The ECCU Business Cycles: Impact of the U.S.

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Abstract

With a fixed peg to the U.S. dollar for more than three decades, the tourism-dependent ECCU countries share a close economic relationship with the U.S. This paper analyzes the impact of the U.S. on the ECCU business cycles and identifies possible transmission channels. Using two different approaches (i.e., the common trends and common cycles approach of Vahid and Engle (1993) and the standard VAR analysis), it finds that the ECCU economies are very sensitive to both temporary and permanent movements in the U.S. economy and that such linkages have strengthened over time. There is, however, less clear-cut evidence on the transmission channels. The U.S. monetary policy does not appear to be an important channel of influence and tourism is important for only one ECCU country.

I. INTRODUCTION

Given the close proximity between the United States and Caribbean countries, it is unsurprising that the there are close economic relationships and strong linkages among these economies. The countries of the Eastern Caribbean Currency Union (ECCU) are no exception and a recognition of this fact resulted in the shifting of the Eastern Caribbean dollar peg from the sterling pound to the U.S. dollar in 1976. This shift has the potential for transmitting U.S. monetary policy to the ECCU countries and further strengthening the economic relationships between the two. By far the most important influence of the U.S. on the tourism-dependent ECCU countries is through tourism receipts, with trade in goods playing a much smaller role. About one third of the stayover tourists to the ECCU countries are from the U.S., the top source country. These economies are also heavily dependent on the U.S. for foreign direct investment mainly in tourism. On the contrary, the U.S. accounts for less than 5 percent of ECCU's exports. Furthermore, the flow of remittances is an important channel of influence with a significant proportion of Caribbean migrants making their homes in the U.S.

The recent slowdown in the U.S. economy raises questions about the extent of the spillover effects of cyclical fluctuations to the ECCU economies. Thus the motivation of this paper is to quantify the effects of U.S. business cycles on the ECCU economies and identify the channels of spillovers. This paper follows on previous work on the Caribbean to identify the characteristics of Caribbean business cycles, for example Cashin (2006) and Kandil (2008). Two empirical procedures are used in this paper. The first is based on the "common trends and common cycles" approach developed by Vahid and Engle (1993). The paper decomposes real GDP into trend and cycle for selected Caribbean economies treating the ECCU as a single country, and like Roache (2008) estimates the growth elasticities of the cycle and trend to the U.S. growth. The paper also uses standard VAR analysis to estimate the magnitude of spillovers from the U.S. to the ECCU and identify different channels through which spillovers occur along the lines of Bayoumi and Swiston (2008).

The analysis based on common trends and common cycles reveals that both the trend and cycle of the ECCU economies are highly sensitive to movements in the U.S., with a growth elasticity close to 1. This analysis also finds that reactions to the U.S. economic movements, both trend and cycle, can vary significantly across Caribbean economies, with different directions and magnitudes. Furthermore, the VAR analysis reveals the strong and increasing impact of the U.S. economic movements on the ECCU. However, evidence on the channels for spillover is less clear-cut

and would require further investigation. The U.S. monetary policy does not appear to be an important channel of influence and tourism is statistically important for only one ECCU country.

The paper is organized as follows: Section II reviews the literature on business cycles and spillovers. The methodology and data issues are discussed in Section III and the empirical results are analyzed in Section IV. The final section discuses the policy implications and gives some concluding remarks.

II.   Business Cycles and Spillovers

A.   Analysis of Business Cycles in the Caribbean

There is a dearth of literature on Caribbean business cycles. Caribbean literature has focused more on trend growth rather than fluctuations. Data inadequacies, in particular the relative short time series is also a serious challenge to such analysis. Earlier analysis of Caribbean business cycles have tended to transform the data by differencing or filtering to ensure stationarity[1]. Recent studies by Cashin (2006) and Kandil (2008) have used more efficient filters to analyze the characteristics of Caribbean business cycles.

Using an ideal band-pass frequency filter to extract the cyclical component from the real GDP series for the ECCU countries, Cashin (2006) observes that there is strong co-movement between Canadian and Caribbean classical business cycles. He found less synchronization with U.S. and United Kingdom (U.K.) classical cycles (defined as sequence of expansion in out followed by a sequence in contraction in output) . The analysis also showed that:

- Caribbean classical cycles are asymmetric with long periods of expansion and short sharp periods of contraction. Their growth cycles (defined as a sequence of output expansion above trend followed by below trend output growth), on the other hand are more symmetric in duration and amplitude.

- The classical cycles are also longer than similar cycles in other middle-income developing countries, and developed countries.

- ECCU growth cycles also more synchronized with Canadian growth cycles than they are with the U.S. The close relationship with Canada

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[1] See for example Mamingi (1999) and Craigwell and Maurirn (2000). Cashin (2006) notes that such transformations yield distorted estimates of the growth cycle.

was likely due to the flow of development assistance from Canada, the domination of Canadian banks in the financial system and the flow of remittances from Canada.

Explaining the asymmetries of output growth between the expansion and contraction phases of Caribbean business cycles was the main focus of Kandil (2008). The analysis include a larger sample of Caribbean countries, which encompasses the ECCU sample in Cashin 2004, and used annual real GDP for the period 1975-2006. After filtering the data to remove trend, regression analysis is used to discriminate between the responsiveness or output and inflation to demand shocks during contraction and expansion, controlling for natural disasters and oil price shocks. Kandil finds that output increases more slowly in the expansionary phase and contracts sharply in a recession. On the contrary prices rise more quickly in the expansion phase and deflation is less during contractions. This is consistent with a kinked supply curve related to rigidities in the economies.

B. Common trend and cycle analysis

Common trend and common cycle analysis has not been used extensively in the literature on business cycles. Two exceptions are Hernandez (2004) and Roache (2008). Hernandez employed a two-country version of the Vahid-Engle methodology to estimate the sensitivity of Mexican business cycles to those of the U.S. He found that the response of short-term fluctuations of the Mexican economy to shocks in the U.S. appear to be stronger when the Vahid-Engle methodology in used. In particular he found that:

- The short-term elasticity estimated from this method was larger than that estimated using other methods like the Hodrick-Prescott filter

- The short-term elasticity (response to temporary shocks) was much higher than the long-term elasticity (response to permanent shocks) which was less than 1.

- The short-term fluctuations the Mexican economy in response to temporary shocks in the U.S. are more pronounced (3.78 times) than in the U.S. itself, implying that "when the U.S. sneezes Mexico catches the cold".

