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Price Dynamics in the Eastern Caribbean

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Abstract

The Eastern Caribbean Currency Union (ECCU) countries share a common currency, the EC dollar, which has been pegged to the U.S. dollar at the same rate for more than three decades. This paper examines the influence of the peg on ECCU price stability, and analyzes whether absolute Purchasing Power Parity (PPP) holds within the currency union. It shows that U.S. price stability has helped anchor price movement in the ECCU. As the same time, inflation in the ECCU is not entirely imported from the U.S., and has some domestic policy content. In addition, deviation from PPP within the ECCU can be attributed to persistent price dispersion of nontradables.

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I. INTRODUCTION

Eastern Caribbean Currency Union (ECCU) member countries have generally enjoyed low inflation in the context of the regional quasi-currency board exchange rate arrangement, with a fixed peg to the U.S. dollar. The currency union is one of only two currency unions in the world with a fixed exchange rate,[2] and is the only one in which member countries pool their foreign reserves. The convertibility of the common currency, the EC dollar, is fully self-supported; and the parity of the exchange rate has not been changed in more than three decades.

This paper formally examines the influence of the ECCU exchange rate arrangement on price dynamics in the six Fund-member ECCU countries.[3] First, it examines to what extent the long-standing fixed peg with the U.S. dollar has helped anchor price movements in the ECCU. Second, it analyzes whether the currency union has induced price convergence among its member countries and led to greater real exchange rate stability. Answers to these questions would shed light on whether price dynamics in the ECCU—both vis-à-vis the U.S. and relative to each other—are entirely driven by external factors or have any domestic policy content.

Inflation Rates, 1985–2006
(In percent)

Sources: WEO; and Fund staff estimates.
1/ Simple average of The Bahamas, Barbados, Belize, Dominican Republic, Guyana, Haiti, Jamaica, and Trinidad and Tobago.
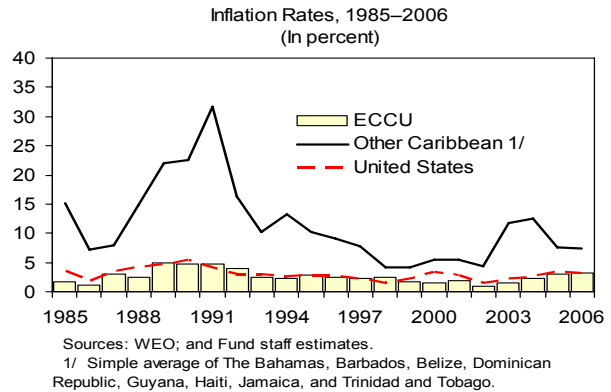
The paper has two important findings. First, it establishes that the U.S. price indeed helps anchor price stability at the ECCU, although inflation in the latter is not entirely imported from the U.S. The failure of convergence to the U.S. price is indeed not surprising, considering large structural differences between the two economies, as well as differences in external environment and domestic policies. Second, even within the ECCU, absolute Purchasing Power Parity (PPP) does not hold, and real exchange rates are nonstationary.[4] These curious results reflect the fact that price movements in the ECCU countries are affected

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[2] The other currency union is formed by the CFA franc zone consolidating the two economic unions in Africa—West African Economic and Monetary Union (WAEMU) and the Economic and Monetary Community of Central Africa (CEMAC). While the ECCU fixed exchange rate is supported by a quasi-currency board arrangement—in that the Eastern Caribbean Central Bank needs to cover only 60 percent of its domestic liabilities with foreign reserves—in actuality it operates like a full fledged currency board with almost full coverage of demand liabilities.

[3] The countries are: Antigua and Barbuda (ATG), Dominica (DMA), Grenada (GRD), St. Kitts and Nevis (KNA), St. Lucia (LCA), and St. Vincent and the Grenadines (VCT). Anguilla and Montserrat, two other ECCU members, are U.K. territories and not members of the Fund.

[4] This paper uses "real exchange rate stability" and "purchasing power parity (PPP)" interchangeably, as movements in real exchange rate may be viewed as a measure of the deviation from PPP. See Sarno and Taylor (2002) for a literature survey on the real exchange rate and PPP.

by persistent price dispersion of nontradables that account for a fairly large share of the consumer basket. The rest of the paper is organized as follows. Section II describes the data. Section III assesses the impact of U.S. price movement on ECCU price dynamics, while Section IV analyzes real exchange rate stability within the ECCU countries. Section V concludes.

II. THE PRICE DATA

The sample comprises quarterly data of the broad disaggregated components of the consumer price index (CPI) of the six ECCU countries from 1990 to 2006. The data have a structural break in 2001 when most ECCU countries modified their CPI baskets to increase the level of disaggregation of some of the components of CPI. In order to ensure that the pre- and post-2001 CPI data are compatible, the new components introduced after 2001 are absorbed back in the old ones using their corresponding weights. In other words, the analysis is based on the pre-2001 components in order to guarantee homogeneous components throughout the sample period.[5]

The weights of individual components of CPI baskets vary considerably across the ECCU countries (Table 1). For instance, food and beverages have the largest weight in the relatively less-developed Windward Islands, accounting for 35–55 percent of the total CPI basket.[6] Conversely, housing and transportation and communication carry more weight—in the order of 30–40 percent—in the relatively more-developed Leeward Islands.

Despite their small sizes and openness, the ECCU countries have a sizeable share of nontradables in their consumer baskets. The classification of CPI components into tradables and nontradables is somewhat subjective, although as a general rule of thumb all goods (usually imported) are classified as "tradable," while services (usually domestically produced) are classified as "nontradables."[7] Generally speaking, the higher the income level of a country, the higher is the share of nontradables—with the share of nontradables ranging from 27 percent in St. Vincent and the Grenadines to close to 50 percent in Antigua and Barbuda.

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[5] For example, the post-2001 components of "food" and "alcoholic beverages and tobacco" are consolidated to one pre-2001 component of "food and beverages". See Cashin and others (2004) for details.

[6] Windward Island countries are Dominica, Grenada, St. Lucia, and St. Vincent and the Grenadines. Leeward Island countries are Antigua and Barbuda and St. Kitts and Nevis.

[7] One caveat is that the production of nontradables would include tradable inputs, which we are unable to take into account in the absence of more disaggregated data of the ECCU CPI baskets.

