Economic and Financial Linkages in the Western Hemisphere
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Central America's Regional Trends and U.S. Cycles

Shaun K. Roache

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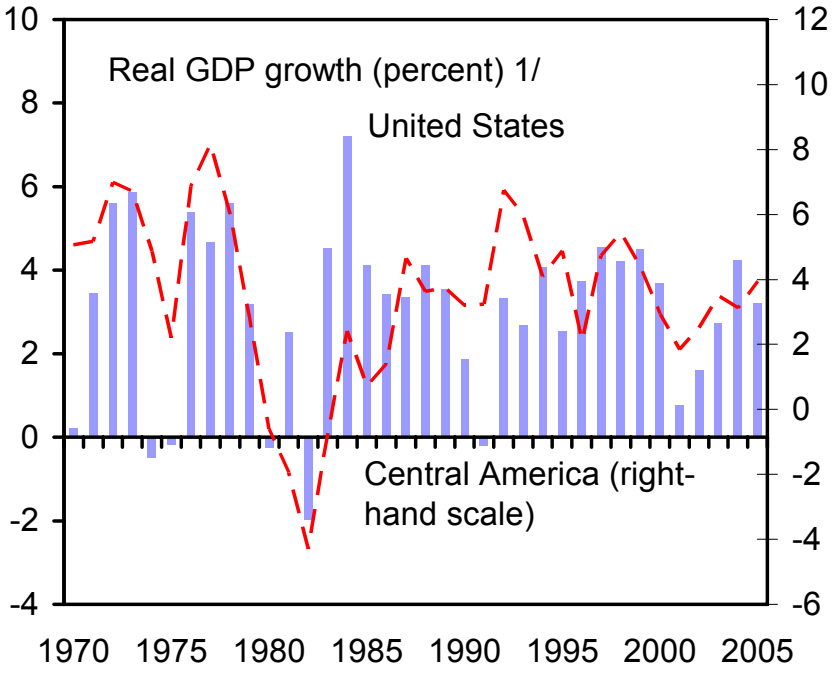
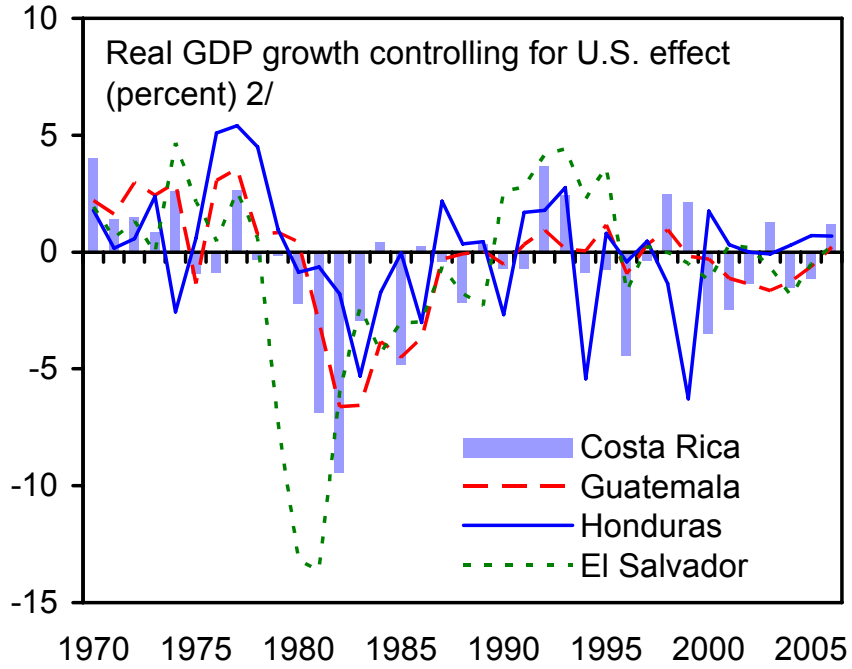
Motivation

- Central America (C.A.) and the U.S…
- …a close relationship with a long history





Source: International Financial Statistics, author's calculations.
1/ Weighted average excluding Nicaragua and Panama.
2/ Residuals from an OLS regression of country GDP growth on U.S. GDP growth.

