



*40th Anniversary Celebrations
A Decade of Pride*

XXXVIth Annual Monetary Studies Conference



Financial Integration and Macroeconomic Volatility in the ECCU

Kari Grenade

**Central Bank of Trinidad & Tobago
Conference Facilities, 16th Floor
November 1-4, 2004**

Draft

**FINANCIAL INTEGRATION AND MACROECONOMIC VOLATILITY
IN THE ECCU**

Abstract

This paper explores the link between financial integration and macroeconomic volatility in the countries of the Eastern Caribbean Currency Union (ECCU) over the period 1986 – 2003. The paper distinguishes between overall macroeconomic volatility (volatility in real GDP growth) and sectoral volatility (volatility of consumption and investment growth). Contrasting results are obtained. While financial integration is associated with lowering consumption volatility, it is linked with rising investment volatility. The results also show that the relationship between overall macroeconomic volatility and financial integration has not been stable over time. The paper advocates that the ECCU should ensure financial integration is accompanied by the reforms that deliver the institutional quality needed to maximise the benefits to economic welfare.

October 2004

*Kari Grenade
Research and Information Department
Eastern Caribbean Central Bank*

Table of contents

1.0 Introduction	3
2.0 Overview of the Empiric Literature	5
3. 0 The degree of financial integration and changes in macroeconomic volatility in the ECCU: 1986-2003.....	6
3.1 Financial Integration within the ECCU context	6
3.1.1 Changes in Macroeconomic Volatility in the ECCU.....	9
4.0 Empirical Testing and Data	11
5.0 Results	13
5.1 Analysis of Results	14
5.1.1 Robustness Checks.....	15
6.0 Conclusions/Recommendations	17
References	21
Appendices.....	23

1.0 INTRODUCTION

What is the exact relationship between financial integration and macroeconomic volatility in the countries of the Eastern Caribbean Currency Union (ECCU)? This paper investigates this relationship, providing empirical evidence on the link between financial integration and the volatilities in the growth of real output, investment and private consumption. The study is motivated by the debates that have emerged both in the policy and academic arenas on the effects of financial integration for small developing countries.

According to the World Bank (1997) in Brunton and Kelsick (2001), the essence of financial integration consists of three sets of measures: first, to expose a country to the uninhibited flow of international finance, second; to eliminate restrictions on the functioning of domestic banks and other financial institutions so that they get properly integrated as participants in the global financial market; and third, to provide autonomy from the government to the central bank so that its supervisory and regulatory role *vis-a-vis* the banking sector is disassociated from the political process of the country and hence from any accountability to the people.

Financial integration (as defined by the process through which a country's market integrates more closely with those in other countries or with those of the rest of the world) has increased in the ECCU over the years. According to Bruton and Kelsick (2001), the integration of the world's financial markets into a single global market place is a subset of the whole globalisation process and is an inescapable part of the external environment in which Caribbean countries must exist.

Fortunately for the countries ECCU, financial integration is not a new phenomenon, these countries have always operated in a globalised environment. According to Samuel

(2001), the production of sugar for export to the United Kingdom and the banking relationships that ensued were the earliest examples of trade and financial integration. Undeniably, financial integration in the ECCU is much deeper than it used to be. FDI flows to the ECCU region increased from EC\$184 m in 1986 to EC\$1.2 b in 2003. In 1986, portfolio flows to the ECCU were nil, by 2003, portfolio flows stood at EC\$378m (ECCB 2003). In addition, there have been several reforms of the financial system geared towards deeper financial integration. These include the establishment of the Eastern Caribbean Stock Exchange and other developments in the money and capital markets. The driving force behind such undertakings hinges on the belief that financial integration can confer several benefits on the region in terms of smoothing consumption, enhancing macroeconomic discipline, increasing the efficiency of the banking system, eliminating informational asymmetries and fostering domestic growth and investment. On the other hand, financial integration carries with it huge risks, since instability in one country can transmit contagion to others. Further, financial market frictions in the form of transaction costs, information asymmetries and other imperfections are still prevalent. In this environment, financial integration may not only bring benefits by allowing better risk sharing and the allocation of capital across countries, but may also increase macroeconomic volatility by magnifying the effects of existing distortions in already weak financial markets like that of the ECCU. Therefore, in evaluating the benefits and risks of financial integration an understanding of its implications for macroeconomic volatility takes on immense importance.

