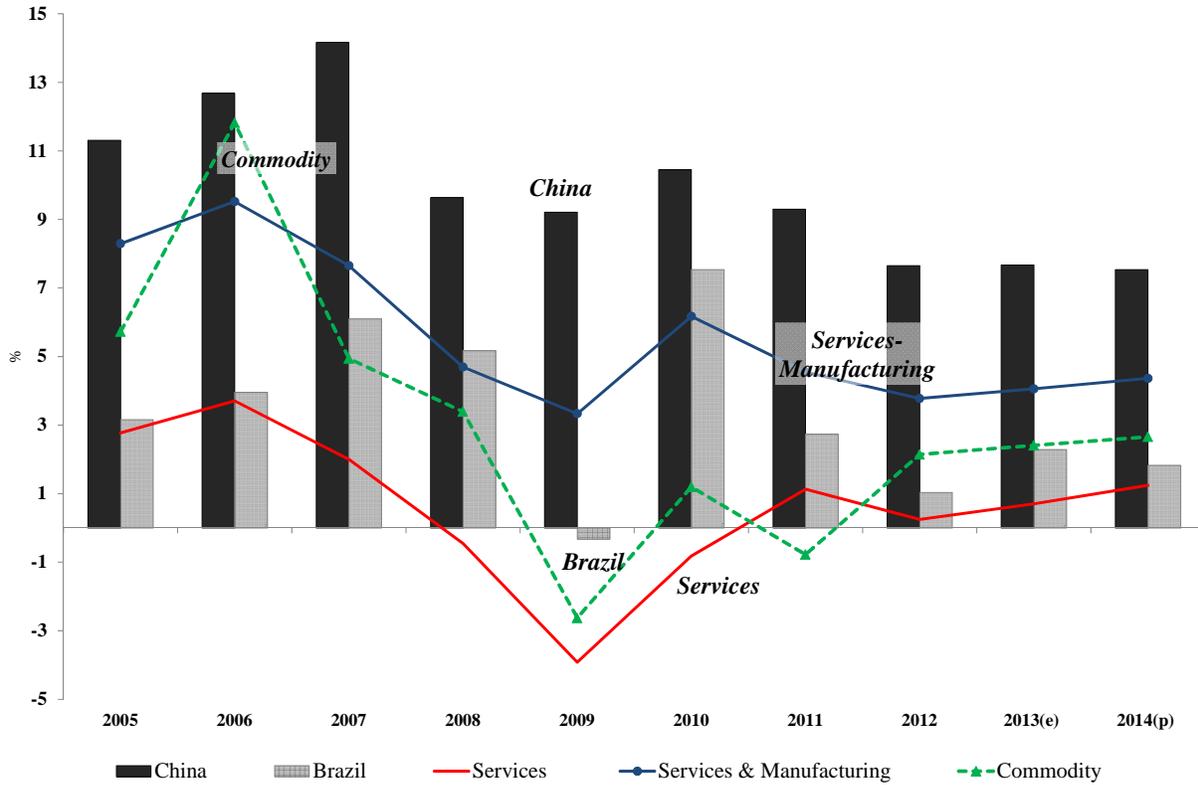
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Appendix: Tables & Graphs

Table A.1: The Caribbean countries – Export Oriented Classification

Services Oriented	Services and manufacturing Oriented	Commodity Oriented
Antigua & Barbuda The Bahamas Barbados Dominica Grenada Jamaica St. Kitts & Nevis St. Lucia St. Vincent & the Grenadines	Belize Dominican Republic Haiti	Guyana Suriname Trinidad & Tobago

