Business cycle symmetry in the Caribbean – Is CSME a feasible Optimum Currency Area?

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This version: November 13, 2011
Preliminary: Not for publication

Abstract

Are CSME members feasible candidates for a monetary union? This paper re-examines this question for the Caribbean region from a new perspective. Using a Dynamic Factor Model to determine the share of output growth attributable to global, regional and country-specific factors, symmetry of business cycles among CSME members is assessed. This paper further contributes to the Caribbean literature by applying the same analysis to the EU and other proposed OCAs (ASEAN+3, GCC and UNASUR) and comparing results across these regions. One of the main insights provided is that business cycle symmetry among CSME members is similar to that among the EU countries prior to forming the EU, suggesting that discussions on forming a monetary union in the Caribbean are not baseless. This result contrasts with the views of recent papers addressing this topic.

1. Introduction

The European Central Bank and IMF debt bailouts of Greece and Ireland in 2010 and the proposed $80 billion Euros debt bailout of Portugal by June 2011 are sobering examples of the costs associated with joining and maintaining an Optimum Currency Area (OCA). As such, they underscore the importance of the question of whether certain countries should form an OCA. They also suggest the need for a clear understanding of the differences among member countries in order to ascertain and address possible vulnerabilities. It is within this context that this paper focuses on the Caribbean.

In 2006, the region effectively began the process of forming a monetary union. Adopting the name 'Caribbean Single Market and Economy' (CSME) in that year, the current membership now comprises of 15 countries that have already taken decisive steps towards economic integration. While the desire and start-up commitment was expressed on several occasions before, for well over half a century, the 2006 agreement seemed much more promising – an official plan of action was drafted and articulated, pieces of the necessary architecture agreed upon were being achieved and anecdotal reports held that organizations like the Inter-American Development Bank firmly threw their support behind the plan. Over the period 2006-2010, with the explicit goal of ensuring the free movement of people, goods, capital and right to establishment, a number of enabling measures were implemented. CSME representatives reported on the formation of a Caribbean Court of Justice, implementation of a regional accreditation bodies, harmonization of standards through the formation of Caribbean Regional Organization on Standards and Quality, harmonization of taxation systems, removal of work-permit requirements for members and harmonization of legislature on agriculture, energy-related industries and intellectual property rights. Two very significant goals had initially been set for the 2010 2015 period: harmonization of fiscal and monetary policies and introduction of a single currency.

The post-2007 financial crisis period has seen a slowdown of the CSME integration process. Amidst the harsh impact of the global crisis on Caribbean economies, the threat of double-dip US recession and the turmoil in the European Union, this may not seem surprising. However, the reasons behind the slowdown run much deeper than just mitigating the current precarious global economy.

To put matters in perspective, for most of the decade after the EU formed in 1999, the EU served as a role model to fledgling and aspiring monetary unions and their success re-ignited talks of integration among many regions. The EU had apparently managed to engineer a well-functioning union and in so doing, realize many of theorized benefits of an OCA! The 2007 global crisis period completely changed these views. The continuing struggles of the EU all too clearly emphasize the dangers of giving up interest and exchange rate flexibility and now represent the need for caution on matters of integration. Against this backdrop, a better appreciation of the following comments made by Caricom Chairman Dr. Denzil Douglas (July, 2011):

> "But with the challenges unfolding today globally, we will have to slow the pace a bit and take a much more realistic perspective of where we have to go in the integration movement."

These cautionary words have been echoed by several other government officials and policymakers. While slowing down to carefully assess the way forward is prudent advice, they also highlight the fact that the way forward is not clear to many Caribbean leaders. What complicates matters and makes the answer even more difficult is one of the main thoughts shared by Caribbean leaders for decades: the Caribbean region can only remain economically competitive in the current and future globalized economy by standing together. The questions of the form of integration, and more broadly, the way forward are consequently still open economic questions and carry important policy implications.

This paper aims to approach these issues by first taking stock of where CSME left off. The consensus among policymakers prior to the recent and ongoing global economic challenges was that CSME should form a monetary union and that such a move would be welfare enhancing. As such, I re-examine the question of whether CSME can form viable OCA by empirically investigating how well member countries conform to the most fundamental of OCA criteria - business cycle symmetry. I contribute to the current literature in two main ways. First, I apply a more recent empirical methodology that has received considerable attention in the OCA literature, one that has not been previously used to study CSME. Secondly, I conduct the same analysis on other current and aspiring OCAs (AEAN+3, GCC, UNASUR and EU) and compare results across all prospective monetary unions. I report new findings on how well the Caribbean

fits OCA criteria – briefly, my results suggest that arguments in favor of CSME are certainly not baseless.

2. Literature Review

Mundell (1961) represented the first major work on OCAs. In that seminal paper, a number of conditions (Mundell criteria) were given for the successful operation of an OCA. It is against this backdrop that the subsequent literature evaluated whether OCAs should be formed in various regions.