Table 1: ECCU: Current Composition of CPI Basket

Category 1/		Antigua and Barbuda	Dominica	Grenada	St. Kitts and Nevis	St. Lucia	St. Vincent and Grenadines
All items		1,000	1,000	1,000	1,000	1,000	1,000
Food	T	214	329	368	281	468	536
Alcoholic beverages and tobacco	T	2	10	9	7	28	10
Clothing and footwear	T	111	82	98	93	65	98
Housing	N	218	112	102	130	135	30
Fuel and light	T	64	59	55	44	45	89
Medical care and health expenses	N	28	32	47	37	23	62
Household furnishing	T	126	94	95	141	58	69
Transportation and communication	N	154	194	157	193	63	10
Education	N	23	29	37	21	-	34
Personal services	N	43	43	16	20	32	34
Miscellaneous	N	18	18	18	34	83	30
Memorandum items:							
Tradables	T	516	573	624	565	663	726
Nontradables	N	484	428	376	435	337	274

Sources: ECCU country authorities; and Fund staff estimates.

1/ T = tradables; N = nontradables.

III. IMPACT OF U.S. PRICE MOVEMENTS

As the ECCU countries have maintained a fixed peg to the U.S. dollar for more than three decades, it is natural to ask how price levels in the ECCU have been affected by the U.S. price movements. This section first describes the dynamics of overall CPI indexes in the ECCU countries vis-à-vis the U.S. It then examines their convergence to the U.S. price using standard unit root tests, and establishes their relation with the U.S. price using error correction techniques.

A close examination of the data reveals several stylized facts:

- Price indexes in the ECCU have generally moved closely with the U.S. price index (Figure 1). Indeed, the ECCU countries have enjoyed remarkable price stability for decades—their average annual rate of inflation was about 3 percent during 1990–2006. Both tradable and nontradable prices display a large degree of co-movement with the U.S. price level, although to a lesser degree for nontradables (Figures 2 and 3);

- Nevertheless, relative price indexes (i.e., bilateral real exchange rates) between individual ECCU countries and the U.S. do not appear to be stationary, suggesting that inflation in the ECCU may not be entirely imported (Figure 4);

- Inflation volatility in the ECCU countries has been much higher than that of the U.S. (Figure 5). As ECCU countries face more exogenous shocks in the context of a pegged exchange rate regime, their domestic prices have to adjust more frequently to absorb the shocks.

Panel unit root tests confirm that the ECCU price levels do not converge to the U.S. price in the long run (Table 2). The nonstationarity of bilateral real exchange rates between ECCU countries and the U.S. is not surprising, considering large structural differences between the two economies, as well as differences in external environment and domestic policies.

Table 2. Panel Unit Root Tests of Relative ECCU Prices with the U.S.

Method	Statistic	Prob.	Cross-Sections	Obs	Test Result (Is the Null Rejected at 5% Significance)
Null: Unit root (assumes common unit root process)					
Levin, Lin & Chu t	-1.10	0.13	6	377	No
Breitung t-stat	-0.70	0.24	6	371	No
Null: Unit root (assumes individual unit root process)					
Im, Pesaran and Shin W-stat	-0.49	0.31	6	377	No
ADF - Fisher Chi-square	16.54	0.17	6	377	No
PP - Fisher Chi-square	15.62	0.21	6	380	No
Null: No unit root (assumes common unit root process)					
Hadri Z-stat	10.45	0.00	6	386	Yes

Source: Authors' calculations.

An error correction model is used to formally establish the link between the U.S. and ECCU price indexes. The first step is to investigate whether there is a long-run equilibrium between the U.S. and ECCU price indexes using cointegration techniques.[8] The second step is to examine short-run inflation dynamics and see how temporary deviations from the long-run equilibrium affect inflation. Results from both Trace test and Max-eigen value test suggest one cointegration vector at the 95 percent significance level (Table 3), with the long-run relationship between the ECCU price level[9] p and the U.S. price level q given by (standard error in parentheses):

$$p = 0.785q + 1.067$$
$$(0.042) \quad (0.194)$$

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[8] The optimal lag length of cointegration is chosen according to the Schwartz Information Criterion.

[9] Derived as a weighted average of prices in individual ECCU countries, using real GDP as the weight.

The hypothesis that the coefficient on the U.S. price is equal to one is rejected, indicating that absolute PPP does not hold vis-à-vis the U.S. price, confirming again that inflation in the ECCU is not entirely imported from the U.S.

Table 3. Cointegration Test Between ECCU and U.S. Prices

No. of CE(s)	Eigenvalue	Trace Statistic	95% Criticial Value	Max-eigen Statistic	95% Criticial Value
None	0.81	117.56	20.26	109.98	15.89
At most 1	0.11	7.58	9.16	7.58	9.16

Source: Authors' calculations.

Moving next from the overall ECCU prices to country level price index data, cointegration analysis confirms the existence of long-run equilibrium between the individual country price level and the U.S. price level. However, cointegration equations differ across countries, likely reflecting structural and policy differences within the ECCU (Table 4). The hypothesis that the cointegration coefficient equals one can be rejected in all countries except Grenada and St. Lucia.

Table 4. ECCU: Price Levels—Long-Run Equilibrium Relationships
Dependent variable: Domestic price level 1/

Country	Cointegration equation 2/
ECCU average	0.785
	(-0.042)
Antigua and Barbuda	0.326
	(-0.089)
Dominica	0.679
	(-0.083)
Grenada	0.934
	(-0.074)
St. Kitts and Nevis	1.475
	(-0.291)
St. Lucia	0.965
	(-0.059)
St. Vincent and the Grenadines	0.704
	(-0.06)

Source: Authors' calculations.

1/ All variables are in logarithms.

2/ Coefficient on U.S. price level in cointegrating regression, with standard error in parentheses.

The short-run inflation dynamics are analyzed using a country-specific vector error correction model, which controls for country-specific factors. The general short-run equation has one country-specific error correction term to reflect deviation from the long-run equilibrium, with the coefficient on the error correction term providing the speed of adjustment for the system to return to its long-run equilibrium. Other independent variables include the U.S. inflation Δq, inflation in other ECCU countries Δp^*, and past domestic inflation (to capture inflation inertia). Growth rates of ECCU-wide broad money m and real GDP y are also included to control for region-wide monetary aggregate and real aggregate demand, respectively.

$$\Delta p_t = c + \sum_{i=1}^{k} \alpha_{1i} \Delta p_{t-i} + \sum_{i=1}^{k} \alpha_{2i} \Delta q_{t-i} + \sum_{i=1}^{k} \alpha_{3i} \Delta m_{t-i} + \sum_{i=1}^{k} \alpha_{4i} \Delta y_{t-i} + \sum_{i=1}^{k} \alpha_{6i} \Delta p^*_{t-i}$$
$$+ \beta(ECT_{t-1}) + \upsilon_t + seasonal \quad dummies \quad + disaster \quad dummies$$

The general model is estimated using OLS at both the country and regional level with four lags. A parsimonious inflation model is then derived using a general-to-specific model selection procedure, such that the model retains only those variables in the equation which are statistically significant.[10] Several results are noteworthy (Table 5):

- Short-run deviations are stationary in that a positive (negative) deviation from the equilibrium level reduces (increases) the rate of inflation, pushing the domestic price back to its equilibrium level. This result holds for the region as a whole and for all ECCU countries (excepting St. Kitts and Nevis), confirming that the peg with the U.S. dollar has helped anchor price stability in the ECCU.