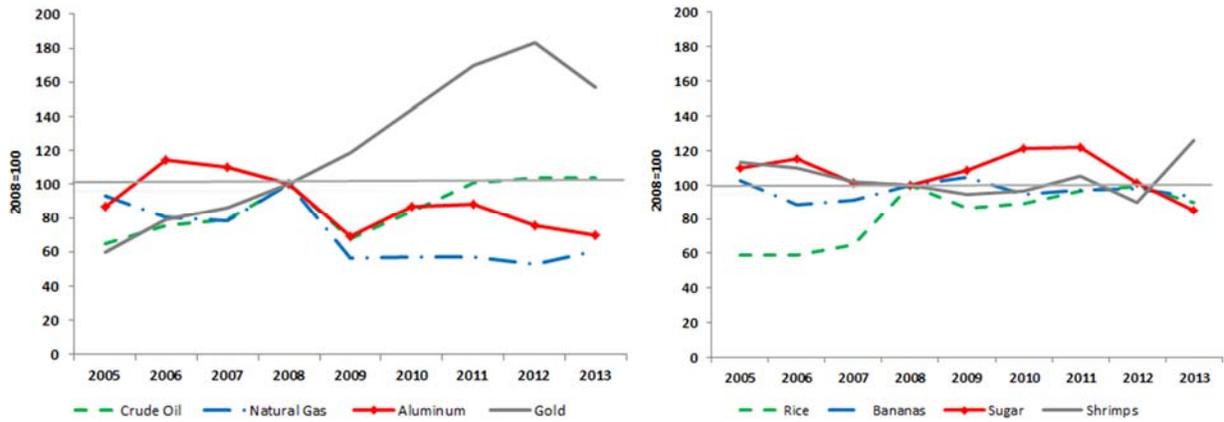
Graph A.1: Annual Economic Growth in the Caribbean, the US and European Union, 1990-2014(p)



Note: Averages are weighted by nominal GDP.

Source: Based on data from World Development Indicators and IMF WEO as of April 2014.

Graphs A.2(a)-(b): Commodity Price Indices, 2005-2013 (2008=100)
Fuels and Minerals **Food Commodities**



Note: Indices have been constructed from real prices.
 Source: Based on the World Bank's commodity price data (Pink Sheet).