One of the more popular and widely accepted Mundell criteria employed for evaluation of proposed monetary unions is the need for similar business cycles. The intuition is that the single monetary authority representing the monetary union would be more effective in setting policies when countries share similar business cylces. As such, the OCA was more likely to succeed. This paper is primarily concerned with an evaluation of CSME as a potential OCA along this dimension.

The most comprehensive paper I found that investigated business cycles in the Caribbean was Cashin (2006) where the focus was compiling Caribbean business cycle stylized facts. He examined the duration, amplitude, turning points and co-movement of business cycles of various Caribbean countries and compared to those of developed and other developing countries over the period 1963-2003. One of his main findings was that while Caribbean classical cycles exhibited large asymmetries in duration and amplitude, Caribbean growth cycles were much more symmetric. Another key finding was evidence of synchronization among Caribbean growth cycles. Although this paper does not address the question of CSME as a viable OCA and does not include all CSME members, these findings provide some initial evidence in favor of a Caribbean monetary union.

Turning to the literature explicitly addressing the question of CSME as a viable OCA, the following are the three most comprehensive. Augustine (2008) examined business cycle co-movements among all members of CSME using the Pearson correlation coefficient and Pagan-Harding statistic. He concluded that CSME members' business cycles were not very correlated and therefore did not fulfill OCA criteria. A shortcoming of this paper is that it provides no

information on the source of differences among CSME business cycles. Additionally, given the static nature of the methodology, it does not provide any sense of whether business cycles were getting more similar or divergent over time.

Pentecost and Turner (2010) approached this topic differently. Using SVAR techniques to isolate demand and supply shocks and then calculating the correlation between these shocks they conclude the shocks were not very correlated and as such, CSME did not fit OCA criteria. This paper falls short in that only four of the larger members of CSME were included in the study.

Ghartey (2008) utilized a similar approach and included all CSME members. Within a VECM framework, he identified supply and demand shocks and calculated the pair-wise correlations among all members by type of shock. He also examined the size of the shocks and speed of adjustment in each country through impulse responses. He concluded that all CSME members do not fulfill OCA business cycle criteria due to asymmetry of shocks. There are three major shortcomings here. This paper does not consider the propagation of shocks within each country - asymmetric shocks may be propagated differently and have the same effect on GDP. Secondly, it does not consider other views of types of shocks. It does not provide any sense of how much global, regional and country-specific shocks matter to each country – certainly if regional shocks were more important in each country's business cycle versus global and country-specific shocks, the region should still form an OCA even though supply and demand shocks affected them asymmetrically. Thirdly, it does not provide any intuition of how CSME compares to existing OCAs. Without some reasonable benchmark for comparison (example, Euro area) the empirical results obtained are insufficient by themselves to address the fundamental question of CSME being a viable OCA.

3. Methodology - Bayesian Dynamic Factor Model

The goals of the empirical methodology to be employed are: identify global, euro zone regional, CSME regional and country-specific shocks, and, determine relative importance of each shock for all countries via variance decompositions. To this end, I estimate a Latent Dynamic Factor Model (DFM) similar to the one first presented by Kose, Otrok, Whiteman (AER 2003). The model is specified as follows:

$$y_{i,t} = \lambda_i^g f_t^g + \lambda_i^r f_t^r + \varepsilon_{i,t}$$

(0.1)

$y_{i,t}$ is demeaned real gdp per capita annual growth for country i (i=1,…,N) at time t (t=1,…,T); data is annual and covers 1981-2009 (T=29) for 6 regions (j=60) comprising 60 (N=60) countries in total. f_t^g is a global unobserved factor common among all countries, $f_{j,t}^r$ is a regional unobserved factor common only to countries within each region, j, and $\varepsilon_{i,t}$ is the country-specific unobserved factor at time t (these three factors are my latent factors). λ_i^g and λ_i^r are the loadings for the global and regional factors for each country.

The latent factors are specified as follows:

$$\varepsilon_{i,t} = \rho_{1,i}\varepsilon_{i,t-1} + \rho_{2,i}\varepsilon_{i,t-2} + \eta_{i,t}$$

(0.2)

$$f_t^g = \rho_1^g f_{t-1}^g + \rho_2^g f_{t-2}^g + \eta_t^g$$

(0.3)

$$f_{j,t}^r = \rho_{1,j}^r f_{j,t-1}^r + \rho_{2,j}^r f_{j,t-2}^r + \eta_{j,t}^r$$

(0.4)

$\eta_{i,t} \sim N(0,\sigma_i^2)$, $\eta_{j,t}^r \sim N(0,\sigma_{r,j}^2)$, $\eta_t^g \sim N(0,\sigma_g^2)$ and $E(\eta_t^g \eta_{t-s}^g) = E(\eta_{j,t}^r \eta_{j,t-s}^r) = E(\eta_{i,t}\eta_{i,t-s}) = 0$ for $s \neq 0$. Also, disturbances in 1.2-1.4 are uncorrelated contemporaneously as well as for all leads and lags (ie. latent factors are orthogonal).