Questions and Some Answers

1. How “U.S. growth dependent” is C.A.?
   C.A. business cycle is very U.S. dependent.

2. Is there a C.A. business cycle?
   No!

3. Why did C.A. decouple from the U.S. in the past?
   Long-term “trend shocks” such as armed conflicts

4. Can C.A. decoupling happen again?
   Clues, but no answers…

Linkages – Stylized Facts

Three main transmission channels from the U.S.:

1. Trade

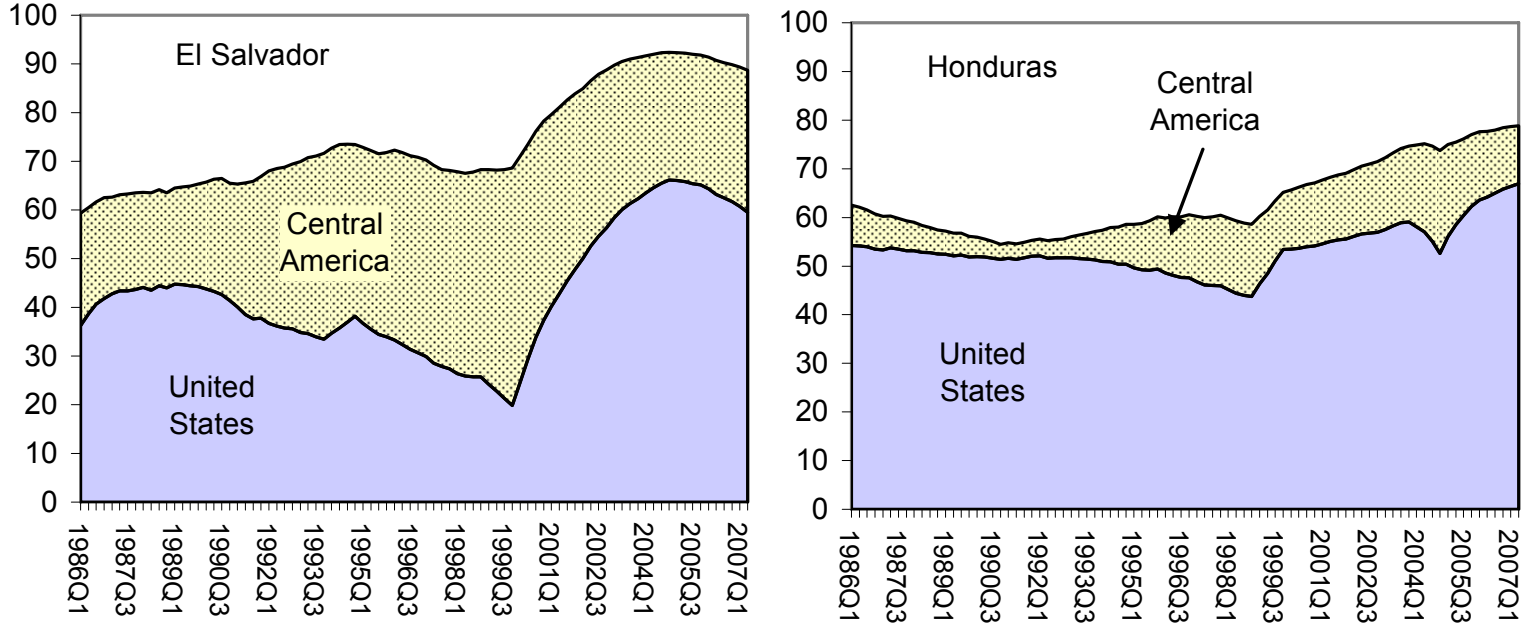
2. Financial sector

3. Remittances

Trade

- Over the last 5 years, ~47% of merchandise exports go to the U.S, another ~20% go the region