Roach (2008) uses a multi-county version of the Vahid-Engle methodology to analyze common cycles and common trends between

Central America and the U.S. This allows him to estimate both regional and U.S. influences on Central American cycles and trends. Using data from 1950 to 2006 for six Central American countries he concludes that the cyclical linkages are stronger than previously thought. The U.S. and Central America share a common business cycle, however, the linkages between long-run growth shocks are weak because of the influence of military conflicts, common terms of trade shocks and poor policy responses in Central America. As a consequence, simple regression and other methods that average the short-run (cycle) and long-run (trend) growth elasticities would show a weaker relationship than that implied by cyclical fluctuations alone.

C. Transmission of U.S. shocks to the Caribbean

Five channels have been proposed in the literature through which spillovers can be transmitted from the U.S. to the ECCU. These are trade, commodity prices, financial markets, remittances and official development assistance. For the Caribbean, the trade channel, in particular trade in tourism services, would appear to be the most important means of transmitting U.S. shocks to the ECCU countries, followed by remittances.

Trade. As noted earlier the proportion of ECCU goods exports to the U.S. is very small, while the bulk of imports comes from that source. The major influence on ECCU output however comes from the impact on tourism. The U.S. is the single largest source of tourist arrivals to the ECCU countries, accounting for almost one-third of stay over tourist arrivals.

Commodity prices. The ECCU countries are net commodity importers because they do not have significant commodity exports. Moreover, their major commodity exports (bananas and sugar in the early years) are mainly to the U.K. Thus commodity prices are unlikely to be a significant channel of spillover from the U.S. On the import side, their major commodity imports are mainly from non-U.S. sources (Trinidad and Tobago for petroleum, Guyana for rice and sugar, and Canada for wheat).

Financial markets. Klyuev (2008) identifies indirect and direct channels through which U.S. financial markets can cause spillovers to the Canadian economy. In an similar vein, U.S. monetary conditions can influence economic developments in the ECCU. The exchange rate peg to the U.S. dollar transmits the U.S. monetary policy to the ECCU.[2] However,

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[2] Grenade and Moore (2008) show that there is long-run convergence between interest rates in the U.S. and the ECCU, which is consistent with interest rate parity with the U.S. In the short-

this influence is likely to be quite small given the low elasticity of investment and consumption to interest rate changes. Foreign direct investment to the ECCU countries has been significant, averaging about 21 percent of GDP over the last five years. A significant portion of foreign investment in the ECCU which is concentrated in the tourism sector comes from the U.S. Thus to the extent that tightening of domestic U.S. financial conditions either cause a delay or outright cancellation of foreign direct investment by U.S. corporations, they serve as a direct transmission mechanism to the Caribbean.

Remittances. All six of the ECCU countries are in the top 20 highest rates of migration. A large proportion of these migrants live in the U.S. (Mishra 2006). Consequently remittances could provide as strong link between the U.S. and ECCU economies. The sign of the relationship however, cannot be determined *a priori*. Rappoport and Doquier (2005) show that there are several motives for remittances and the net effect depends on which motive dominates. For example, under the altruism and exchange motives a decline in income in the destination country would result in a decline in remittances, however, if the migrants home country is experiencing a recession at the same time, the insurance motive would suggest an increase in remittances. Empirically it has been shown that remittances to developing countries are countercyclical.

Official Development Assistance (ODA). ODA to the ECCU countries has declined recently, but, in the past, accounted for a significant amount of foreign inflows. To the extent that budgetary resources in the donor countries have a cyclical component that translates into fluctuations in ODA, this could be another source of spillovers. However, the U.S. has not been a significantly source of ODA for the ECCU countries hence it would play a minor role, if any, in transmitting shocks.

III.   Econometric Methodology and Data

A.   The common trends and common cycles approach

The technique used in this paper is based on the "common trends and common cycles" approach illustrated by Vahid and Engle (1993). Essentially this approach estimates both long-run and short-run co-movements (i.e., trends and cycles) in a set of time series. This section will briefly go over this approach, whose details can be found in Vahid and Engle 1993 paper.

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run changes in the Fed Funds rate have an almost immediate effect on interest rates in the ECCU.

The common trends and common cycles approach is built on the existence of cointegration relationships. Consider a VAR representation for a set y_t of n variables:

$$y_t = \mu + A_1 y_{t-1} + A_2 y_{t-2} + \ldots + A_k y_{t-k} + \varepsilon_t$$
      (1)

where y_t is a vector of n endogenous variables, and ε_t is a vector of white noises. Equation (1) can be written in a VAR error correction form:

$$\Delta y_t = \mu + A y_{t-1} + \sum_{i=1}^{k-1} \Gamma_i \Delta y_{t-i} + \varepsilon_t$$
      (2)

where $A = \sum_{i=1}^{k} A_i - I$ and $\Gamma_i = -\sum_{j=i+1}^{p} A_j$

With no cointegration A will be a zero matrix. If the series of y_t are cointegrated, the matrix A can be decomposed into $A = \beta \alpha'$ where α is the matrix of cointegration vectors and β is the matrix of speed of adjustment. The existence of r cointegration vectors implies (n-r) common trends.

$$\Delta y_t = \mu + \beta(\alpha' y_{t-1}) + \sum_{i=1}^{k-1} \Gamma_i \Delta y_{t-i} + \varepsilon_t$$
        (3)

Once cointegration vectors are estimated, we can test the existence of common cycles using the canonical correlation procedure developed by Vahid and Engle (1993). The presence of common cycles implies that there exist s linear combinations of Δy_t which cannot be forecasted and eliminate serial correlation. In other words, there are s cofeature vectors, implying (n-s) common cycles. Basically the squared canonical correlation between Δy_t and its relevant history $X = (\alpha' y_{t-1}, \Delta y_{t-1}, \ldots, \Delta y_{t-k+1})$ are calculated. The number of cofeature vectors (s) equals the number of squared canonical correlations equal to zero. The squared canonical correlations are obtained by solving for the eigenvalues of the matrix constructed by Δy_t and X.

The test statistic for the null hypothesis that there are at least s cofeature vectors is:

$$C(k,s) = -(T-k-1)\sum_{j=1}^{s}\log(1-\lambda_j^2)$$

(4)

where λ_j^2's are the s smallest squared canonical correlations between Δy_t and its relevant history $X = (\alpha' y_{t-1}, \Delta y_{t-1},...., \Delta y_{t-k+1})$. Under the null, the statistic $C(k,s)$ has a chi-squared distribution with $s(s+nk+r-n)$ degrees of freedom.

When the numbers of common cycles and common trends add up exactly to the total number of variables, i.e., $r+s=n$, Vahid and Engle (1993) suggested that each series of y_t can be decomposed into permanent (trend) and transitory (cycle) components as follows:

$$y_t = \widetilde{\alpha}^- \widetilde{\alpha}' y_t + \alpha^- \alpha' y_t = trend + cycle$$

(5)

where α is the matrix of cointegration vectors and $\widetilde{\alpha}$ is the matrix of cofeature vectors.