Using a Bayesian framework (Gibbs sampling), I am interested in uncovering the properties of the joint posterior distribution of the parameters and unobserved factors of the model given the data. A Markov Chain Monte Carlo (MCMC) procedure (replicated 11,000 times with the first 1,000 being dropped) is used to simulate draws from this complete posterior joint distribution, given standard prior conditions in this literature, which are then used to

generate mean estimates of the parameters and factors. The results that follow reflect these mean values.

The decomposition of output growth into the proportion attributable to the global factor (and analogously the other factors) is then computed using:

$$\theta_i^g = \frac{(\lambda_i^g)^2 \, \text{var}(f_t^g)}{\text{var}(y_{i,t})} \tag{0.5}$$

for i=1,…,N; where

$$\text{var}(y_{i,t}) = (\lambda_i^g)^2 \, \text{var}(f_t^g) + (\lambda_i^r)^2 \, \text{var}(f_{j,t}^r) + \text{var}(\varepsilon_{i,t}) \tag{0.6}$$

Annual data on gdp, gdp deflator and CPI were obtained from the WDI database for the periods 1970 – 2009.

4. Results – listing of graphs and tables shown

In the following tables and figures shown, 'G' refers to the global factor, 'R' refers to the regional factor, and 'C' refers to the country-specific factor. Figures are sorted by size of global proportion to allow easier comparison.

Results shown:

- Decompositions by country for the periods before and after formation of EU (sub-periods 1981-1998 and 1999-2009) – Table 1 and Figure 1

- Estimated global and regional latent factors across full period (f_t^g , $f_{j,t}^r$) – Figure 2

- Average decomposition for CSME vs EU before entering union - Figure 3

- Average decomposition by region (prior to forming any unions) - Figure 4

- Average decomposition by region (across 2 sub periods) - Figure 5

5. Main Conclusions

1. The decompositions for the periods before and after formation of the EU in 1999 (Table 1) indicate that during the latter period 1999-2009 CSME experienced on average 46% proportion of growth attributable to country-specific factors whereas the EU experienced 51% over 1981-1998 (it would be more appropriate to compare to the EU before becoming an OCA due to the possible endogeneity between forming an OCA and members becoming more harmonized). There is a sense here then that CSME fulfills minimum OCA criteria as much as the EU did before joining.

2. While the sub-periods analysis does reveal that all regions experience lower country-specific influences in the latter period, CSME and ASEAN+3 share a similar story - this decline was mainly accompanied by the global influence becoming more important that in the previous period (Figure 1). In contrast, UNASUR and GCC's decline in the idiosyncratic influence was accompanied mainly by increase in their regional components.