Starting from the premise that the ECCU is reasonably well integrated into the global financial system, a natural question arises. What is the implication for macroeconomic volatility? The remainder of the paper is organised as follows; section two explores the relevant empirical literature. Section three examines the degree of financial integration and changes in macroeconomic volatility in the ECCU over time, while section four is concerned with the empirical testing. Section five presents the results and section six concludes with some recommendations.

2.0 OVERVIEW OF THE EMPIRIC LITERATURE

Kose, Prasad and Torrones (2003) examined the link between financial integration and macroeconomic volatility in a large group of industrial and developing countries over the period 1960-1999 and found that financial openness is associated with an increase in the ratio of consumption volatility to income volatility but the relationship is non-linear. Once the measure of financial integration (gross capital flows to GDP) crosses a particular threshold, it appears to have a negative impact on the ratio of consumption to income volatility. Garvin and Hausman (1996) in Buch *et al* (2003) explore the sources of output volatility in a sample of developing countries over the period 1970-1992. They find that there is a significant positive association between the volatility of capital flows and output volatility. Buch, Dopke and Pierdzioch (2002), explore the link between financial openness and business cycle volatility using data for 25 OECD countries over the period 1960-2000. They report no stable relationship between financial openness and business cycle volatility and offer two plausible explanations for the “missing link”. First, parameter instability may explain why empirical studies fail to find a link between openness and volatility. Second, the link between openness and volatility may depend on the nature of the underlying shocks. In their empirical estimates the impact of interest rate volatility on output volatility is enhanced in open financial markets while the volatility of government spending is diminished. They interpret this finding to mean that monetary policies are more effective in financially open markets while the reverse is true for fiscal policies. Easterly, Islam and Stiglitz (2001) in Kose *et al* (2003) examine the determinants of output volatility using data for a sample of 74 countries during the period 1960-1997. Their results indicate that neither financial openness nor the volatility of capital flows has an impact on output volatility. Razin and Ross (1994) using panel data set for 138 counties over the period 1950-1988 test the proposition that capital market integration lowers consumption volatility, while it raises investment volatility. Their empirical results indicate that the degree of capital mobility is not strongly correlated with the volatility in output, consumption or investment.

Denizer, Iyigun, and Owen (2000) in Kose *et al* (2003) using panel data of 70 countries for the period 1956-1998 find that countries with more developed financial systems experience smaller fluctuations in real per capita output, consumption and investment growth.

In summary, the existing empirical literature offers no unequivocal consensus as to the link between financial integration and macroeconomic volatility. Notwithstanding its importance, given the peculiar vulnerabilities of the ECCU region, none of the empirical work reviewed focussed on the effects of financial integration on the macroeconomic welfare of these small developing states. As such, this paper represents an important first step in shedding some light on the issue as it relates to the ECCU.

3.0 THE DEGREE OF FINANCIAL INTEGRATION AND CHANGES IN MACROECONOMIC VOLATILITY IN THE ECCU: 1986-2003

3.1 Financial Integration within the ECCU context

Within the context of the ECCU, Nicholls (2001) identifies the following as ¹five of the more relevant indicators of financial integration: the current account deficit, foreign assets accumulation by the monetary authorities, foreign direct investment (FDI) flows, short-term capital flows and public sector borrowing. This paper uses three measures of financial integration: the current account deficit, the net foreign assets of the monetary authority and gross capital flows. All measures are averages expressed as a percentage of GDP.