An important special case is a first-order cointegration system where $k=1$. In this case the error-correction representation equation (2) would have no lagged differences on the right-hand side:

$$\Delta y_t = \mu + A y_{t-1} + \varepsilon_t$$

(6)

If the matrix of A has rank of r, there will be r cointegration vectors and $n - r$ common trends. We can see that the left null place of A is $s = n - r$. So there exists s cofeature vectors and $r = n - s$ common cycles. Specifically, it can be shown that:

$$(I-A^{-1})\Delta y_t = (I-A^{-1})(\mu + A y_{t-1} + \varepsilon_t) = (I-A^{-1})(\mu + \varepsilon_t) = \text{an innovation}$$

(7)

In sum, all first-order cointegration systems have common cycles.

B.   The VAR analysis

Vector Autoregressions (VARs) have long been used to analyze spillover effects across countries. In this paper, we try to identify the magnitude by which shocks to the U.S. growth affect the growth of individual ECCU countries by estimating impulse responses. The basic VAR equation can be written as:
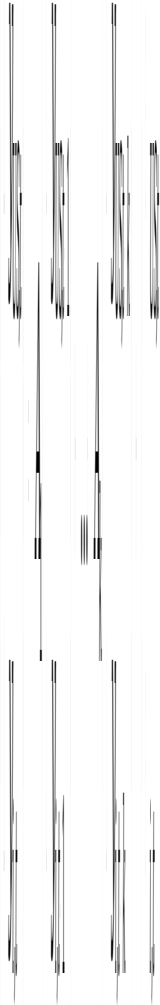
$$\tag{8}$$

where $\Delta y_{US,t}$ is the real growth rate of U.S. at time t and $\Delta y_{i,t}$ is the real growth rate of an ECCU country i at time t. Since we can safely assume the dominance of the U.S growth shocks, the order of Cholesky decomposition is straightforward. An impulse response function can help

us trace the effect of a one-time shock to the U.S. growth rate, one of the endogenous variables in the VAR, on the ECCU growth rate.

The procedure in Swiston and Bayoumi (2008) is followed to identify channels through which shocks to the U.S. growth are transmitted to individual ECCU countries. Essentially, we augmented the basic VAR equation by adding each possible channel, for example, trade and financial, as an exogenous variable. The individual channel's contribution to spillovers would equal to the difference between this response and the one from the basic VAR in Equation (8):

$$c_{i,j} = r_i - r_{i,j} \tag{9}$$

The impulse response from the VAR with only real growth is r_i and $r_{i,j}$ is the impulse response of domestic growth to U.S. shocks from the VAR with channel j included.

C. The data

The analysis uses annual real GDP data for 1963-2007, covering most CARICOM countries—Belize, Barbados, Guyana, Jamaica, six ECCU Fund member countries (Antigua and Barbuda, Dominica, Grenada, St. Kitts and Nevis, St. Lucia, and St. Vincent and the Grenadines), and Trinidad and Tobago—and the U.S. The data were obtained from the IMF's World Economic Outlook (WEO) database. Unavailability of quarterly real GDP data for many of the Caribbean countries including the ECCU, the main focus of the study, prevents the use of quarterly data for business cycle analysis.

Summary statistics of real GDP and GDP growth is provided in Table 1. All real GDP series are found to be I(1) while their first differences are I(0).

Table 1. Summary Statistics of Real GDP growth

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Observations	Unit root test p-value 1/	
								Real GDP Levels	Growth
			(percentage)						
Belize	5.48	5.10	19.88	-7.85	4.74	0.24	44	0.15	0.07
Barbados	3.04	3.70	14.43	-5.87	3.64	-0.18	44	0.56	0.02
ECCU	4.37	4.40	8.52	-1.24	2.04	-0.20	44	0.71	0.00
Antigua and Barbuda	5.10	5.21	11.53	-5.08	2.89	-0.89	44	0.74	0.00
Dominica	3.36	3.32	15.15	-18.61	4.89	-1.83	44	0.98	0.00
Grenada	4.16	4.02	12.59	-5.88	3.78	-0.45	44	0.55	0.00
St. Kitts and Nevis	4.72	5.33	9.35	-1.03	2.32	-0.54	44	0.36	0.00
St. Lucia	4.49	3.88	17.27	-3.80	3.98	1.04	44	0.50	0.00
St. Vincent and the Grenadines	4.43	4.29	13.81	-2.95	2.94	0.61	44	0.86	0.00
Guyana	1.92	1.65	15.66	-13.05	5.49	-0.27	44	0.73	0.00
Jamaica	2.10	1.50	11.60	-4.87	3.59	0.51	44	0.89	0.00
Trinidad and Tobago	3.48	3.81	13.48	-10.88	5.09	-0.65	44	0.93	0.02
United States	3.20	3.36	6.94	-1.96	1.99	-0.54	44	0.89	0.00

Source: Authors' calculations.
Notes: Sample moments were computed from log-difference of real GDP.
1/ P-values from augmented DF unit root tests with lags selected using Aikake information criteria.

IV. EMPIRICAL RESULTS

This section presents our findings from two empirical approaches discussed above. First, results from the common trends and common cycles approach are presented. In this study, all six ECCU Fund member countries are aggregated to be one. The sample, therefore, has 7 time series, including 6 Caribbean countries (Belize, Barbados, Guyana, Jamaica, ECCU, and Trinidad and Tobago) and the U.S. Second, results from standard VAR analysis are presented, focusing specifically on the impact of U.S. growth shocks on individual ECCU countries. The sample also covers 7 countries, including 6 ECCU Fund member countries and the U.S.

A. Caribbean Common Trends and Common Cycles

Cointegration and cofeature vectors

The first and key step is to choose the lag order of the system, that is the number of k in Equation (1). As indicated in Table 2, two of the four selection criteria indicate a lag order of one. Based on this, we proceed to test the existence of cointegration in a first-order system. Both engelvalue and trace tests suggest 3 cointegration vectors, which implies 4 common trends among the seven GDP time series (Table 3).

Table 2. VAR Lag Order Selection

Lag order	LR	AIC	SC	HQ
0	NA	-12.32	-12.03	-12.21
1	667.84	-29.63	**-27.31***	**-28.78***
2	**77.93***	-30.18	-25.83	-28.59
3	56.52	**-30.67***	-24.30	-28.34

Source: Authors' calculations.