3. Discussions on forming a monetary union in the Caribbean have some empirical traction.
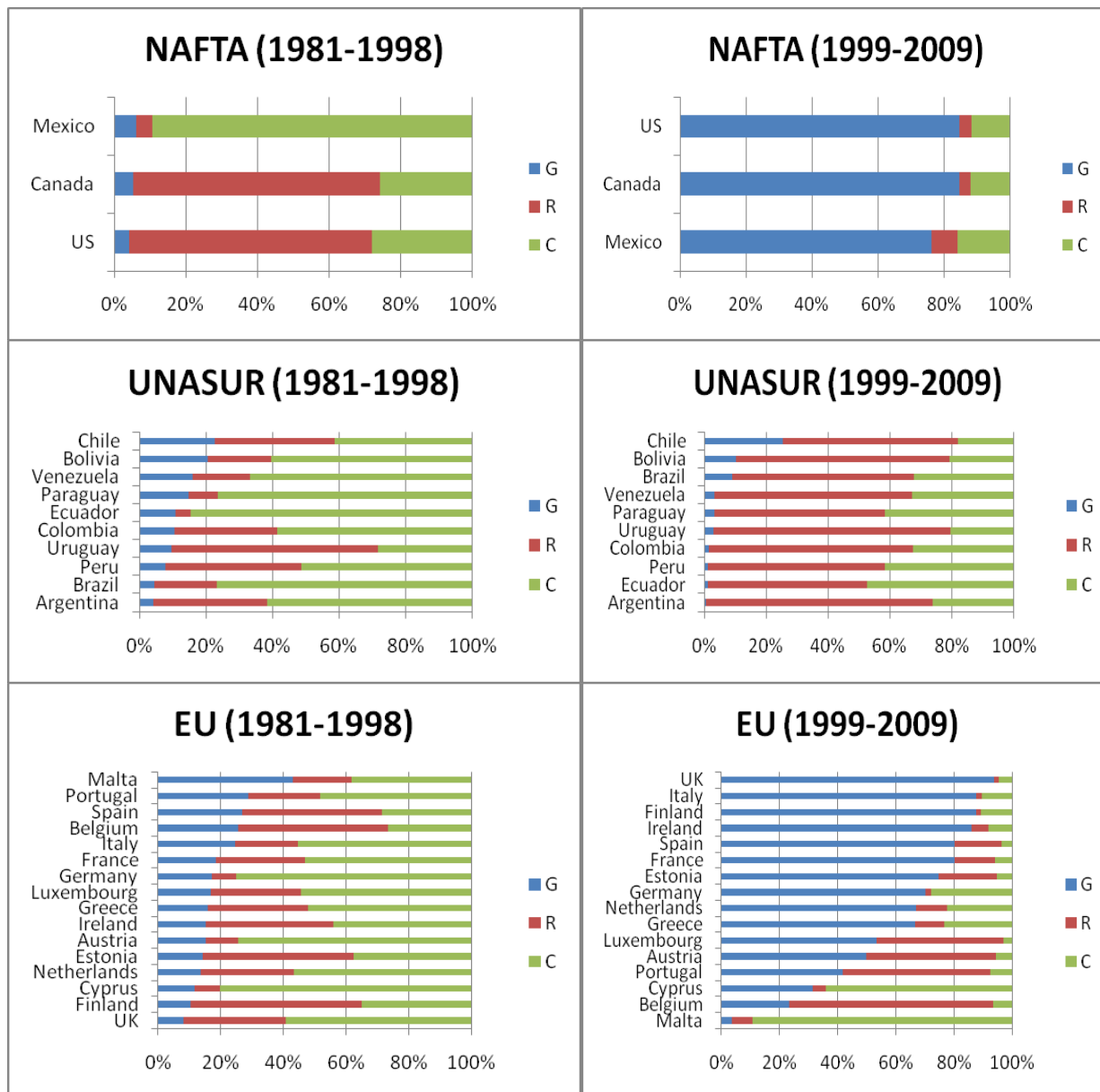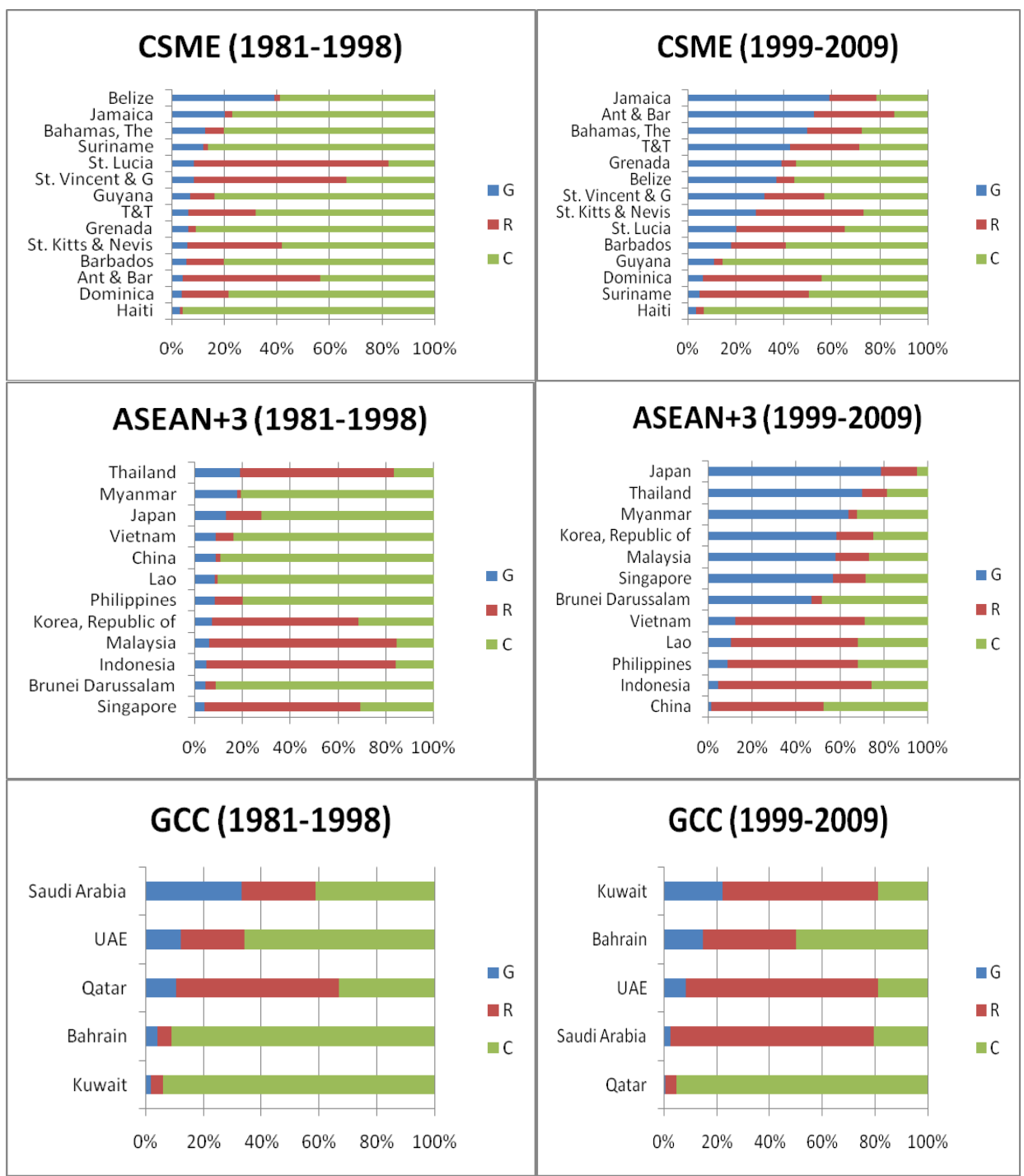
Table 1: Variance Decomposition of real per capita gdp growth into global, regional and country-specific proportions: over sub-periods