- The speed of adjustment to equilibrium is quite fast, with an estimated half life of about eight months for the ECCU as a whole.[11] Moreover, there is a large degree of heterogeneity within the ECCU when it comes to the speed of adjustment to long-run equilibrium.[12] The implied half life ranges from 1 quarter to 9 quarters, with Antigua and Barbuda adjusting the fastest, and Grenada the slowest.

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[10] See Owen (2003) for a review on general-to-specific modeling using PcGets.

[11] The implied half life is calculated as $-\ln 2 / \ln(1 + \beta)$.

[12] The error correction term for St. Kitts and Nevis is found to be statistically insignificant in explaining short-run inflation dynamics.

Table 5. Restricted Coefficient Estimates of Short-Run Inflation Dynamics Model

Regressor	ECCU	ATG	DMA	GRD	KNA	LCA	VCT
Error correction term	**-0.24**	**-0.72**	**-0.36**	**-0.07**		**-0.43**	**-0.41**
Implied half life (in quarters)	2.55	0.54	1.56	9.41		1.25	1.31
Dm (lagged change in M2)		0.30		0.42	-0.51		
Dq (lagged U.S. inflation)	0.00			0.25		-1.15	-1.67
Dp (inflation inertia)	-0.28	-0.62			-0.31	0.68	
Dy (lagged change in real GDP)	0.63	1.60	1.02	0.03	0.72		1.18
R-square	0.42	0.61	0.48	0.51	0.33	0.43	0.33

Source: Authors' calculations.

In sum, the analysis in this section suggests that although the peg to U.S. dollar has helped anchor price movement in the ECCU, ECCU prices do not converge to the U.S. price, implying that inflation in ECCU countries is not entirely imported. The next objective is to analyze real exchange rate stability within the ECCU.

IV. REAL EXCHANGE RATES WITHIN THE ECCU

A. Literature Review

Whether PPP holds across international borders is a topic that has drawn significant academic interest for decades. An emerging consensus is that PPP might be viewed as a valid long-term international parity condition when applied to bilateral exchange rates among major industrialized countries, and that the pace of mean reversion is quite slow. Consensus estimates of the half life of deviation from PPP range between four and five years. A study on price dispersions among G7 industrial countries by Engel (1993) reveals that a strong empirical regularity—the consumer price of a good relative to a different good within a country tends to be much less variable than the price of that good relative to a similar good in a different country. Essentially, this result shows that nominal exchange rate fluctuations play a larger role in determining real exchange rate movements than relative consumer price movements within a country.

Some studies have looked at convergence toward PPP in the absence of trade barriers or nominal exchange rate fluctuations by analyzing price differences across cities within a country. Using 51 commodity prices across 48 cities in the U.S., Parsley and Wei (1996) found convergence rates substantially higher than typically uncovered in cross-country analysis. The rates of convergence occur faster for larger price differences and are slower for cities farther apart. Engel and Rogers (1996) used disaggregated CPI data for the U.S. and Canadian cities and found that price differentials are much larger for two cities across the two different countries relative to two equi-distant cities within the same country. Engel and Rogers (2001) updated Engel's 1993 study using disaggregated CPI data for 29 U.S. cities. They found that the strong cross-country empirical regularity uncovered by Engel (1993) does not hold as well across the U.S. cities, implying that deviation from PPP is not as important for locations within the U.S. as compared to deviation across countries.

The ECCU provides an interesting case study for analysis of the evolution of the real exchange rate. As discussed above, the literature on the real exchange rate has focused on either countries with different currencies or cities within the same country to which trade barriers or currency fluctuations do not apply. A currency union such as the ECCU is something in between these two polar cases. Nominal exchange rate variation, a standard factor underlying real exchange rate differences across countries, is not applicable in the ECCU countries, which share a common currency. However, many structural policies—related to trade barriers, factor market segmentation, and industry regulations—differ across the ECCU, making these countries less integrated than cities within the same country.

This section analyzes bilateral real exchange rates among ECCU countries. We address the following questions: Does PPP hold? If not, what can explain the deviation from PPP? How large is the deviation from PPP? While it may be difficult to draw any definitive conclusions given the relatively short sample period (1990–2006), we feel that it is important to analyze the above issues as a first step to understand inflation irregularities among these countries, which has not been done before.[13]

B. Does PPP Hold?

A broad look at the data suggests that absolute PPP does not hold within the ECCU. Figure 6 depicts relative price indexes (i.e., the real exchange rate) using Antigua and Barbuda as the benchmark, and they do not appear to be stationary.[14]

Unit root tests formally establish that bilateral real exchange rate among ECCU countries are indeed nonstationary. Standard ADF tests applied to the 15 bilateral real exchange rates among the six ECCU countries indicate that only one pair (GRD—LCA) is weakly stationary at the 10 percent significance level. In addition, the majority of the panel unit root tests also confirm the nonstationarity of bilateral real exchange rates among ECCU countries (Table 6).

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[13] Data on the components of CPI of the ECCU countries prior to 1990 were not available at quarterly frequency.

[14] The above result holds regardless of the choice of benchmark ECCU country.

Table 6. Panel Unit Root Tests of Relative Prices Within ECCU

Method	Statistic	Prob.	Cross-Sections	Obs	Test Result (is the Null Rejected at 5% Significance)
Null: Unit root (assumes common unit root process)					
Levin, Lin & Chu t	-1.40	0.08	15	918	No
Breitung t-stat	-3.08	0.00	15	903	Yes
Null: Unit root (assumes individual unit root process)					
Im, Pesaran and Shin W-stat	-0.08	0.47	15	918	No
ADF - Fisher Chi-square	26.95	0.63	15	918	No
PP - Fisher Chi-square	28.12	0.56	15	925	No
Null: No unit root (assumes common unit root process)					
Hadri Z-stat	16.11	0.00	15	940	Yes

Source: Authors' calculations.

C. What Explains the Deviation from PPP?

The absence of PPP among ECCU countries is quite surprising, considering that these countries have a common currency and share many economic similarities. To uncover the factors underlying the deviation from PPP within the ECCU, we next study the role of nontradables prices and transportation costs, as suggested in the literature (Engle, 1993; Parsley and Wei, 1996; Engel and Rogers, 2001; and Cecchetti, Mark, and Sonora, 2002).