* indicates lag order selected by the criterion

LR: sequential modified likelihood ratio test statistic (each test at 5% level

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Table 3. Tests for the Number of Cointegrating Vectors

Hypothesized No. of CE(s)	Trace test			Maximum eigenvalue test		
	Eigenvalue	Trace statistic	P-value	Eigenvalue	Max-eigenvalue statistic	P-value
None	0.8	193.9	0.0	0.8	64.6	0.0
At most 1	0.7	129.2	0.0	0.7	51.6	0.0
At most 2	0.5	77.6	0.0	0.5	34.2	0.0
At most 3	**0.4**	**43.5**	**0.1**	**0.4**	**21.3**	**0.3**
At most 4	0.2	22.1	0.3	0.2	12.4	0.5
At most 5	0.2	9.8	0.3	0.2	9.6	0.2
At most 6	0.0	0.2	0.7	0.0	0.2	0.7

Source: Authors' calculations.

As indicated above, all first-order cointegration systems have common cycles. There is no need to test for common cycles based on calculating the square canonical correlations. In this case, the existence of 3 cointegration vectors (i.e., 4 common trends) in a first-order system suggests the existence of 4 cofeature vectors, i.e., 3 common cycles. Figure 1 and 2 plot 4 common trends and 3 common cycles estimated for the seven countries in the sample. In essence, Caribbean economies are found to be exposed to these common trends and common cycles, although individual exposure to a particular common trend or cycle could be very different, as will be revealed below.

Decomposition into cycles and trends

Since the number of common trends (4) and the number of common cycles (3) add up to 7, the number of variables, we can decompose real GDP series into trend and cycle components for each of the seven countries in the sample, which are plotted in Figures 3 and 4 together with trend/cycle components derived from the standard HP filter. The common trends and common cycles approach has a tendency to derive the trend component with a relatively high volatility, as seen in the original application to the U.S. consumption by Vahid and Engle (1993).

Growth elasticities to the U.S.

It would be reasonable to assume that the U.S. has been driving the common trends and common cycles these small open Caribbean economies are exposed to. Following Roache (2008), we use ordinary least squares (OLS) to estimate how much growth in the Caribbean would respond to cyclical and trend shocks in the U.S. The two basic

equations to estimate cyclical and trend growth elasticities, respectively,

are as follows[3]:

$$\Delta y_i^{cycle} = c_i + \alpha_i \Delta y_{US}^{cycle} + \beta \Delta y_{US}^{trend} + \varepsilon_i$$
(10)

$$\Delta y_i^{trend} = c_i + \alpha_i \Delta y_{US}^{cycle} + \beta \Delta y_{US}^{trend} + \varepsilon_i$$
(11)

Main estimation results are summarized as follows (Table 4), with diagnostics of these models shown in Table 6:

- Growth trend and cycle in the ECCU are found to synchronize closely with those of the U.S., with estimated cyclical and trend growth elasticities close to 1. Indeed, the simple growth correlation between the U.S. and ECCU (0.4) is statistically significant and the highest among all Caribbean economies in the sample.

- Barbados and Trinidad and Tobago are also found to be significantly affected by both the trend and cycle in the U.S., although directions of linkages vary. Consistent with the result of simple correlation analysis, Trinidad and Tobago's trend and cycle are negatively related to those of the U.S. Barbados' cycle is positively affected by that of the U.S. while its trend is negatvely associated with the U.S. trend. This helps explain the small GDP growth correlation between Barbados and U.S. (0.21).

- The elasticity of the cycle for Barbados and Guyana to the U.S. is gretater than 1, which would imply an exaggerated effect of the U.S. fluctuations on these economies. On the contrary Jamican economic activity is fairly inelastic to fluctuations in the US economy, which is consistent with the findings of Murray (2007).

- In sum, Caribbean countries in the sample appear to differ in terms of the impact of the U.S. business cycle and trend on them. This is in constrast with Roache's study on Central American (2008) which suggested that central america has its own regional trend while the cycle is driven by the U.S. There are Caribbean economies such as ECCU that have been heavily affected by the U.S. short-run and long-run economic movements. Guyana and Jamaica, however, appear to have their own growth trends, although their cycles are influenced by

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[3] In a few cases where serial autocorrelation is detected using standard tests, lagged dependent variables are added to the basic estimation equations.

that of the U.S. The decoupling of the Guyana and Jamaica trends cound be a result of the long periods of economic crisis experienced by these two countries, and the associated contractionary policies pursued, which could have blunted the response to changes in the U.S. In the case of Belize, we find that its growth trend, not cycle, is heavily affected by that of the U.S. Together, these results suggest that Caribbean economies may not be as homogenous as people tend to think.

Table 4. Growth Elasticities in the Caribbean 1/

	Simple growth correlation with the U.S.	Elasticity of the Cycle to		Elasticity of the Trend to	
		U.S. cycle	U.S. trend	U.S. cycle	U.S. trend
Belize	0.15				1.09***
Barbados	0.21	1.64***	1.03**		-1.35***
ECCU	**0.40***	**0.92***			**0.94***
Guyana	0.06	1.25***			
Jamaica	0.10	0.36***			
Trinidad and Tobago	-0.18	-2.00**	1.10*		-1.46**

Source: Authors' calculations.
1/ Elasticity of the cyclical and trend component of growth in each Caribbean economy to the cycle and trend in the U.S., with ***, **, and * indicating significance at the 1, 5, and 10 percent levels, respectively.

Table 5. Diagnostics of Growth Elasticity Models

	R-square	DW-statistics	LM autocorrelation test 1/
Cycle equations			
Barbados	0.22	1.40	0.21
ECCU	0.51	1.35	0.16
Guyana	0.47	1.90	0.90
Jamaica	0.81	1.58	0.13
Trinidad and Tobago	0.40	1.67	0.41
Trend equations			
Belize	0.22	1.53	0.63
Barbados	0.19	1.55	0.33
ECCU	0.31	1.66	0.44
Trinidad and Tobago	0.24	1.34	0.11

Source: Authors' calculations.
1/ P-value of the test statistic if the null hypothesis of no autocorrelation were true.

B. Spillovers from the U.S. to ECCU

This section uses VAR analysis to quantify spillovers and transmission channels from the U.S. to ECCU economies.

- First, we use standard VAR analysis to estimate the impact of a one percent U.S. growth shock on the growth of each ECCU economy. Since quarterly GDP growth data are unavailable for the ECCU countries, the VAR analysis uses annual data with a lag of one. To see the evolution of spillovers over time, we also conduct estimation for three sample periods: 1963-2007, 1976-2007, and 1989-2007. We divide the sample period this way because the ECCU pegged its common currency (EC$) to the U.S. dollar starting from 1976, and 1989 is the year from which data on stayover tourist arrivals from the U.S. to the ECCU are available.