		1981-1998				1999-2009		
Regions	**Countries**	**G**	**R**	**C**	**Countries**	**G**	**R**	**C**
NAFTA	Canada	5%	69%	26%	Canada	85%	3%	12%
	Mexico	6%	5%	89%	Mexico	76%	8%	16%
	US	4%	68%	28%	US	85%	4%	12%
	average	*5%*	*47%*	*48%*	*average*	*82%*	*5%*	*13%*
UNASUR	Argentina	4%	34%	61%	Argentina	0%	73%	26%
	Bolivia	21%	19%	60%	Bolivia	10%	69%	21%
	Brazil	5%	18%	77%	Brazil	9%	59%	32%
	Chile	23%	36%	41%	Chile	25%	57%	18%
	Colombia	11%	31%	59%	Colombia	2%	66%	33%
	Ecuador	11%	5%	85%	Ecuador	1%	52%	47%
	Paraguay	15%	9%	76%	Paraguay	3%	55%	42%
	Peru	8%	41%	51%	Peru	1%	57%	42%
	Uruguay	10%	62%	28%	Uruguay	3%	77%	20%
	Venezuela	16%	17%	67%	Venezuela	3%	64%	33%
	average	*12%*	*27%*	*61%*	*average*	*6%*	*63%*	*31%*
EU	Austria	15%	11%	74%	Austria	50%	45%	6%
	Belgium	25%	48%	27%	Belgium	23%	70%	7%
	Cyprus	12%	8%	80%	Cyprus	31%	5%	64%
	Estonia	14%	48%	38%	Estonia	75%	20%	5%
	Finland	10%	55%	35%	Finland	87%	2%	11%
	France	19%	28%	53%	France	80%	14%	6%
	Germany	17%	8%	75%	Germany	70%	2%	28%
	Greece	16%	32%	52%	Greece	67%	10%	23%
	Ireland	15%	41%	44%	Ireland	86%	6%	8%
	Italy	25%	20%	55%	Italy	88%	2%	10%
	Luxembourg	17%	29%	54%	Luxembourg	53%	44%	3%
	Malta	43%	19%	38%	Malta	4%	7%	89%
	Netherlands	14%	30%	57%	Netherlands	67%	10%	23%
	Portugal	29%	23%	48%	Portugal	42%	51%	7%
	Spain	27%	45%	28%	Spain	80%	16%	4%
	UK	8%	32%	59%	UK	94%	2%	5%
	average	*19%*	*30%*	*51%*	*average*	*62%*	*19%*	*19%*