- The presence of nontradables, which on average comprise about 40 percent of the CPI basket of ECCU countries, could give rise to deviation from PPP. To analyze the role of nontradables prices, we examine individual components of consumer price indexes to see if PPP would hold at disaggregated price levels, i.e., we analyze whether real exchange rates of tradables are more stationary than that of nontradables.

- Barriers to trade such as transportation costs could also lead to failure of PPP. The geographical distance is used as a proxy for transportation costs (drawing on Engel and Rogers, 1996) and test if deviation from PPP is larger for countries which are further apart.

The role of nontradables prices

The data suggest that the deviation from PPP among ECCU countries is driven by persistent price differences in nontradables rather than tradables (Figures 7 and 8). We use two approaches to formally establish the role of nontradables in explaining the deviation of PPP. The first approach is to conduct panel unit root tests on disaggregated relative price indexes to

assess whether relative tradable prices are indeed stationary while relative nontradables prices are not. The second approach is to examine how the degree of tradability of a good affects the deviation from PPP. Other things equal, we expect deviation to be smaller for goods that have a smaller nontradable component.

The first approach is conducted in two steps. First, a number of panel unit root tests are used to determine if relative prices of individual CPI components are stationary. The relative prices are defined as the log price difference of CPI component k at time t between countries i and j; i.e., $q_{ij,k,t} = p_{k,t}^i - p_{k,t}^j$, where $p_{k,t}^i$ and $p_{k,t}^j$ are the log of the prices of good k at time t and in countries i and j, respectively. If alternative tests yield conflicting results, we take the result that is supported by a majority of the tests. Second, if stationarity is confirmed, the rate of convergence is estimated using a convergence regression where the change in relative prices is regressed on the lagged relative prices. Our regression is based on the Levin, Lin, and Chu (2002) specification.

The main results are summarized as follows (Table 7):

- Relative prices indexes are indeed stationary for most tradable goods (food and beverages, clothing and footwear, and household furnishing), except for fuel and light. The latter possibly reflects the fact, in the sample period under consideration, fuel prices have been administered in most ECCU countries, except Dominica.[15]

- As for nontradables, relative price indexes are nonstationary, implying that country-specific structural and policy differences may have resulted in persistent differences in the national price of these nontradables.

- For tradables, the speed of convergence to PPP, given by the estimated half life, ranges from four to nine quarters. It is much faster than the consensus estimates of four to five years using cross-country data, likely reflecting the fact that barriers to PPP such as currency and exchange rate volatility do not exist within the ECCU (see Parsley and Wei, 1996).

- Also, among the tradables, the speed of convergence to PPP is faster for perishables (e.g., food and beverages) compared with nonperishables (e.g., household furnishing and clothing and footwear). This supports the findings of Parsley and Wei (1996) using disaggregated prices within the U.S.

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[15] Dominica has allowed full pass through from the world oil prices to domestic prices since late 2003. Grenada and St. Kitts and Nevis liberalized the determination of retail gasoline prices in late 2006.

Table 7. Panel Unit Root Tests of Relative Disaggregated Prices Within ECCU

	Unit Root	Convergence Coefficient	Max Lags	Half Life (Quarters)
Tradables	No	-0.11	10	5.8
Food and beverages	No	-0.15	10	4.3
Clothing and footwear	No	-0.08	10	8.7
Household furnishing	No	-0.08	10	8.7
Fuel and light	Yes		10	
Nontradables	Yes		10	
Housing	Yes		10	
Transportation and communication	Yes		10	
Education	Yes		10	
Medical care and health expenses	Yes		10	

Source: Authors' calculations.

The second approach tests whether deviation from PPP is larger for nontradables than tradables. Drawing on Engel and Rogers (2001), we use the standard deviation of changes in the log of the relative price index of good k across countries i and j, $\Delta p^i_{k,t} - \Delta p^j_{k,t}$ (where Δ stands for the first difference), as a measurement of degree of deviation from PPP— the higher the standard deviation, the larger the deviation. With only the exception of Antigua and Barbuda, the standard deviation for overall nontradables is always higher than for tradables in individual countries (Table 8). The cross-country average for nontradables is 4.2, as compared to 3.0 for tradables.

We perform pooled regression of the standard deviation of $\Delta p^i_{k,t} - \Delta p^j_{k,t}$ on a number of explanatory variables to identify factors behind the deviation from PPP. As noted by Engel and Rogers (2001), deviation from PPP could be larger when nominal prices are more volatile. To control for the effect of nominal price stickiness, the sum of the standard deviation of $\Delta p^i_{k,t}$ and $\Delta p^j_{k,t}$ is included in the regression as one independent variable. A dummy for nontradables is used to capture the effect of nontradability on price dispersion.

Table 8. Standard Deviation of Logarithmic Price Differences [1]

	ATG	DMA	GRD	KNA	LCA	VCT	Average
Food and beverages	3.2	2.2	2.3	2.7	3.4	2.8	2.8
Clothing and footwear	5.6	3.4	4.7	4.8	3.9	4.0	4.4
Household furnishing	2.4	1.8	2.1	2.3	2.2	2.3	2.2
Fuel and light	3.7	3.4	2.7	3.1	2.9	3.8	3.3
Housing	3.6	3.3	3.4	5.6	4.2	5.5	4.3
Transportation and communication	3.3	5.7	4.0	3.4	3.3	3.8	3.9
Education [2]	3.7		3.6		4.7		4.0
Medical care and health expenses [2]	3.0		3.4		3.7		3.4
Total	**3.5**	**3.3**	**3.0**	**3.5**	**3.5**	**3.1**	**3.3**
Tradables	**3.6**	**2.5**	**2.7**	**3.0**	**3.3**	**3.0**	**3.0**
Nontradables	**3.5**	**4.8**	**3.7**	**4.3**	**3.9**	**5.1**	**4.2**

Source: Authors' calculations.

1/ Standard deviation x100
2/ Data for three countries (DMA, KNA, and VCT) are unavailable.

The results indicate that deviation from PPP is larger when nominal prices are more volatile (see Table 9, first column), consistent with the finding of Engel and Rogers (2001). More importantly, the coefficient of the dummy variable for nontradables is positive and statistically significant, confirming that the deviation from PPP is indeed larger for nontradables than for tradables.

Table 9. Explaining PPP Deviation

	Specification 1		Specification 2	
	Coefficient	t-statistics	Coefficient	t-statistics
Nominal price stickiness	0.76	28.30	0.75	28.10
Dummy for nontradables	0.00	1.83	0.00	1.90
Distance			0.00	-1.17
Constant	0.00	-2.49	0.00	0.47
R-square	0.89		0.90	

Source: Authors' calculations.