Destination of Exports (percent of total exports)
1986 Q1 - 2007 Q2 1/

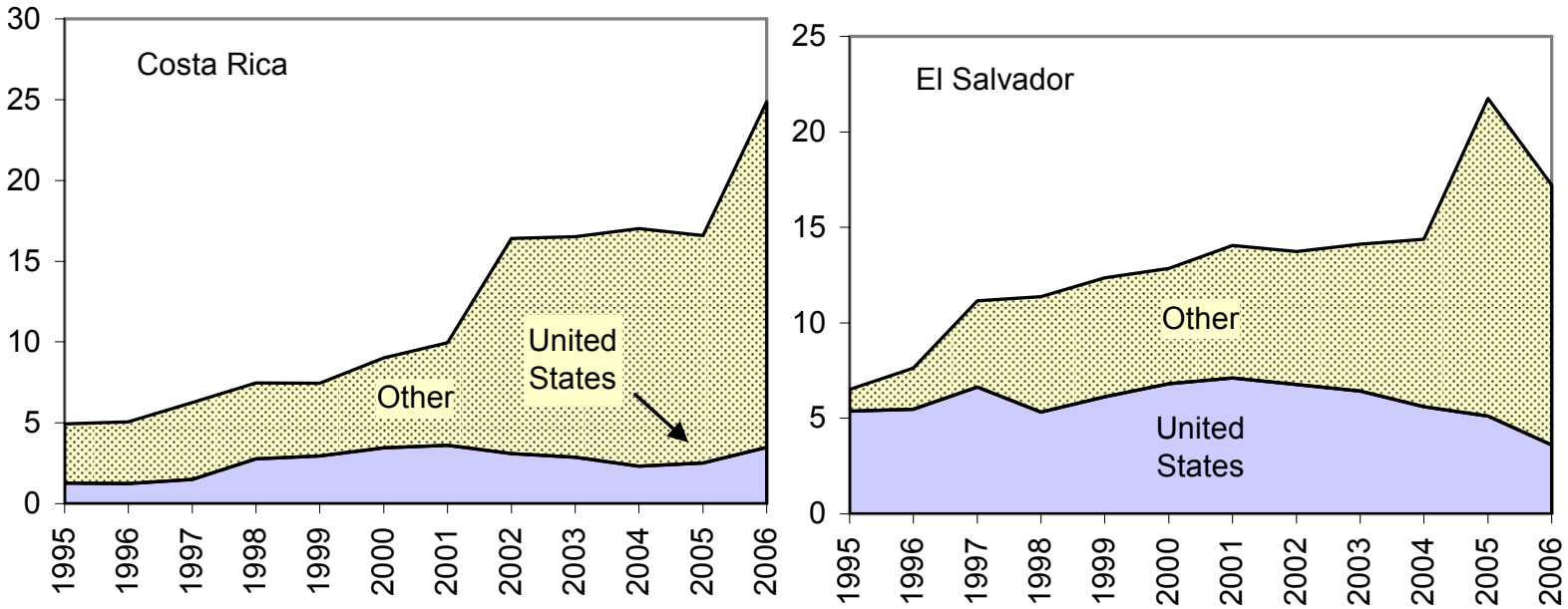


Source: IMF Direction of Trade Statistics.
1/ Rolling five-year sum of quarterly export data.

Financial Sector

- End-2006, claims by BIS banks accounted for 14% of GDP (excl. Panama), of which ½ was short-term

Central America: External Debt Owed to BIS-reporting Foreign Banks by Domicile (percent of GDP 1995-2006)



Source: Bank for International Settlements.

Remittances

- Remittances are large, but evidence of link to U.S. business cycle is weak (IMF REO November 2007)

Comparing the Size of Remittances, 2006

	US dollars billions	Percent change since 2000	Percent of GDP	Percent of FDI inflows	Percent of Exports of G&S
Costa Rica	0.5	na	2.3	74	4
El Salvador	3.3	89	18.1	667	69
Guatemala	3.6	541	10.2	1,111	66
Honduras	2.2	na	25.0	774	60
Nicaragua	0.7	105	12.2	235	28

Source: National authorities; International Financial Statistics; author's calculations.