Graph A.3: Natural Logarithm of US GDP and Trend GDP, 1980-2013

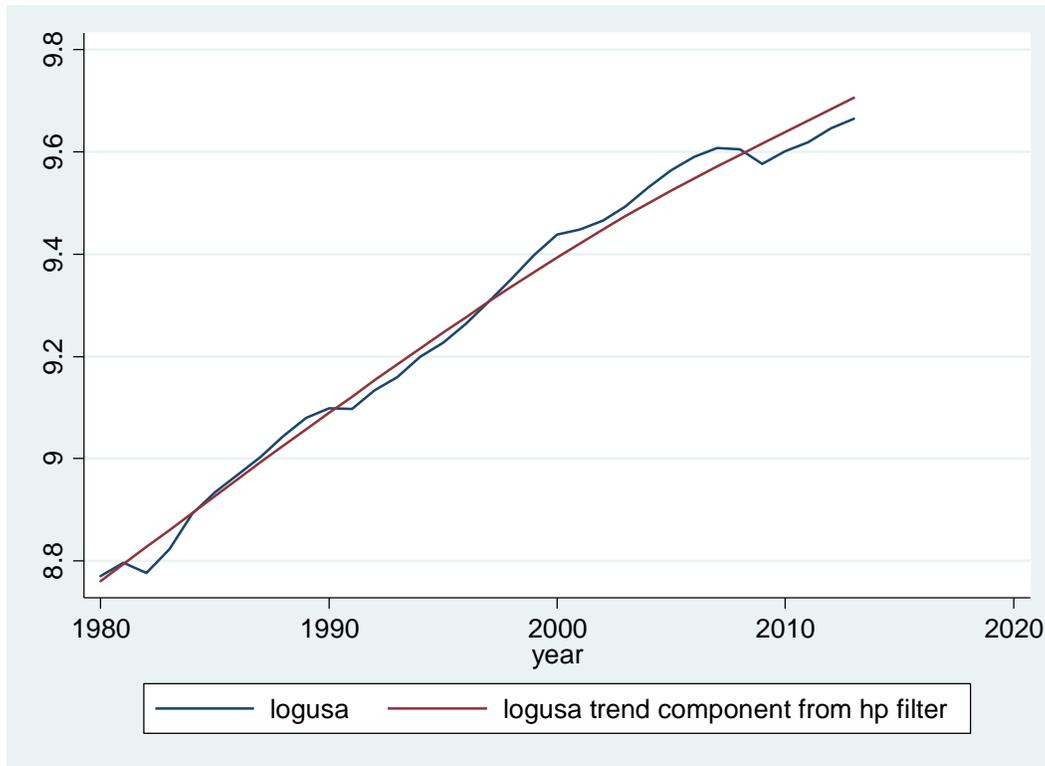


Table A.2: Correlation Growth rates of Gross Domestic Product, 1981-2013

	Caribbean (t)	Caribbean (t-1)	USA (t)	EU (t)	Canada (t)	China (t)	Brazil (t)
Caribbean (t)	1.0000						
Caribbean (t-1)	0.0538	1.0000					
USA (t)	0.1343	0.0096	1.0000				
EU (t)	0.1949	0.0987	0.6548	1.0000			
Canada (t)	0.1288	0.0112	0.8662	0.6520	1.0000		
China (t)	0.0048	-0.0312	0.2494	0.0452	0.2480	1.0000	
Brazil (t)	0.0504	-0.0519	0.1883	0.2472	0.3453	0.4293	1.0000

Table A.3: Correlation Log of Gross Domestic Product Cycle, 1981-2013

	Caribbean (t)	Caribbean (t-1)	USA (t)	EU (t)	Canada (t)	China (t)	Brazil (t)
Caribbean (t)	1.0000						
Caribbean (t-1)	0.7140	1.0000					
USA (t)	0.2392	0.0926	1.0000				
EU (t)	0.3303	0.2348	0.7821	1.0000			
Canada (t)	0.2309	0.1182	0.8768	0.7519	1.0000		
China (t)	-0.0558	-0.0916	-0.0224	-0.1811	-0.0788	1.0000	
Brazil (t)	-0.0042	-0.0591	-0.0095	-0.0451	0.1678	0.6491	1.0000

Table A.4: Growth in the Caribbean, 1981-2013, Dependent Variable: Growth (i,t) – ALL GLOBAL PARTNERS