The role of distance

To assess the role of distance in explaining price dispersion, we add the log of distance between country i and j in the pooled regression of the standard deviation of $\Delta p_{k,t}^i - \Delta p_{k,t}^j$ (Table 9, second column)**.** The coefficient on distance is statistically insignificant and also has the wrong sign. Hence, we conclude that distance does not explain price dispersion among ECCU countries. This result contrasts with other studies in the literature (such as Engel and

Rogers, 1996 and 2001), and likely reflects the low level of intra-country trade within the ECCU.

D. Does Engel's Regularity Hold?

In this section we examine how deviation from PPP within the ECCU countries compares with findings of other studies. Specifically, we replicate Engel's (1993) study on price dispersion among G7 industrial countries for the ECCU countries. Using data at the national level, Engel compared the relative prices of similar good across countries to the relative price of different goods within a country, and found that the consumer price of a good relative to a different good within a country tends to be much less variable than the price of that good relative to a similar good in a different country. He attributed his finding to the fact that prices in domestic currencies are less variable than the nominal exchange rate. So as the nominal exchange rate varies, the common currency prices of the goods vary. We ask whether this empirical regularity holds within the ECCU in the absence of nominal exchange rate variability.

Following Engel (1993), we calculate the ratio r_{ki} for every good $k = 1, 2, …, 8$, and every country $i = 1, 2, ..., 6$.

$$r_{ki} = \frac{\frac{1}{7}\sum_{n=1,n\neq k}^{7} std(\Delta p_{kt}^{i} - \Delta p_{nt}^{i})}{\frac{1}{5}\sum_{j=1,j\neq i}^{5} std(\Delta p_{kt}^{i} - \Delta p_{kt}^{j})}$$

The numerator of r_{ki} is the average of the standard deviations *(std)* of the first difference of the price of good k relative to the price of each different good in country i. It measures the volatility of relative prices of different goods in the same country. The denominator of r_{ki} represents the average standard deviation of the first difference of the price of good k in country i relative to the price of the same good in other countries. A small value of r_{ki} indicates that deviation from PPP across the ECCU countries is large.

Table 10 reports our calculation of the above ratio (r_{ki}) for each CPI component across ECCU countries. If Engel's empirical regularity holds for ECCU countries, the value of r_{ki} should be much smaller than one. However, the average ratio of ECCU countries (1.1) is much higher than the cross-country average (0.15) found by Engel (1993), but lower than the average of 29 U.S. cities (2.03) found by Engel and Rogers (2001). This implies that the Engle's cross-country empirical regularity does not hold as well for ECCU countries. In other words, deviation from PPP within the ECCU is much smaller than that across countries, but larger than that among U.S. cities. This likely reflects the absence of nominal exchange rate fluctuations under the currency union arrangement, as well as the existence of structural differences across ECCU countries (much more so than that across U.S. cities).

Another interesting result generated by this exercise is that the value of r_{ki} tends to greater for tradables (1.2) than for nontradables (0.9), indicating that deviation from PPP is indeed larger for nontradables. This result reinforces our earlier finding on the role of nontradables in explaining deviations from PPP within the ECCU.

Table 10. Ratio of Relative Price Variability to Cross-Country PPP Deviation

	ATG	DMA	GRD	KNA	LCA	VCT	Average
Food and beverages	1.2	1.0	1.1	1.1	1.2	1.5	1.2
Clothing and footwear	0.9	0.7	0.8	0.9	0.8	1.0	0.9
Household furnishing	1.3	1.2	1.2	1.4	1.3	1.6	1.3
Fuel and light	1.2	1.0	1.0	1.0	1.3	1.2	1.1
Housing	0.9	0.8	0.4	0.7	0.6	0.9	0.7
Transportation and communication	1.0	0.9	0.9	1.0	1.0	1.2	1.0
Education 1/	0.9		0.8		0.9		0.9
Medical care and health expenses 1/	1.0		0.9		1.2		1.0
Total	**1.1**	**1.0**	**0.9**	**1.1**	**1.1**	**1.4**	**1.1**
Tradables	**1.2**	**1.0**	**1.0**	**1.2**	**1.1**	**1.4**	**1.2**
Nontradables	**0.9**	**0.9**	**0.7**	**0.9**	**0.8**	**1.0**	**0.9**

Source: Authors' calculations.

1/ Data for three countries (DMA, KNA and VCT) are unavailable.

V. CONCLUDING REMARKS

This paper uncovers important peculiarities in the price dynamics of ECCU countries, which confirm that domestic policies and structural differences could have a persistent impact on prices in the ECCU. First, while U.S. price stability has helped anchor price stability in the ECCU, inflation in the ECCU is not entirely imported from the U.S. Second, purchasing power parity does not hold within the ECCU, due to the persistent price dispersion of nontradables. Thus, policy differences—related to the labor market and trade barriers—as well as differences in structural characteristics appear to have played a role in maintaining persistent inflation differences across ECCU countries. Looking ahead, these differences should decline over time as labor market segmentation and trade distortions are gradually removed, in the context of greater economic integration among ECCU countries.