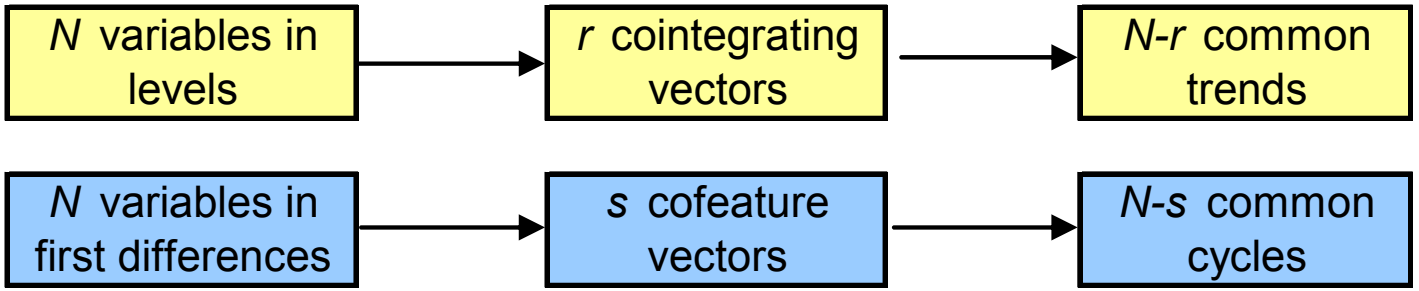
Previous Literature

- Fiess (2007)
  - measures C.A. business cycle synchronization
  - correlations and coherence
  - U.S. a big influence, except for NIC and PAN

- Kose and Rebucci (2005)
  - multi-country VARs using GDP growth rates
  - NAFTA shocks → average of 22% of output variance
  - regional shocks → average ½ of output variance

Common Cycles Method

- Vahid and Engle (1993)
- Analagous to cointegration in reasoning…



- Intuition – some combination of first differences remove all predctive power of history.

Common Cycles Method

- Also, analagous to cointegration in method
- Based on canonical correlations.

$$\max \operatorname{corr}\left(\Delta \mathbf{y}_t, \left[\Delta \mathbf{y}_{t-1} \quad \cdots \quad \Delta \mathbf{y}_{t-p} \quad \boldsymbol{\beta} \mathbf{y}_{t-1}\right]\right)$$

- Formal tests – are the canonical correlation coefficients significantly different from zero?

Data and Correlations

Nicaragua and Panama exhibit low correlations

Evidence of "unique" Central American comovement

	Correlation of GDP growth rates including the United States						Correlation of GDP growth rates controlling for the U.S. effect 2/					
	Costa Rica	El Salvador	Guatemala	Honduras	Nicaragua	Panama	Costa Rica	El Salvador	Guatemala	Honduras	Nicaragua	Panama
						1950-2006						
El Salvador	**0.54**						**0.47**					
Guatemala	**0.38**	**0.39**					**0.36**	**0.37**				
Honduras	0.12	**0.26**	**0.44**				0.01	0.15	**0.42**			
Nicaragua	0.13	**0.33**	0.10	-0.21			0.13	**0.34**	0.10	-0.24		
Panama	0.21	0.13	0.09	-0.07	0.23		0.23	0.14	0.09	-0.07	0.23	
United States	**0.34**	**0.37**	0.13	**0.35**	0.05	0.00						

Source: Author's calculations

1/ Figures in bold are statistically significant at the 5 percent level.

2/ These correlation coefficients use residuals from a regression of country i's growth rate on a constant and the United States growth rate, over the same sample period.