- Second, we look at channels through which the U.S. shocks could affect the ECCU. Three possible channels—trade, financial, and commodity prices—are considered. As noted earlier, the ECCU countries the trade channel is through tourist arrivals from the U.S. rather than traditional trade of goods. The unavailability of reliable data on remittances does not allow us to explore remittances as a transmission channel.

We find that spillovers from the U.S. are large drivers of business cycles in the ECCU countries, which is consistent with what we have found above using the common trends and common cycles approach. Moreover, the magnitude of spillovers has strengthened over time.

- For the entire sample period of 1963-2007, the ECCU economies as a whole are found to respond to a one percent U.S. growth shock by 0.4 percentage point in the first year. The estimated response increased to 0.7 and 0.8 percentage point for the sub-sample periods of 1976-2007 and 1989-2007, respectively, suggesting that the impact of the U.S. business cycles on the ECCU economies has strengthened over time (Figure 5).

Figure 5. ECCU: Responses to One Percent U.S. Growth Shock
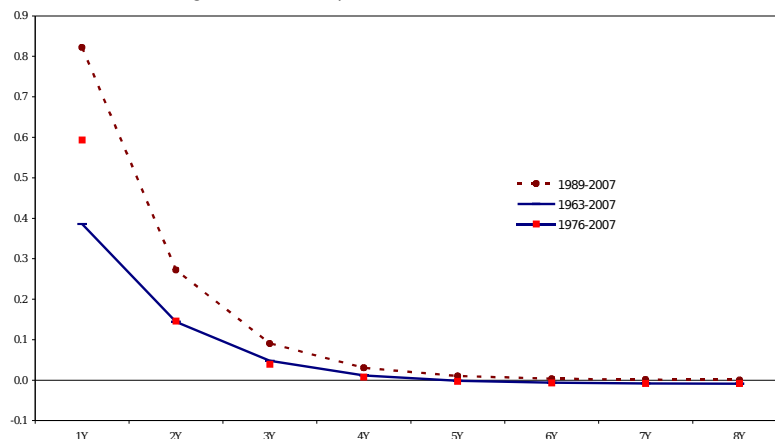
Source: Authors' calculations.

- Similar results are obtained for individual ECCU economies (Figure 6). For whole sample period of 1963-2007, individual countries' responses to a one percent U.S. growth shock range from 0.3 to 0.7 percentage point in the first year. Moreover, the spillover effects are found to have strengthened over time. The estimated responses to a one percent U.S. growth shock, using a sub-sample period of 1976-2007, have increased marked for every single ECCU economy, reaching 0.4-1.4 percentage point. With only the exception of St. Vincent and the Grenadines, the estimated responses are higher for the period of 1989-2007.

To identify spillover channels, we use annual growth of stayover arrivals from the U.S. to capture the trade channel and the U.S. interest rates (three-month T-bill rate and the yield on ten-year government bonds) to capture the financial channel. The world commodity prices used are annual percent changes of the WEO fuel and non-fuel commodity indexes.

- For all ECCU countries, adding financial indicators or world commodity prices to the basic VAR equation does not alter much the estimation results, i.e., r_i and $r_{i,j}$ are almost the same, suggesting that financial channel or commodity prices do not account for much of the spillovers from the U.S. to the ECCU. This result is not

Figure 7. Antigua and Barbuda: Responses to One Percent U.S. Growth Shock
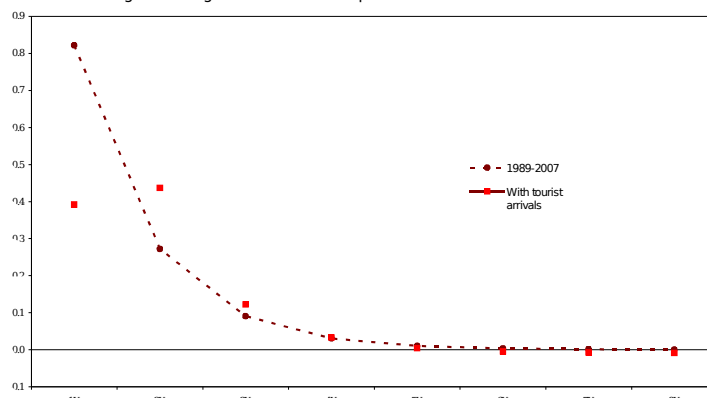
Source: Authors' calculations.

surprising, considering the very limited degree of financial integration of the ECCU with the U.S. despite the peg to the U.S. dollar.

- There is only limited evidence that trade (i.e., tourism) might be the spillover channel. In the case of Antigua and Barbuda, the largest ECCU economy, annual growth of tourist arrivals from the U.S. helped explain about a half of the response of Antigua and Barbuda to a one percent growth shock in the U.S. in the first year. However, this result does not hold for other five ECCU countries—adding annual growth rates of tourist arrivals from the U.S. does not change much the impulse responses estimated under the basic VAR equations.

V. Conclusions and Policy Implications

Using two different approaches, this paper finds that ECCU economies are very sensitive to both temporary and permanent movements in the U.S. economy and that such linkages have strengthened over time. Based on these results, the ECCU economies cannot be expected to escape from the impact of the current downturn in the U.S. There is, however, less clear-cut evidence on the transmission channels. The U.S. monetary policy does not appear to be an important channel of influence, reflecting the relative stability of ECCU interest rates and the low elasticity of spending to interest rates changes. Tourism is important for only one ECCU country. More research in this direction is warranted.

The strong sensitivity of economic activity in the ECCU to the U.S. fluctuations would require space to implement offsetting policies. Monetary policy is muted because the ECCU maintains a hard peg against the U.S. reducing monetary policy independence. Accordingly fiscal policy would need to take the brunt of any adjustment. However, given high debt levels and extremely tight fiscal position in most countries, further exacerbated by recent food and fuel shocks, there might not be sufficient fiscal room to maneuver. It is therefore important to continue efforts at fiscal consolidation to reduce the high public debt levels and to create room for countercyclical fiscal policy in the future.

Structural reforms would also be particularly important to increase the flexibility of the economies to respond to these external shocks. These reforms should be aimed at reducing the rigidities in the economy that limit supply responses and create asymmetries over the business cycle. Inflexible labor markets, product market imperfections and inefficiencies in the investment climate have been identified as some of major sources of rigidities.

The diversity of responses of Caribbean economies to shocks in the U.S. would suggest that there is still some way to go to achieve the convergence necessary for a regional monetary integration. In particular, a monetary union that includes Trinidad and Tobago could prove to be challenging. Monetary policy under a proposed common currency for the region will need to take account of the disparate responses of the economies to external shocks, and may need to complemented by fiscal action.