Figure 1. ECCU: Consumer Price Index Movement, March 1990–December 2006
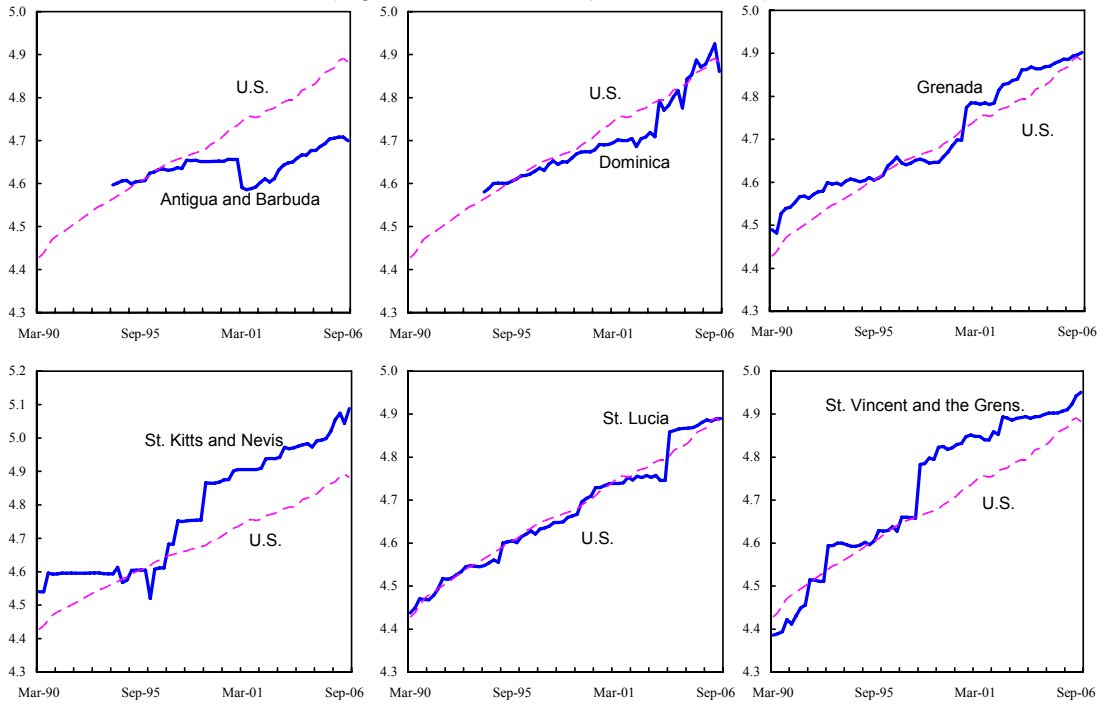(Logarithmic scale, index September 1995=100)
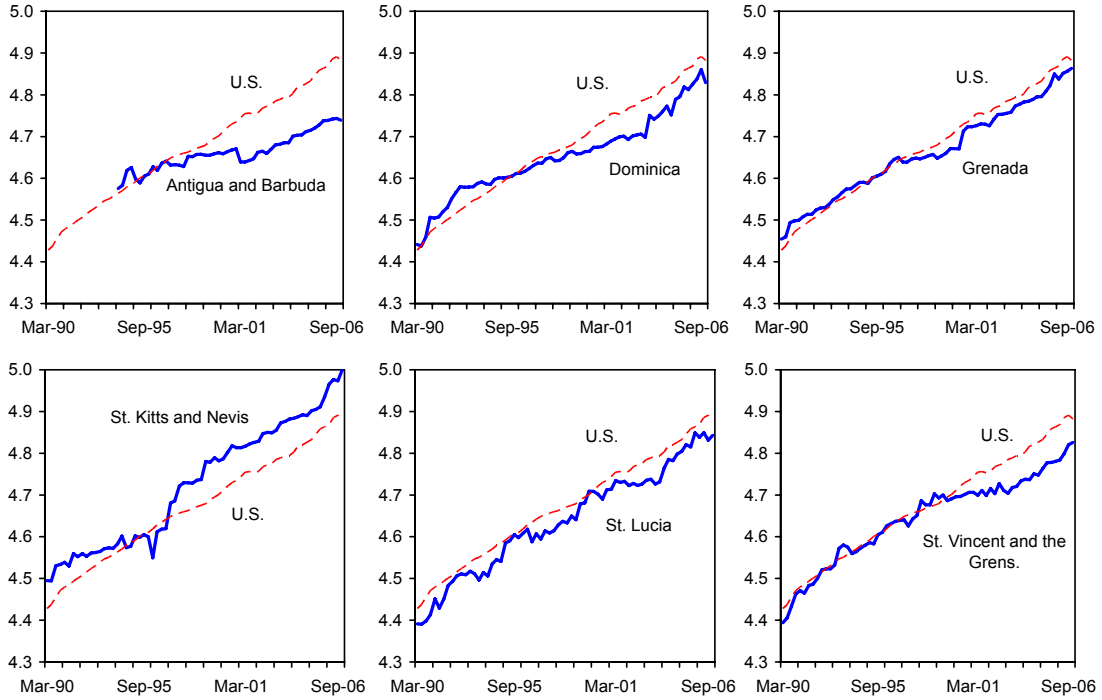
Sources: ECCB; and Fund staff estimates.

Figure 2. ECCU: Tradable Price Index Movement, March 1990–December 2006
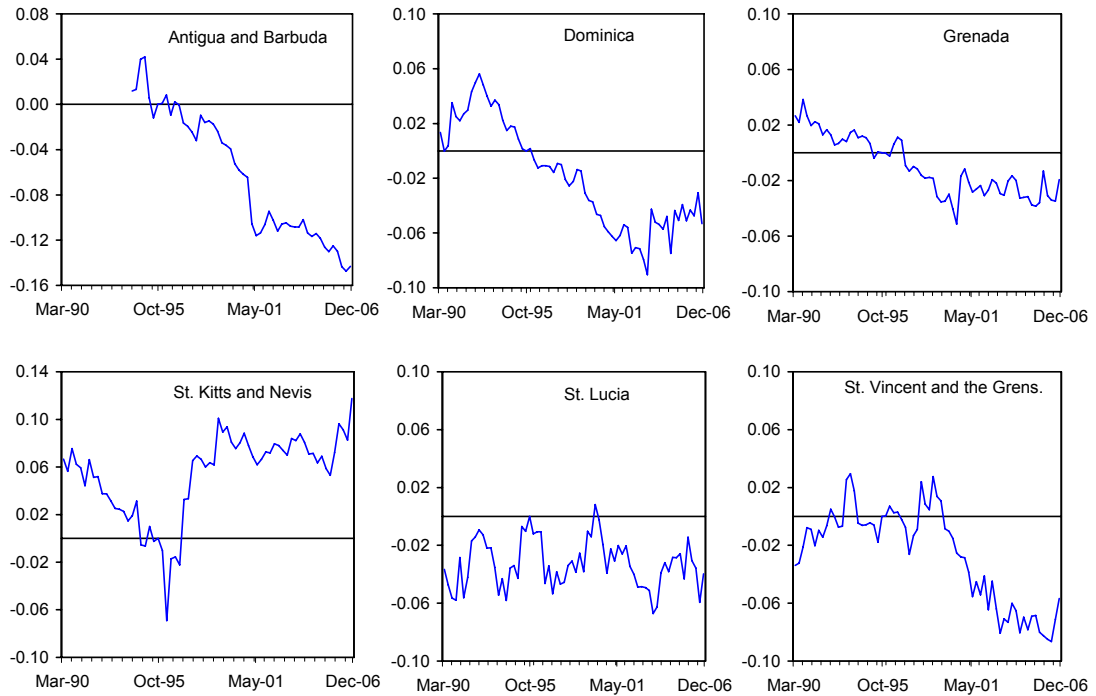(Logarithmic scale, index September 1995=100)
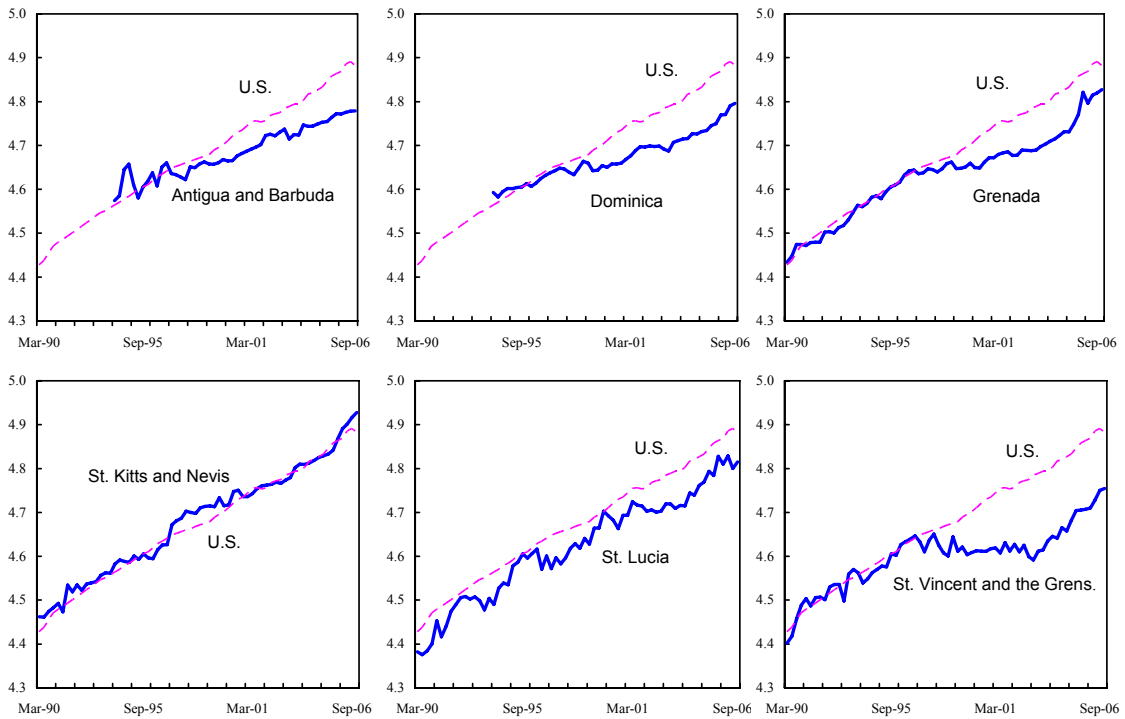
Sources: ECCB; and Fund staff estimates.