Estimating the Model

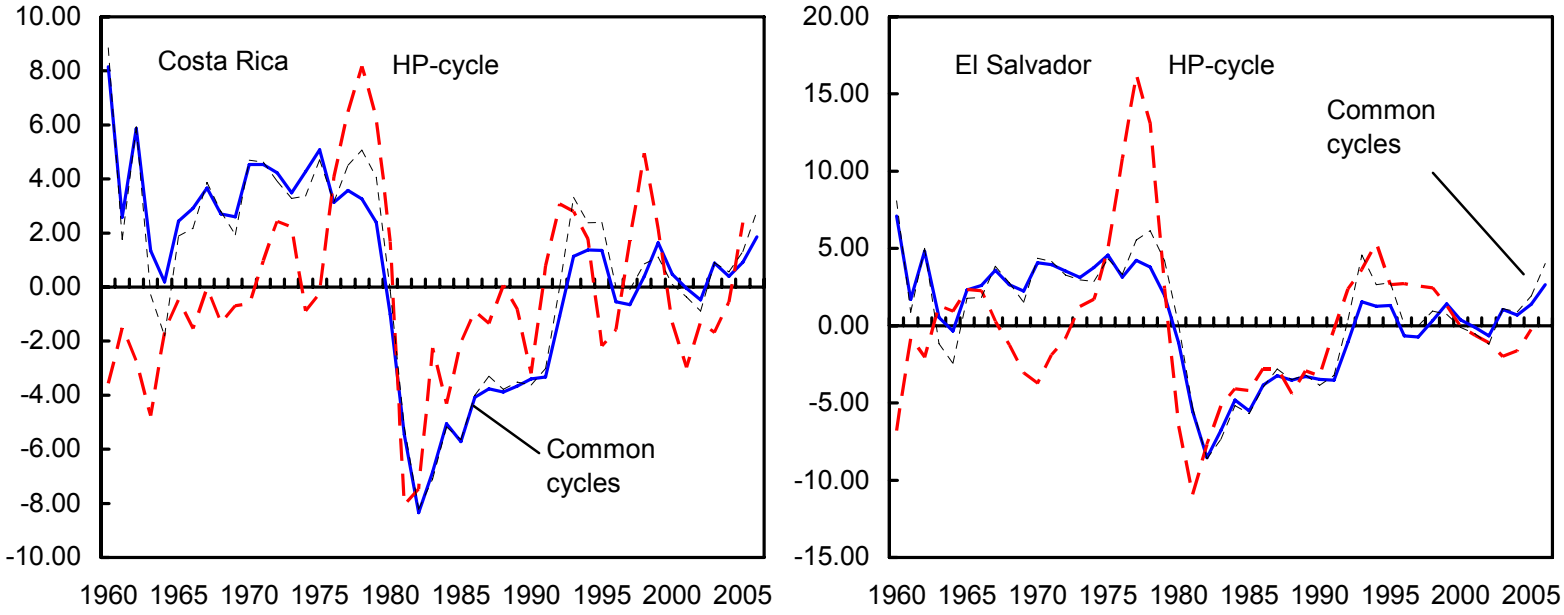
- 3 cointegrating vectors → 4 common trends
- 4 cofeature vectors → 3 common cycles
- Pseudo-structural form
  - *s* equations in first difference to estimate cofeatures
  - *r* equations in reduced form complete the system
  - estimated using iterative 3SLS

$$\begin{bmatrix} \mathbf{I}_s & \tilde{\boldsymbol{\alpha}}^{*\prime} \\ \mathbf{0}_{(n-s)\times s} & \mathbf{I}_{n-s} \end{bmatrix} \Delta \mathbf{y}_t = \begin{bmatrix} \mathbf{0}_{s\times(np+r)} \\ \boldsymbol{\Pi}_1^*, \ldots, \boldsymbol{\Pi}_1^* \beta^* \end{bmatrix} \cdot \begin{bmatrix} \Delta \mathbf{y}_{t-1} \\ \\ \\ \Delta \mathbf{y}_{t-p} \\ \tilde{\boldsymbol{\alpha}}' \mathbf{y}_{t-1} \end{bmatrix} + \mathbf{v}_t$$