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Caribbean growth (i,t-1)	-0.024 [0.045]	-0.024 [0.045]	-0.051 [0.050]	-0.067 [0.050]	-0.072 [0.051]	-0.075 [0.050]	-0.066 [0.050]	-0.067 [0.050]	-0.107* [0.061]	-0.067 [0.050]	-0.071 [0.050]	-0.076 [0.051]
USA growth (t)	0.078 [0.277]	0.078 [0.277]	-0.013 [0.295]	0.340 [0.342]	-0.076 [0.485]	0.355 [0.341]	0.332 [0.343]	0.335 [0.343]	0.437 [0.410]	0.303 [0.363]	0.341 [0.342]	0.342 [0.342]
EU growth (t)	0.656*** [0.217]	0.656*** [0.217]	0.704*** [0.222]	0.499** [0.244]	0.511** [0.245]	0.021 [0.451]	0.458* [0.265]	0.576* [0.335]	0.711** [0.291]	0.464* [0.269]	0.493** [0.244]	0.502** [0.244]
Canada growth (t)	-0.050 [0.257]	-0.050 [0.257]	-0.134 [0.267]	-0.289 [0.278]	-0.300 [0.278]	-0.305 [0.277]	-0.291 [0.278]	-0.298 [0.279]	-0.580* [0.327]	-0.247 [0.309]	-0.287 [0.278]	-0.286 [0.278]
China growth (t)	-0.023 [0.119]	-0.023 [0.119]	0.006 [0.125]	0.036 [0.125]	0.033 [0.125]	0.037 [0.125]	0.060 [0.139]	0.029 [0.127]	0.017 [0.158]	0.005 [0.161]	0.038 [0.125]	0.031 [0.125]
Brazil growth (t)	0.015 [0.106]	0.015 [0.106]	0.033 [0.114]	0.055 [0.117]	0.054 [0.117]	0.056 [0.117]	0.052 [0.118]	0.060 [0.118]	0.021 [0.141]	0.061 [0.119]	0.054 [0.117]	0.056 [0.117]
REER (t-1)			-0.004 [0.003]	-0.003 [0.003]	-0.002 [0.003]	-0.003 [0.003]	-0.003 [0.003]	-0.003 [0.003]	0.024 [0.026]	-0.003 [0.003]	-0.003 [0.003]	-0.004 [0.003]
FDI/GDP (t-1)			-0.014 [0.057]	-0.047 [0.061]	-0.034 [0.062]	-0.045 [0.060]	-0.047 [0.061]	-0.047 [0.061]	0.025 [0.079]	-0.045 [0.061]	-0.057 [0.063]	-0.039 [0.061]
XGS/GDP(t-1)			0.124*** [0.030]	0.123*** [0.031]	0.123*** [0.031]	0.119*** [0.031]	0.123*** [0.031]	0.123*** [0.031]	0.181*** [0.043]	0.123*** [0.031]	0.125*** [0.031]	0.120*** [0.031]
Remittances/GDP (t-1)			0.170** [0.080]	0.147* [0.082]	0.135 [0.083]	0.114 [0.083]	0.146* [0.082]	0.146* [0.082]	0.103 [0.119]	0.149* [0.083]	0.149* [0.084]	0.104 [0.088]
Natural Disaster Damage/GDP (t-1)			0.005 [0.011]	0.004 [0.011]	0.004 [0.011]	0.004 [0.011]	0.004 [0.011]	0.004 [0.011]	0.002 [0.012]	0.004 [0.011]	0.003 [0.011]	0.004 [0.011]
Real Oil Price (t)				0.012 [0.014]	0.012 [0.014]	0.013 [0.014]	0.010 [0.016]	0.014 [0.015]	0.008 [0.017]	0.016 [0.018]	0.013 [0.014]	0.014 [0.025]
US Unemployment rate (t-1)				-0.460** [0.212]	-0.460** [0.212]	-0.479** [0.212]	-0.520** [0.261]	-0.423* [0.239]	-0.277 [0.252]	-0.397 [0.295]	-0.473 [0.443]	-0.478** [0.213]
Dummy Services*USA growth(t)					0.499 [0.414]							
Dummy Serv-Manuf*USAgrowth(t)					0.454 [0.472]							
Dummy Services*Eugrowth(t)						0.722 [0.454]						
Dummy Serv-Manuf*Eugrowth(t)						0.066 [0.522]						
Dummy Crisis*US growth(t)							0.172 [0.435]					
Dummy Crisis*EU growth (t)								-0.144 [0.426]				
Herfindhal Index Export Product (t)									-4.549 [3.221]			
Dummy Crisis*US U rate (t-1)										-0.065 [0.210]		
Dummy Services*US U rate (t-1)											-0.129 [0.486]	
Dummy Serv-Manuf*US U rate (t-1)											0.389 [0.548]	
Dummy Commodity*Price Oil (t)												0.042 [0.035]
Dummy Services*Price Oil(t)												-0.009
Constant	1.586 [1.091]	1.586 [1.091]	-3.838** [1.875]	-1.638 [2.234]	-1.676 [2.238]	-1.225 [2.236]	-1.290 [2.404]	-1.966 [2.437]	-4.788 [4.219]	-1.757 [2.269]	-1.613 [2.309]	-1.171 [2.264]
Observations	480	480	412	412	412	412	412	412	290	412	412	412
Number of countryid	15	15	14	14	14	14	14	14	14	14	14	14
R sq within	0.0412	0.0412	0.103	0.114	0.117	0.124	0.114	0.114	0.126	0.114	0.118	0.120

Standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Table A.5 (Part I): Cycles in the Caribbean, 1981-2013
Dependent Variable: Log GDP Cycle (i,t) – ALL GLOBAL PARTNERS