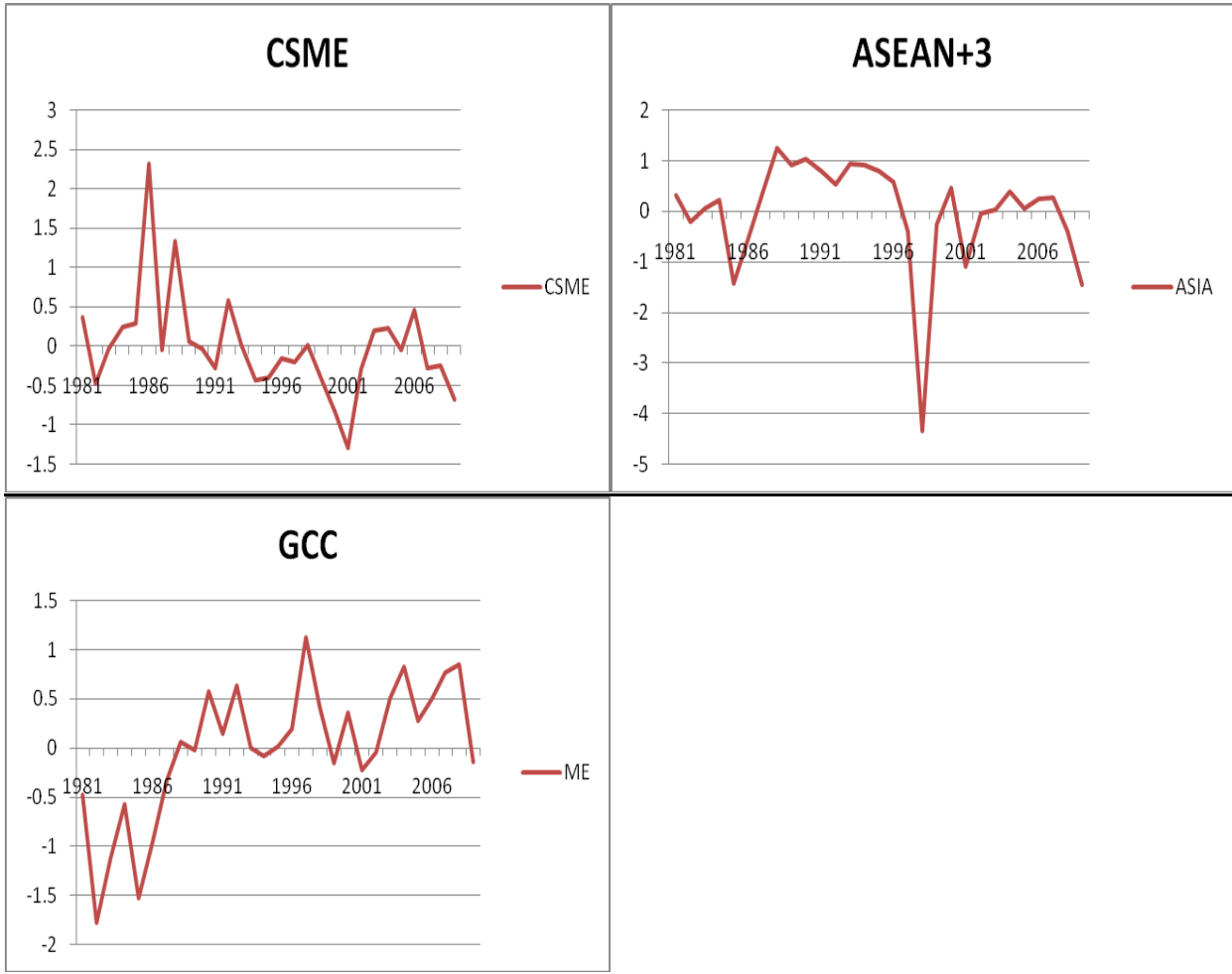| Regions	Countries		G	R	C	Countries		G	R	C
CSME	Ant & Bar	4%	52%	44%		Ant & Bar	53%	33%	14%	
	Bahamas, The	13%	7%	80%		Bahamas, The	50%	23%	28%	
	Barbados	6%	14%	80%		Barbados	18%	23%	59%	
	Belize	39%	2%	59%		Belize	37%	8%	56%	
	Dominica	4%	18%	78%		Dominica	6%	49%	44%	
	Grenada	6%	3%	91%		Grenada	39%	6%	55%	
	Guyana	7%	9%	84%		Guyana	11%	4%	85%	
	Haiti	3%	1%	96%		Haiti	3%	3%	93%	
	Jamaica	20%	3%	77%		Jamaica	59%	20%	21%	
	St. Kitts & Nevis	6%	36%	58%		St. Kitts & Nevis	28%	45%	27%	
	St. Lucia	8%	74%	18%		St. Lucia	20%	45%	35%	
	St. Vincent & G	8%	58%	33%		St. Vincent & G	32%	25%	43%	
	Suriname	12%	2%	86%		Suriname	5%	46%	50%	
	T&T	6%	26%	68%		T&T	43%	29%	29%	
	average	*10%*	*22%*	*68%*		*average*	*29%*	*26%*	*46%*	
ASEAN+3	Brunei D	5%	4%	91%		Brunei D	47%	5%	48%	
	China	9%	2%	89%		China	2%	51%	47%	
	Indonesia	5%	79%	16%		Indonesia	5%	70%	26%	
	Japan	13%	15%	72%		Japan	79%	16%	5%	
	Korea	7%	61%	32%		Korea	58%	17%	25%	
	Lao	9%	1%	90%		Lao	10%	58%	32%	
	Malaysia	6%	79%	15%		Malaysia	58%	15%	27%	
	Myanmar	18%	2%	80%		Myanmar	64%	4%	32%	
	Philippines	8%	12%	80%		Philippines	9%	59%	32%	
	Singapore	4%	65%	31%		Singapore	57%	15%	28%	
	Thailand	19%	64%	17%		Thailand	70%	11%	19%	
	Vietnam	9%	7%	84%		Vietnam	12%	59%	29%	
	average	*9%*	*33%*	*58%*		*average*	*39%*	*32%*	*29%*	
GCC	Bahrain	4%	5%	91%		Bahrain	15%	35%	50%	
	Kuwait	2%	4%	94%		Kuwait	22%	59%	19%	
	Qatar	11%	56%	33%		Qatar	1%	4%	95%	
	Saudi Arabia	33%	25%	41%		Saudi Arabia	3%	77%	21%	
	UAE	12%	22%	66%		UAE	8%	73%	19%	
	average	*12%*	*23%*	*65%*		*average*	*10%*	*50%*	*41%*	