GDP Cyclical Components

- Similarities with the HP-filter, but less volatile

Central America: Cyclical Components of GDP, 1960-2006 1/



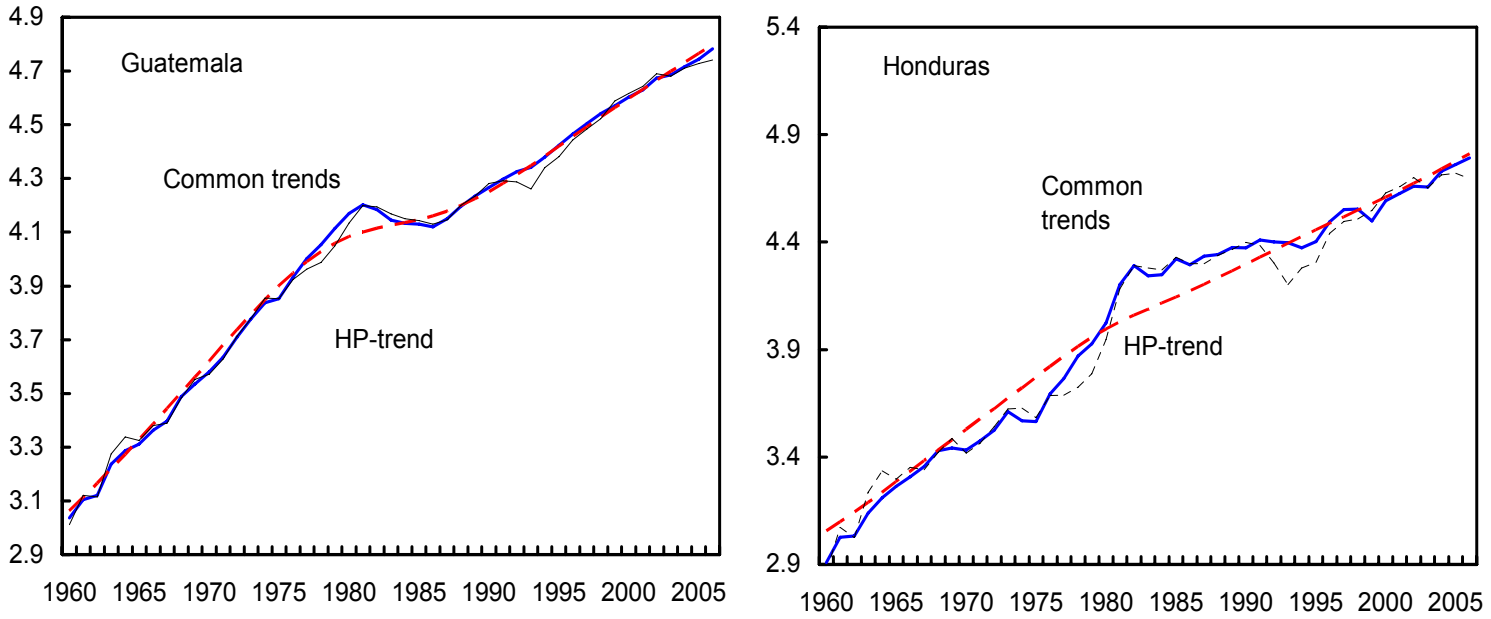
Source: Author's calculations.

1/ There are two cyclical components from the common cycles model for each country. Cycle 1 is estimated from a model with 4 cofeature vectors (i.e. 3 common cycles and 4 common trends). Cycle 2 is estimated from a model with 3 cofeature vectors (i.e. 4 common cycles and 3 common trends).