Figure 3. ECCU: Nontradable Price Index Movement, March 1990–December 2006
(Logarithmic scale, index September 1995=100)

Sources: ECCB; and Fund staff estimates.

Figure 4. ECCU: Relative Price Indexes with the United States, March 1990–December 2006
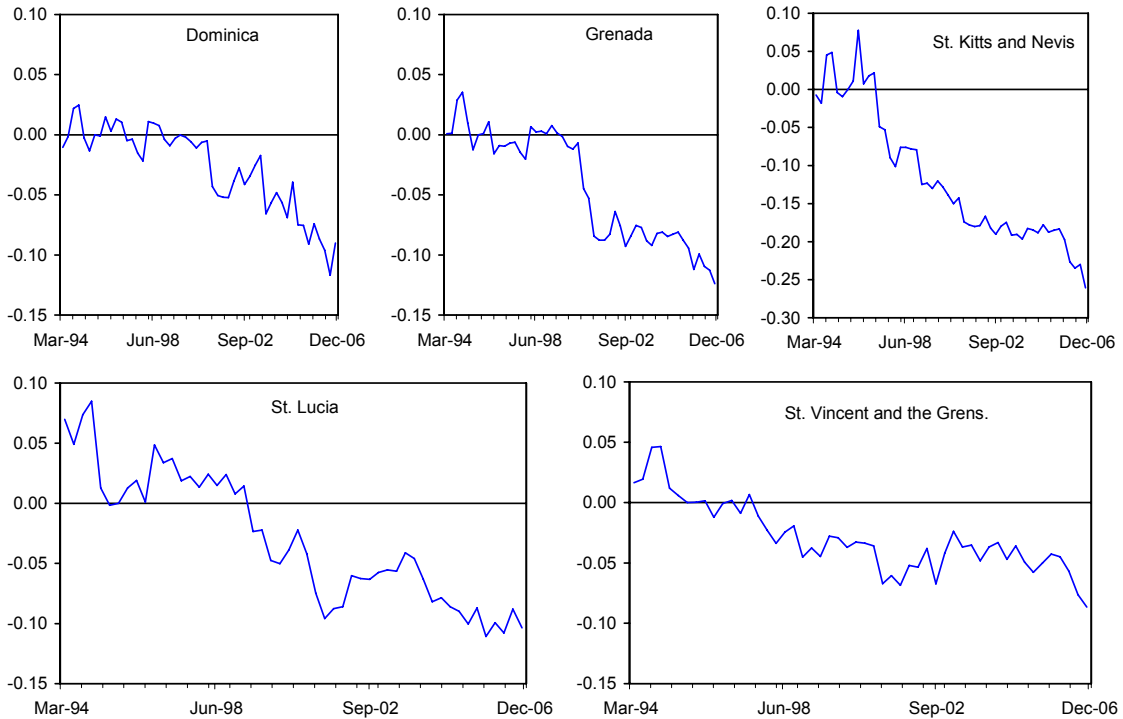(Logarithmic difference)

Sources: ECCB; and Fund staff estimates.