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log GDP Cycle (i, t-1)	0.684*** [0.032]	0.684*** [0.032]	0.686*** [0.036]	0.668*** [0.036]	0.653*** [0.036]	0.645*** [0.036]	0.668*** [0.036]	0.666*** [0.036]
Log USA Cycle (t)	0.501** [0.201]	0.501** [0.201]	0.362* [0.214]	0.404 [0.248]	-0.090 [0.312]	0.383 [0.244]	0.458 [0.327]	0.333 [0.444]
Log EU Cycle (t)	0.271* [0.156]	0.271* [0.156]	0.398** [0.163]	0.459** [0.181]	0.485*** [0.179]	-0.088 [0.285]	0.464** [0.182]	0.485** [0.199]
Log Canada Cycle (t)	-0.264 [0.177]	-0.264 [0.177]	-0.269 [0.188]	-0.308 [0.203]	-0.327 [0.200]	-0.316 [0.200]	-0.310 [0.203]	-0.278 [0.267]
Log China Cycle (t)	-0.074 [0.096]	-0.074 [0.096]	-0.130 [0.102]	-0.127 [0.104]	-0.125 [0.102]	-0.106 [0.103]	-0.122 [0.106]	-0.113 [0.105]
Log Brazil Cycle (t)	0.174* [0.101]	0.174* [0.101]	0.228** [0.113]	0.224** [0.114]	0.223** [0.112]	0.204* [0.112]	0.227** [0.114]	0.226** [0.114]
REER (t-1)			-0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]
FDI/GDP (t-1)			0.000 [0.000]	0.000 [0.001]	-0.000 [0.001]	-0.000 [0.001]	0.000 [0.001]	-0.000 [0.001]
XGS/GDP(t-1)			0.001*** [0.000]	0.001*** [0.000]	0.001*** [0.000]	0.001*** [0.000]	0.001*** [0.000]	0.001*** [0.000]
Remittances/GDP (t-1)			-0.000 [0.001]	-0.000 [0.001]	-0.001 [0.001]	-0.000 [0.001]	-0.000 [0.001]	-0.000 [0.001]
Natural Disaster Damage/GDP (t-1)			0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]
Real Oil Price (t)			0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	-0.000 [0.000]
US Unemployment rate (t-1)				0.001 [0.002]	0.000 [0.002]	0.000 [0.002]	0.001 [0.002]	0.001 [0.002]
Dummy Services*Log USA Cycle (t)					0.682*** [0.229]			
Dummy Serv-Manuf*Log USA Cycle (t)					0.228 [0.262]			
Dummy Services*Log EU Cycle (t)						0.821*** [0.274]		
Dummy Serv-Manuf*Log EU Cycle (t)						0.223 [0.309]		
Dummy Negative Cycle*Log USA Cycle(t)							-0.105 [0.413]	
Dummy 1STDHigh*log USA Cycle (t)								0.156 [0.285]
Dummy 1STDLow*log USA Cycle (t)								-0.111 [0.367]
Constant	-0.001 [0.002]	-0.001 [0.002]	-0.032** [0.013]	-0.040** [0.020]	-0.031 [0.020]	-0.032 [0.020]	-0.041** [0.021]	-0.038* [0.021]
Observations	495	495	420	412	412	412	412	412
Number of countryid	15	15	14	14	14	14	14	14
R sq within	0.547	0.547	0.573	0.566	0.580	0.581	0.566	0.567
R sq between	0.186	0.186	0.245	0.235	0.151	0.175	0.234	0.230
R sq overall	0.546	0.546	0.550	0.542	0.557	0.561	0.542	0.542

Standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table A.5 (Part II): Cycles in the Caribbean, 1981-2013
Dependent Variable: Log GDP Cycle (i,t) – ALL GLOBAL PARTNERS