GDP Trend Components

- Trends more volatile than the HP filter

Central America: Trend Components of GDP, 1960-2006 1/

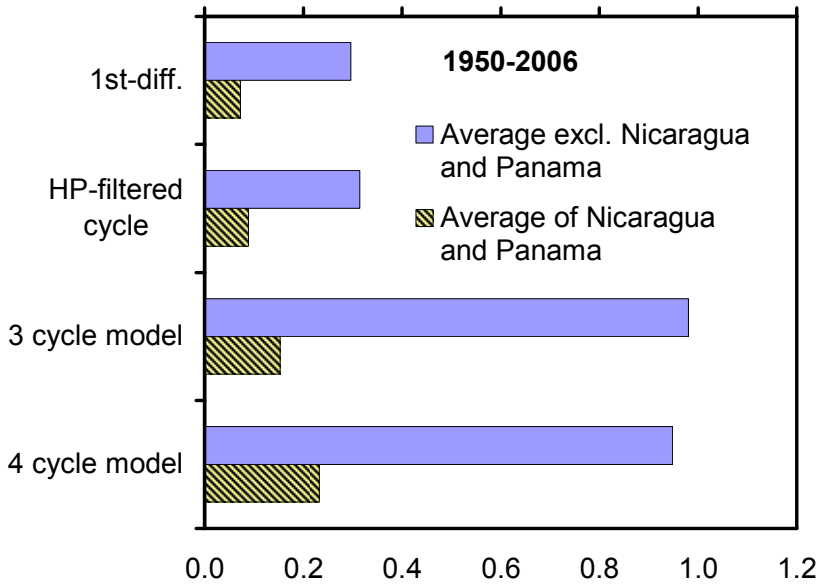


Source:Author's calculations.

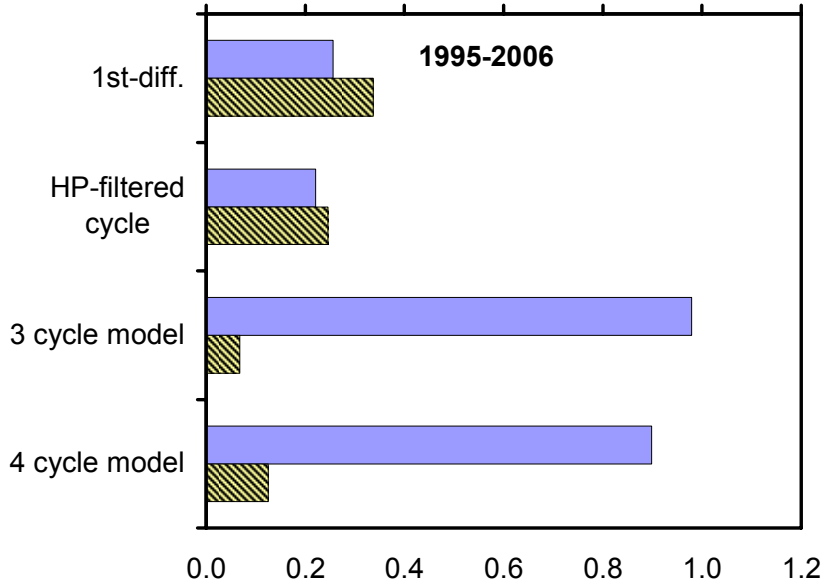
1/ There are two trend components from the common cycles model for each country. Trend 1 (solid line) is estimated from a model with 4 cofeature vectors (i.e. 3 common cycles and 4 common trends). Trend 2 (broken line) is estimated from a model with 3 cofeature vectors (i.e. 4 common cycles and 3 common trends).

High Cyclical Correlations

Central America: Average Correlation of Cyclical GDP Component to the United States - Comparison of Methods 1/



Source: Fund Staff estimates



Source: Fund Staff estimates

Source: Author's calculations

1/ The methods include first-differenced log values, the first difference of the cyclical component from the Hodrick-Prescott filter, and the first difference of the common cycle factor recovered from the Vahid and Engle (1993) decomposition.

Growth Elasticities

- U.S. cycle matters for the C.A. cycle
- U.S. trend much less important

	Elasticity of the Cycle to		Elasticity of the Trend to	
Country	US cycle	US trend	US cycle	US trend
Costa Rica	0.90 ***	0.02	0.00	0.41 *
El Salvador	1.07 ***	0.06	-0.23	0.44
Guatemala	0.17 ***	0.01	-0.05	0.11
Honduras	0.59 ***	0.00	0.00	0.66 **
Nicaragua	0.41	0.36	-0.35	-0.86
Panama	0.10	0.03	-0.10	-0.35

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

Conclusion

- Regional growth trends and a U.S. cycle

- How will linkages evolve? Key is CAFTA
  - Obvious: encourage more U.S. integration
  - Less obvious: stimulate diversification?
  - Short-run: can +ve trends offset the –ve cycle?

- Why is this important?
  - "Source of growth" should affect the policy response
  - Current e.g.: save or spend the current tax revenue windfall?