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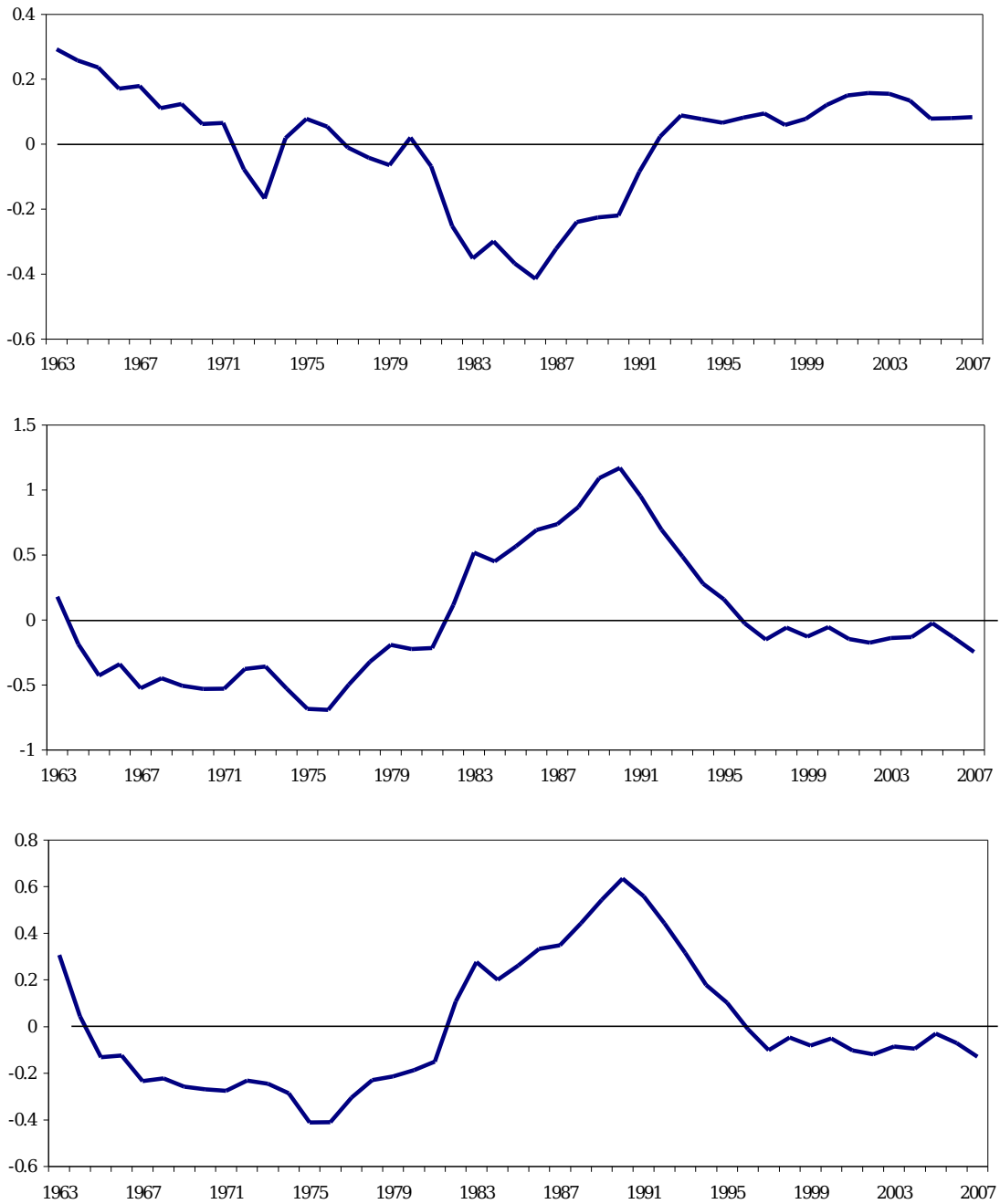
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