Figure 1: Variance Decomposition of real per capita gdp growth into global, regional and country-specific proportions: over 2 sub-periods

CSME (1981-1998)

CSME (1999-2009)

ASEAN+3 (1981-1998)

ASEAN+3 (1999-2009)
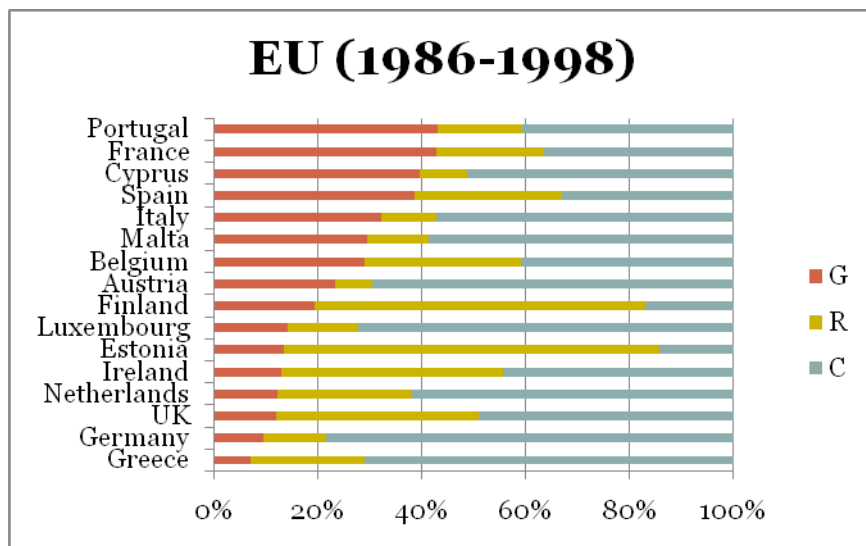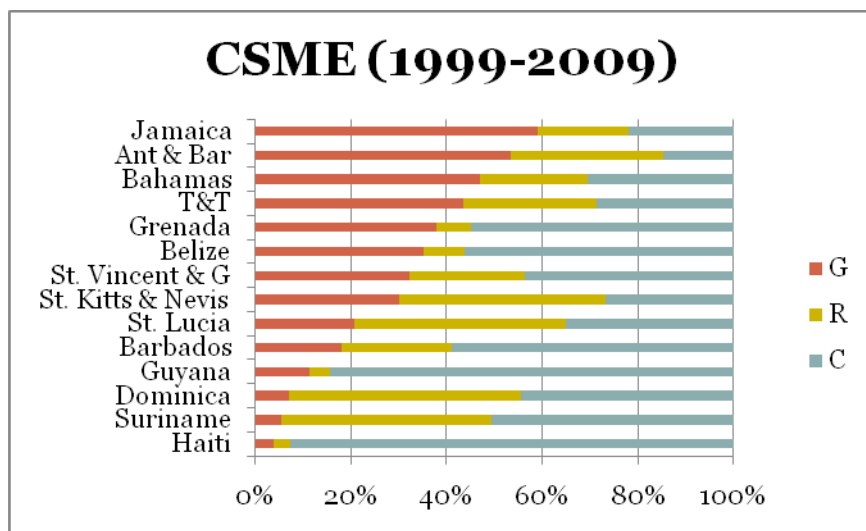

GCC (1981-1998)

GCC (1999-2009)