Variables	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
Log GDP Cycle (i, t-1)	0.666*** [0.036]	0.668*** [0.036]	0.672*** [0.036]	0.671*** [0.036]	0.668*** [0.036]	0.645*** [0.042]	0.673*** [0.036]	0.656*** [0.036]	0.744*** [0.068]
Log USA Cycle (t)	0.514* [0.294]	0.407 [0.248]	0.446* [0.262]	0.333 [0.255]	0.401 [0.249]	0.411 [0.279]	0.288 [0.253]	0.389 [0.246]	0.434* [0.248]
Log EU Cycle (t)	0.508*** [0.194]	0.393 [0.337]	-0.108 [0.471]	0.309 [0.221]	0.489* [0.261]	0.537** [0.268]	0.264 [0.204]	0.472*** [0.180]	0.442** [0.181]
Log Canada Cycle (t)	-0.363* [0.218]	-0.310 [0.203]	-0.197 [0.212]	-0.257 [0.208]	-0.313 [0.205]	-0.393* [0.234]	-0.285 [0.203]	-0.303 [0.202]	-0.303 [0.203]
Log China Cycle (t)	-0.118 [0.105]	-0.127 [0.104]	-0.306* [0.167]	-0.147 [0.105]	-0.119 [0.113]	-0.223* [0.133]	-0.177* [0.106]	-0.117 [0.103]	-0.137 [0.104]
Log Brazil Cycle (t)	0.228** [0.114]	0.225** [0.114]	0.281** [0.124]	0.250** [0.116]	0.221* [0.116]	0.302** [0.140]	0.334*** [0.125]	0.216* [0.113]	0.235** [0.114]
REER (t-1)	-0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]	0.000* [0.000]	-0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]
FDI/GDP (t-1)	0.000 [0.001]	-0.000 [0.001]	0.000 [0.001]						
XGS/GDP(t-1)	0.001*** [0.000]								
Remittances/GDP (t-1)	-0.000 [0.001]	-0.000 [0.001]	-0.000 [0.001]	-0.000 [0.001]	-0.000 [0.001]	-0.001 [0.001]	-0.000 [0.001]	-0.001 [0.001]	-0.000 [0.001]
Natural Disaster Damage/GDP (t-1)	0.000 [0.000]								
Real Oil Price (t)	-0.000 [0.000]	0.000 [0.000]	-0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000* [0.000]	0.000 [0.000]	0.000 [0.000]
US Unemployment rate (t-1)	0.001 [0.002]	0.001 [0.002]	0.001 [0.003]	0.000 [0.002]	0.001 [0.002]	0.002 [0.003]	0.000 [0.002]	0.007* [0.004]	0.001 [0.002]
Dummy 1STDLow*log USA Cycle (t)	-0.217 [0.312]								
Dummy Negative Cycle*log EU Cycle (t)		0.123 [0.531]							
Dummy 1STDLow*log EU Cycle (t)			0.829* [0.488]						
Dummy 1STDLow*log EU Cycle (t)			0.248 [0.382]						
Dummy Crisis*log USA Cycle (t)				0.355 [0.300]					
Dummy Crisis*log EU Cycle (t)					-0.041 [0.259]				
Herfindhal Index Export Product (t)						0.032 [0.028]			
Dummy Crisis*US U rate (t-1)							-0.004** [0.002]		
Dummy Services*US U rate (t-1)								-0.009** [0.004]	
Dummy Serv-Manuf*US U rate (t-1)								-0.003 [0.005]	
Dummy Negative Cycle*log GDP Cycle(t-1)									-0.154 [0.116]
Constant	-0.041** [0.020]	-0.040* [0.020]	-0.033 [0.021]	-0.039* [0.020]	-0.040** [0.020]	-0.114*** [0.038]	-0.042** [0.020]	-0.031 [0.021]	-0.045** [0.021]
Observations	412	412	412	412	412	290	412	412	412
Number of countryid	14	14	14	14	14	14	14	14	14
R sq within	0.567	0.566	0.570	0.568	0.566	0.594	0.571	0.574	0.568
R sq between	0.231	0.232	0.260	0.260	0.234	0.355	0.268	0.0229	0.177
R sq overall	0.542	0.541	0.548	0.546	0.542	0.548	0.551	0.474	0.538

Standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1