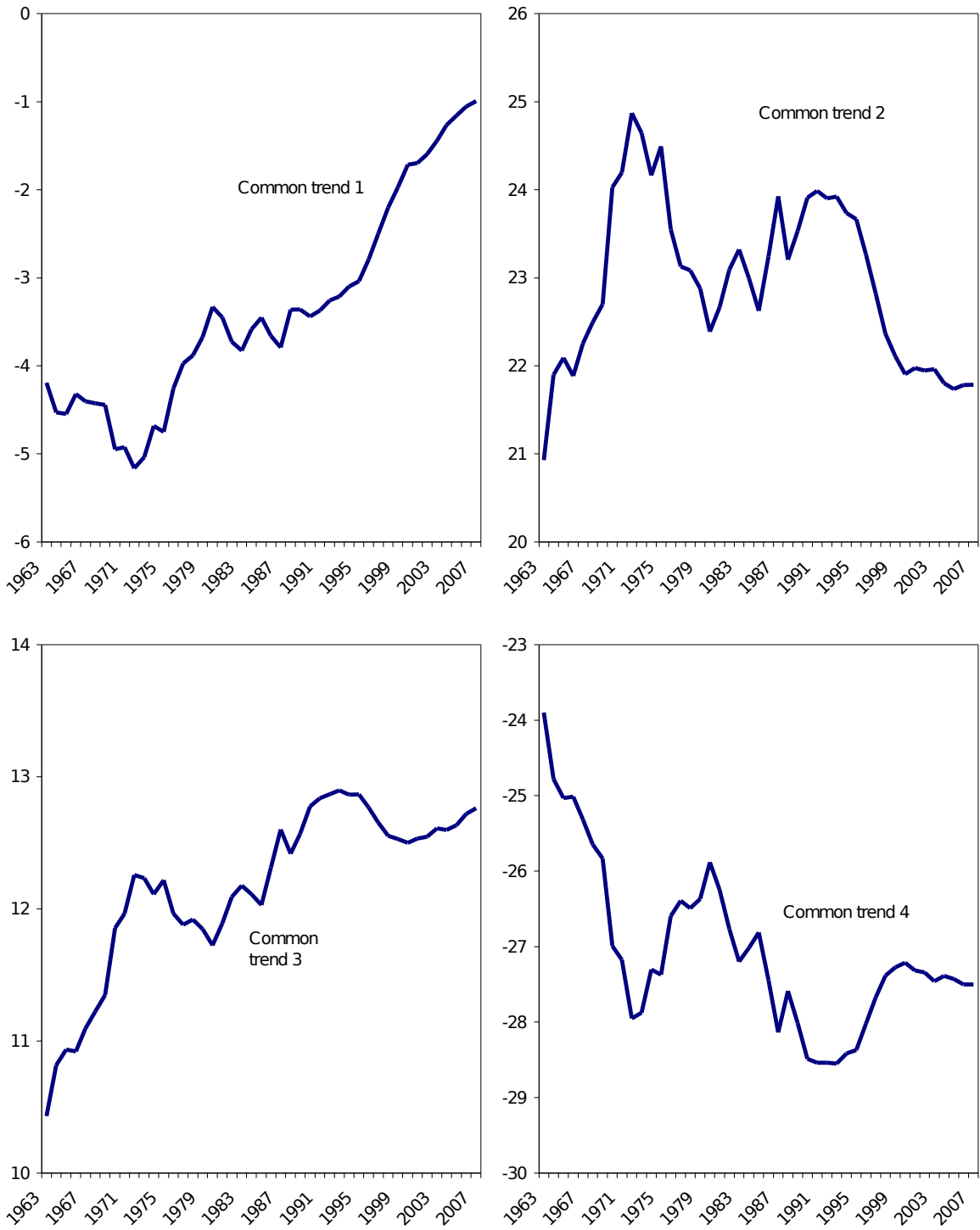
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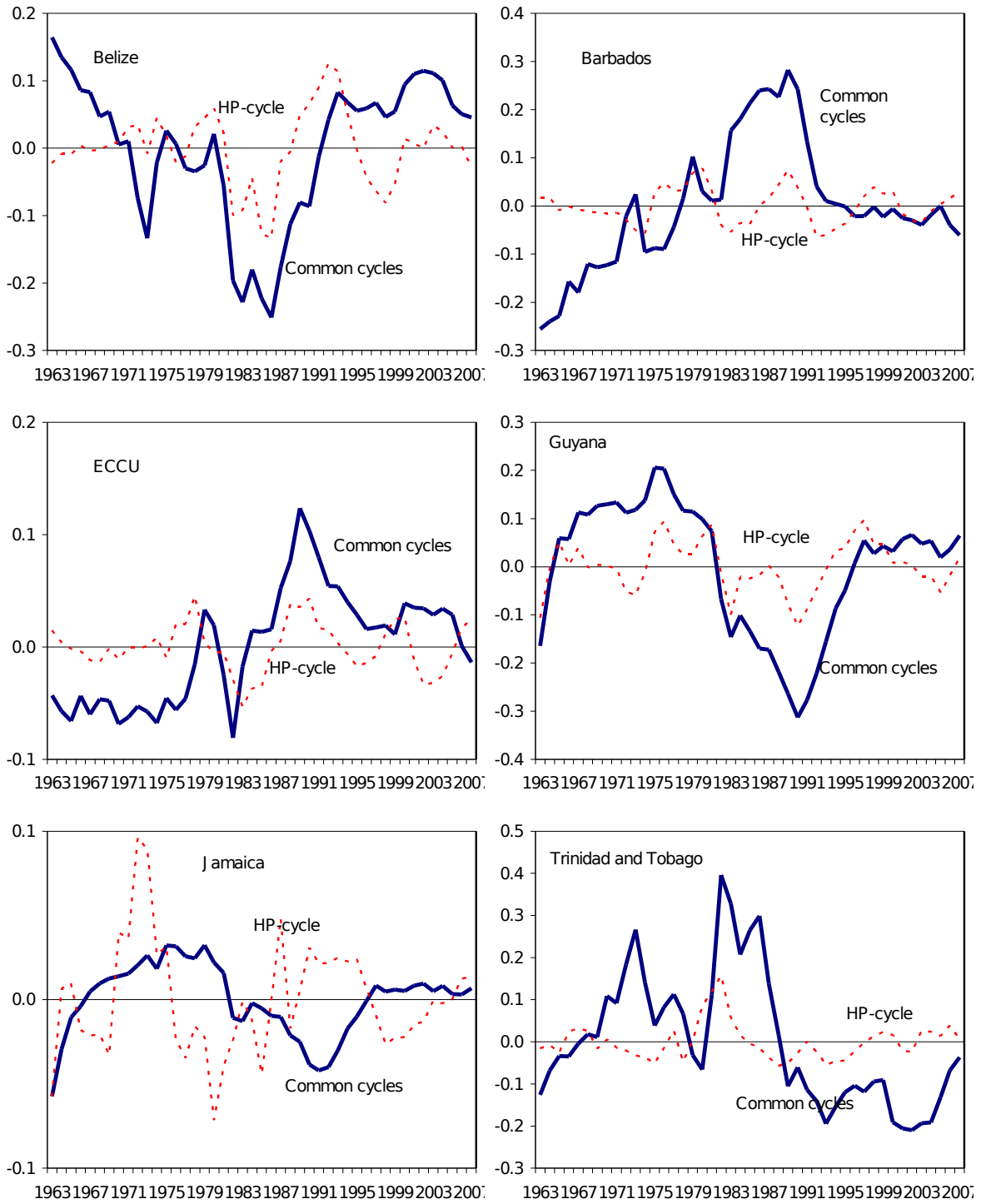
Figure 1. Three Common Cycles