The current account deficit provides a rudimentary measure of net capital inflows within the ECCU context. Since net capital outflows (savings less investment) must equal the current account balance at all times, this establishes an intimate co-movement

¹ For a detailed exposition see, Nicholls (2001), "Obstacles to Financial Integration: A case study of the ECCU", pg 5-6.

between these variables. Given negative current account balances as obtains in the ECCU economies, this identity implies a net capital inflow into those countries each year. As shown in table 1, the current account deficit as a percent of GDP has been continuously widening for the ECCU as a whole over the last three decades, on average. In the latter 80s the ratio of the current account deficit to GDP was 14.4 per cent compared with 15.0 per cent in the 90s and 24.0 per cent in the early 20s.

At the country level, for the latter part of the 80s decade, Montserrat's current account deficit as a percentage of GDP averaged 31.3 per cent, the highest of the ECCU countries, while St Lucia had the lowest ratio of 6.9 per cent. During the 90s and early 20s Montserrat again had the highest current account deficit as a percentage of GDP, while Antigua and Barbuda had the lowest. It is noteworthy that in the case of Montserrat, the inflows during the 90s and early 20s may have been more in the form of official development assistance in light of the volcanic eruptions that occurred in 1995 as opposed to FDI. As such, it would be erroneous to infer that Montserrat is the most financially integrated of all ECCU economies based on this measure.

As it pertains to the accumulation of net foreign assets (NFA), Nicholls (2001) advances that the Eastern Caribbean Central Bank (ECCB) is an important avenue for global financial integration and correctly so. For the ECCU, where the Monetary Authority does not have to intervene to defend the exchange rate, increases in capital inflows are reflected in an accumulation of foreign reserves. The ratio of NFA to GDP has been trending upwards over the sample period. In the latter 80s the ratio stood at 10.8 per cent as compared with 14.9 per cent in the 90s and 21.4 per cent in the early 20s.

The third measure of financial integration gross capital flows (GCF), is the amalgamation of FDI, short-term capital flow (portfolio investments) and other investments. According to Buch *et al* (2002), GCF as a ratio of GDP provides a broader assessment of the openness of the financial system. For the ECCU as a whole,

GCF as a percentage of GDP was the highest in the early 20s, averaging 19.3 per cent. For the latter half of the 80s until the mid 90s the ratio remained relatively constant. In the years following 1995, except in 1998, a positive trend is observed.

Of the ECCU economies, St Kitts and Nevis had the highest GCF to GDP averaging 15.2 per cent and 35.9 per cent in the latter 80s and early 20s respectively, while Anguilla's ratio of 24.6 per cent was the highest in the 90s. Of interest are Antigua and Barbuda and Montserrat's declines in this ratio during the early 20s indicative of some sort of capital flight in those countries. See table 1. Generally, the countries of the ECCU have shown increasing degrees of financial openness over the sample period irrespective of the measures used.

The above indicators by no means point to full financial integration. They simply reflect the extent to which financial integration has deepened in the ECCU over time. As Nicholls (2001) points out there are several obstacles to further financial integration of the ECCU among them are; domestic structural obstacles such as small size, underdeveloped economic base and financial systems, fledging financial market structures and fragmented financial systems. Then there are domestic policy related obstacles such as, alien landholding licences and limited resources available for effective supervision and régulation of the financial system. Further, there are external obstacles such as uncertainty of the investment environment due to the region's vulnerability to natural disasters and world interest rates. In addition, the majority of flows to the ECCU are in the form of FDI mainly for hotel construction and more recently for information telecommunication (ITC) development. FDI has the lowest weight in the World Bank index of financial integration. As elucidated by Nicholls (2001), notwithstanding the many factors mitigating the inflow of global capital into the region, the ECCU is already reasonably integrated into the global financial system and the ECCB is one of the main channels for global financial integration.