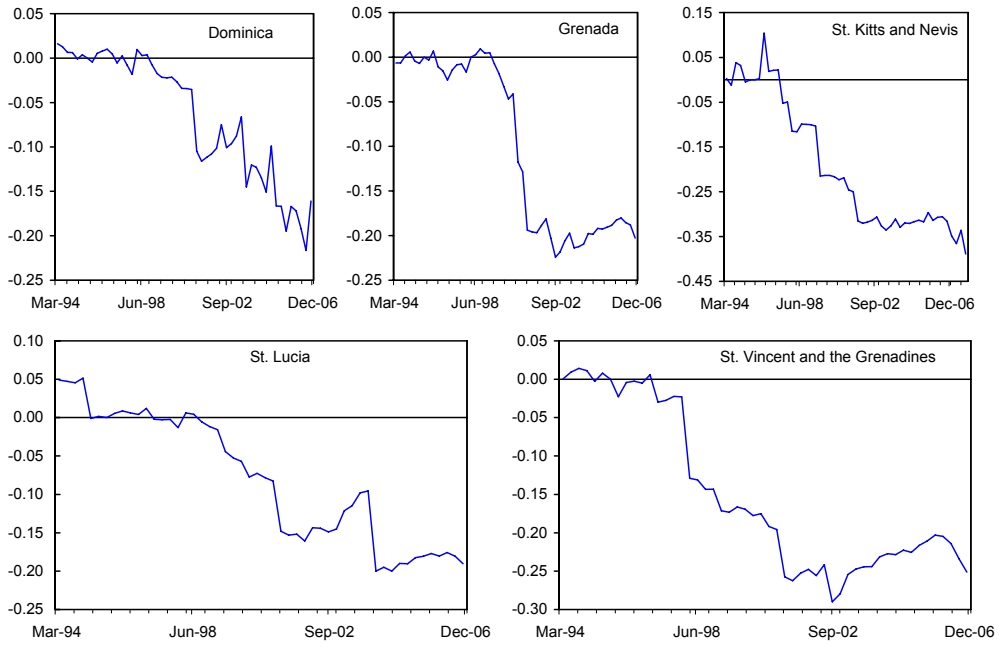Figure 5. ECCU: Quarterly Inflation, March 1990–December 2006
(In percent)
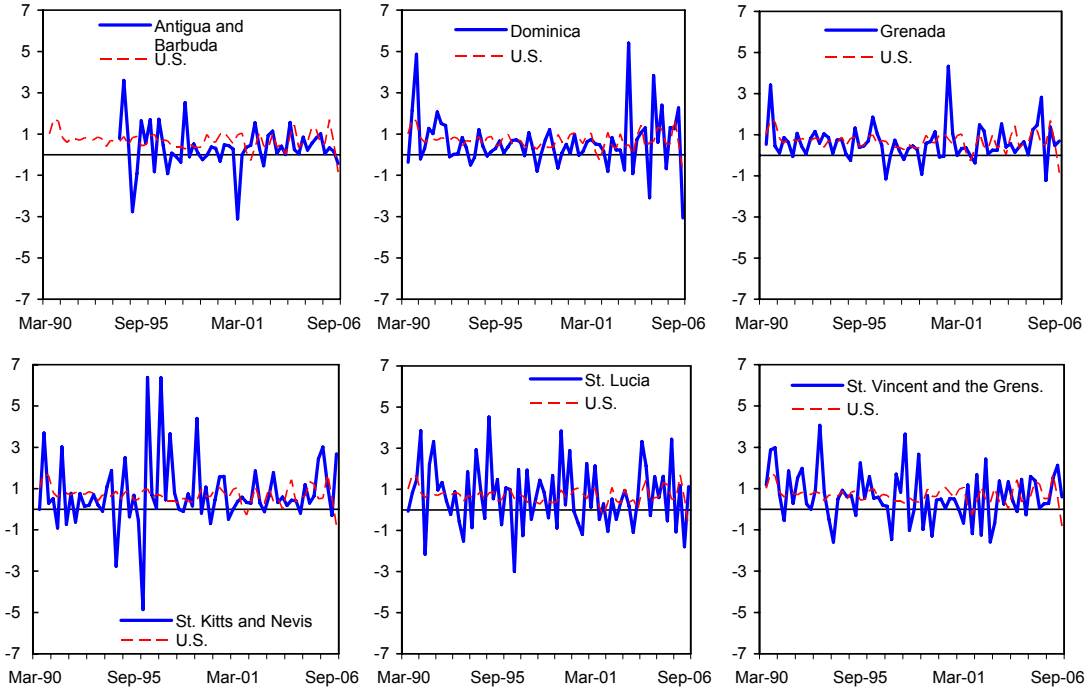
Sources: ECCB; and Fund staff estimates.

Figure 6. ECCU: Relative Prices with Antigua and Barbuda, March 1994–December 2006
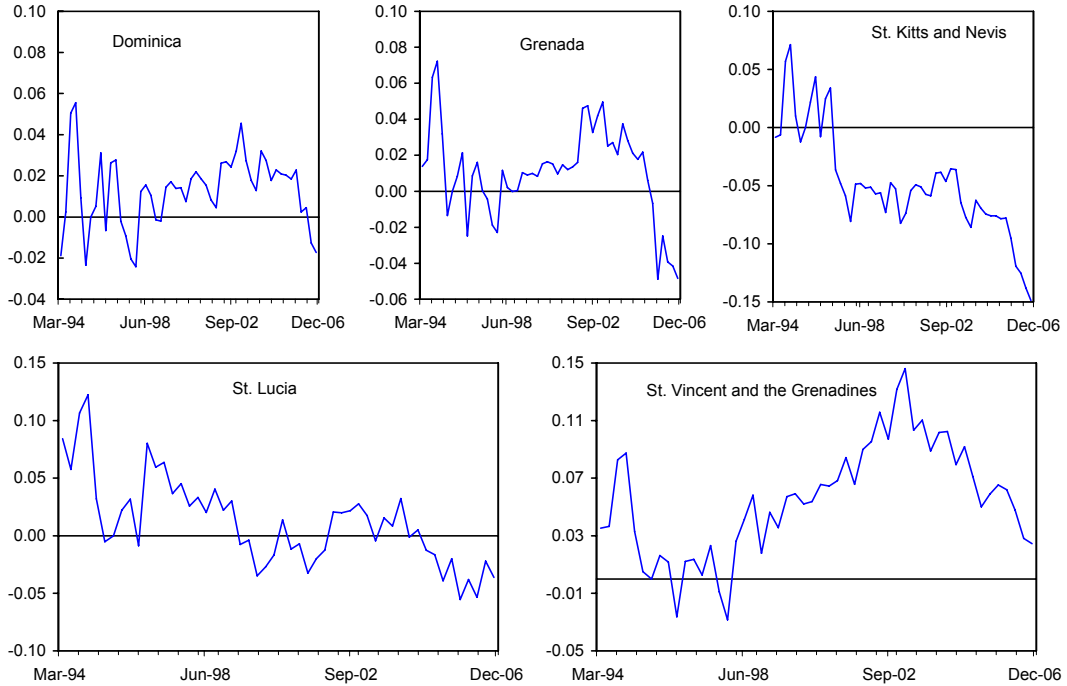(Logarithmic difference)

Sources: ECCB; and Fund staff estimates.

Figure 7. ECCU: Relative Nontradable Prices with Antigua and Barbuda, March 1994–December 2006
(Logarithmic difference)

Sources: ECCB; and Fund staff estimates.

Figure 8. ECCU: Relative Tradable Prices with Antigua and Barbuda, March 1994–December 2006
(Logarithmic difference)

Sources: ECCB; and Fund staff estimates.

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