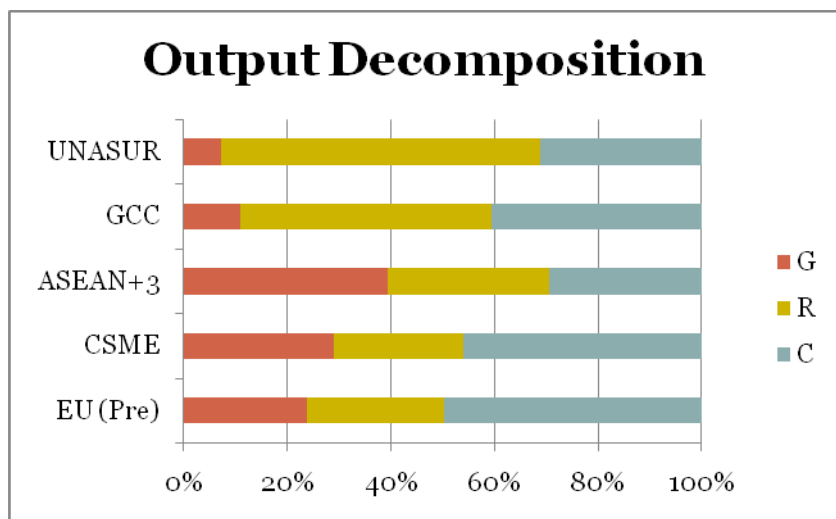**Figure 2:** Estimated global and regional factors (f_t^g , $f_{j,t}^r$)
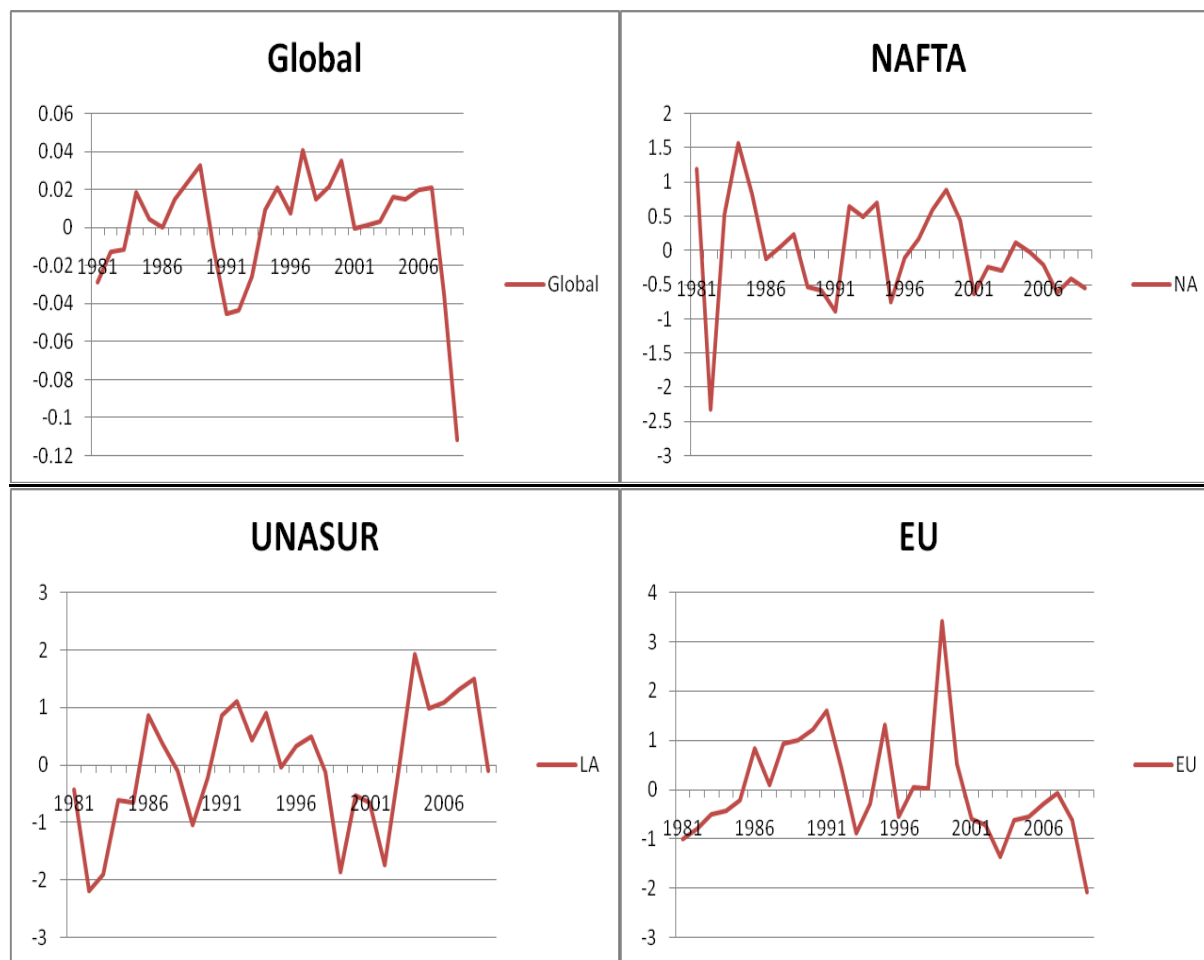
Figure 3: Average Variance Decomposition of real per capita gdp growth into global, regional and country-specific proportions: CSME and EU

Figure 4: Average Variance Decomposition of real per capita gdp growth into global, regional and country-specific proportions: all regions over 1999-2009 (EU is over 1986-1998)

Output Decomposition

Legend: G, R, C

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Figure 5: Average Variance Decomposition of real per capita gdp growth into global, regional and country-specific proportions: by OCA across periods

GCC

UNASUR