Figure 2. Four Common Trends

Common trend 1

Common trend 2
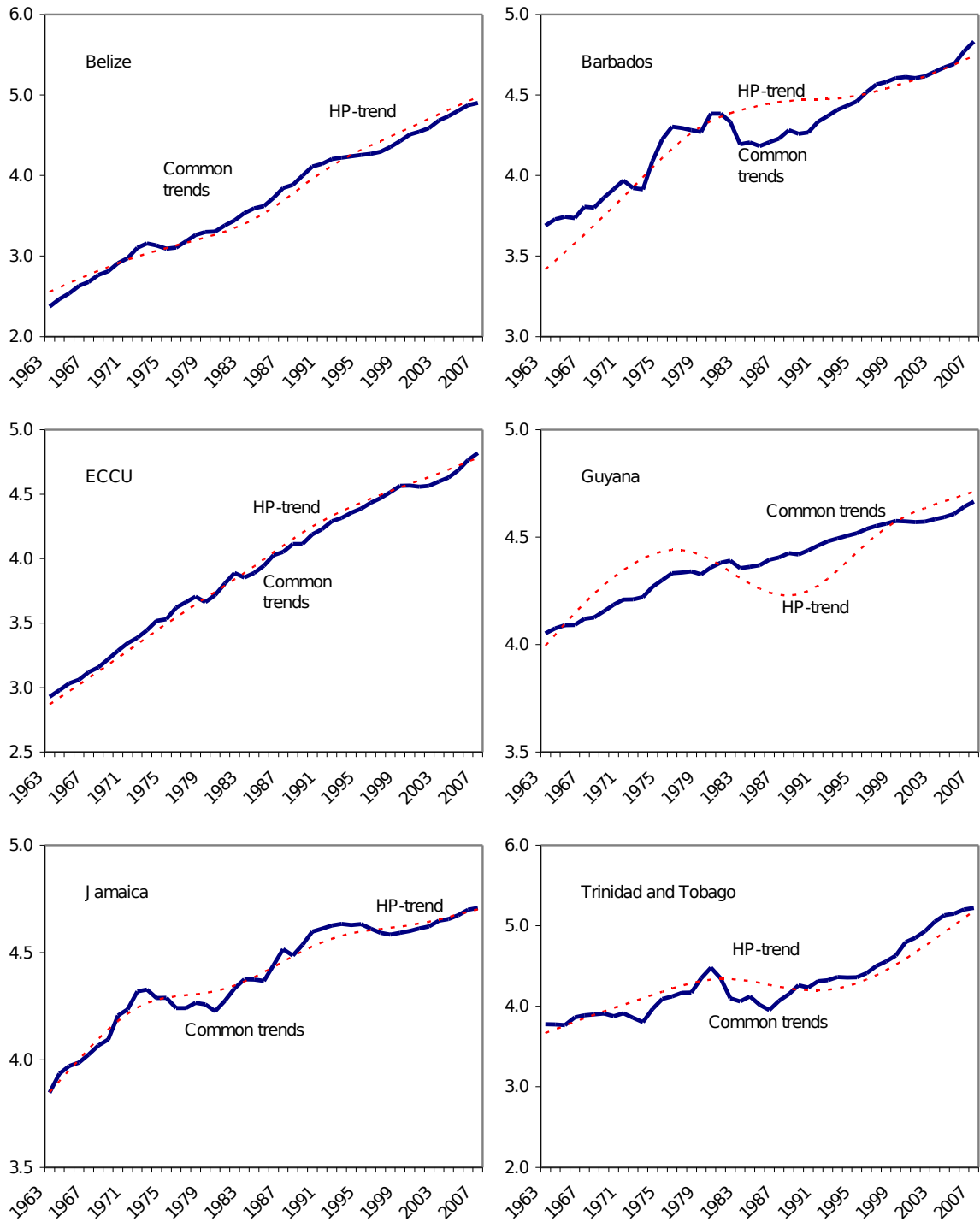
Common trend 3

Common trend 4

Source: Authors' calculations.

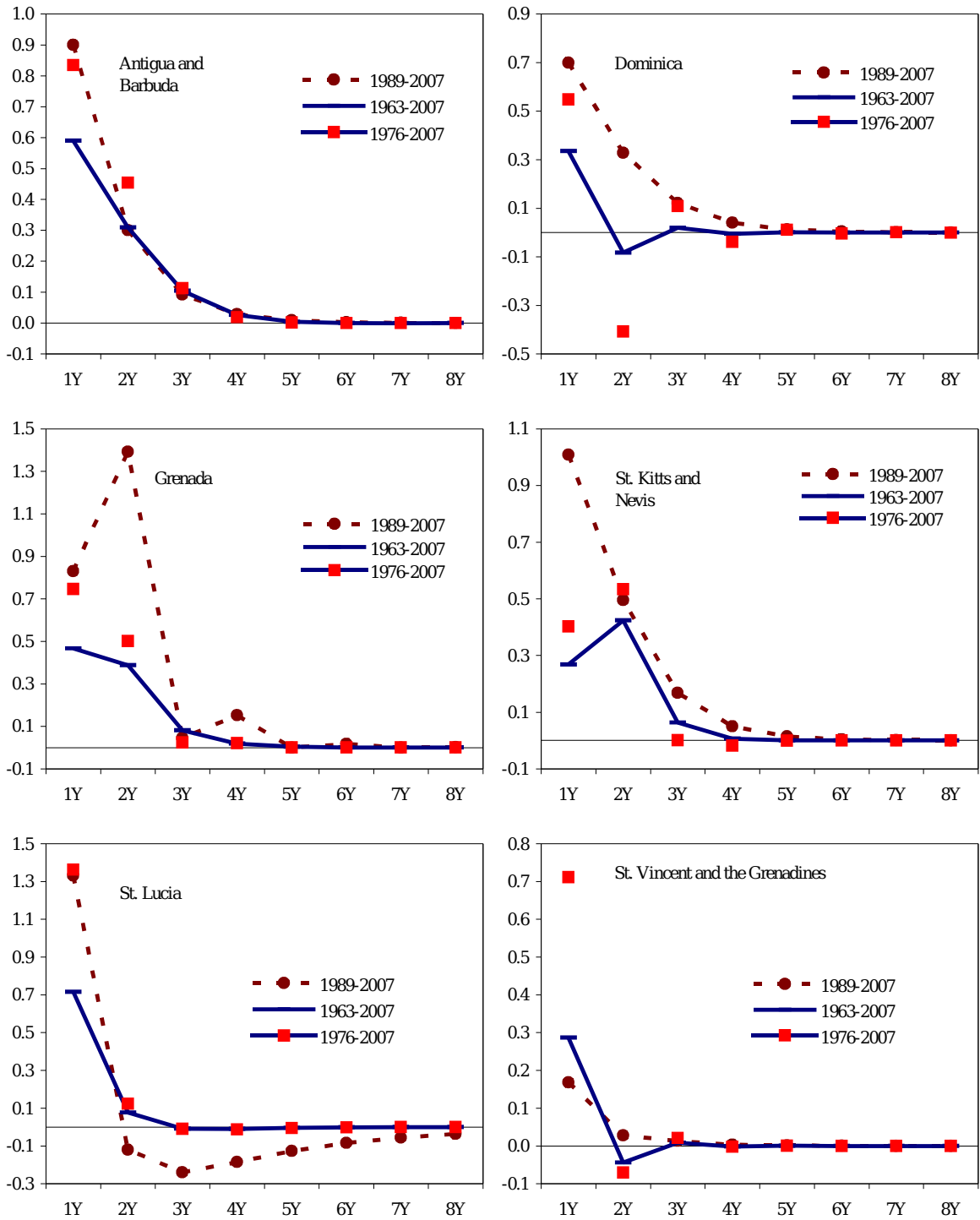Figure 3. Caribbean Countries: Cyclical Components of Real GDP

Source: Authors' calculations.

Figure 4. Caribbean Countries: Trend Components of Real GDP

Source: Authors' calculations.

Figure 5. ECCU: Responses to One Percent U.S. Growth Shock

Source: Authors' calculations.