3.1.1 Changes in Macroeconomic Volatility in the ECCU

Macroeconomic volatility refers to how much aggregate economic performance fluctuates from one period to another de Ferranti *et al* (2000) in Kouame (2003). In this paper, macroeconomic volatility is measured by the standard deviation of the rates of growth in real GDP, investment and private consumption. Standard deviation quantifies the extent to which a variable departs from its mean. Variables are in percentage so are the reported standard deviations. Following Denzier *et al* (2000), the distinction is made between overall macroeconomic volatility (volatility in real output growth) and sectoral volatility (volatility in private consumption and investment growth). According to the authors the sectoral disaggregation reveals whether financial integration has different influences on households and business sectors and as such, is useful for policy makers attempting to reduce risks in particular sectors of the economy.

Output Volatility

Table 2 shows striking differences in volatility across the ECCU. In the latter 80s, topping the list of most volatile counties as measured by GDP volatility was St Lucia with a rate of 5.7 per cent. St Kitts and Nevis ranked lowest in output volatility with a volatility rate of 1.7 per cent. Further scrutiny reveals even more marked differences in volatility across countries of the ECCU over the decades. Throughout the 90s Montserrat and Anguilla ranked the most volatile economies with GDP volatility rates of 12.1 and 4.5 per cent respectively. For the period 2000-2003, GDP volatility was the highest in Grenada with a rate of over 5 per cent. In Montserrat, GDP volatility peaked in 1990 compared with the latter 80s. The fact that this country experienced periodic volcanic eruptions since 1994 would explain the increase in output fluctuation. In the early 20s, GDP volatility declined significantly. Although St Vincent and the Grenadines and Antigua and Barbuda ranked high in terms of GDP Volatility in the latter 80s, both countries experienced decreases in GDP volatility during the 90s and

early 20s. St Vincent and the Grenadines had the lowest level in the ECCU with a GDP volatility of 0.5 per cent in the early 20s.

Investment Volatility

During the latter 80s, St Kitts and Nevis and Montserrat ranked the first and second most volatile countries with rates of 39.8 per cent and 29.6 per cent respectively. At the bottom of the list were St Vincent and the Grenadines and Grenada with rates of 7.1 and 4.5 per cent respectively. During the 90s, all the ECCU countries experienced lower volatility rates except for Anguilla, Grenada and St Vincent and the Grenadines. Between 2000 and 2003, when compared with the other two periods the dissimilarity in investment volatility between the ECCU countries was most striking with rates ranging from 1.5 per cent in Antigua and Barbuda to 27.8 per cent in Montserrat (See figure 2).

Consumption Volatility

At the aggregate level, private consumption volatility in the ECCU fell sharply throughout the latter 80s up to the mid 90s. During the latter 90s until 2003, it remained relatively flat. Consumption volatility was highest during the latter part of the 80s and lowest in the 90s. (Figure 3). During the later 80s, Antigua and Barbuda was twice as volatile as St Lucia and St Vincent and the Grenadines and five times as volatile as Dominica and Grenada with volatility rates of over 20 per cent. Throughout the 1990s, and early 20s Montserrat topped the list of most volatile economies with a striking 67.46 per cent and 47.26 per cent respectively, while St Lucia and Antigua and Barbuda ranked least volatile countries. Consumption volatility is highest in the smaller economies perhaps because factor incomes and the transfers (including remittances) may not be able to adjust to respond to shocks and thus do not play a major role in smoothing out the volatility of consumption in the face of a shock. It may also reflect the fact that consumers in these small economies are unable to protect their consumption from fluctuations in income through mechanisms such as savings, borrowing and asset diversification.

4.0 EMPIRICAL TESTING AND DATA

In this section, the following empirical framework is used to elucidate the main determinants of macroeconomic volatility in the ECCU, specifically examining the role of financial openness in fuelling the patterns of volatility observed;

$$V_{i,t} = \beta_0 + \beta_1 X_{i,t} + \beta_2 FI_{i,t} + \mu_i + \varepsilon_{i,t} \quad (1)$$

Where $V_{i,t}$ is the standard deviation of the growth rate of real GDP, private consumption, or investment for country i at time t . $FI_{i,t}$ is the three financial integration measures (CAD/GDP = **FI1**, NFA/GDP = **FI2** and GCF/GDP = **FI3**) for country i at time t . $X_{i,t}$ is the set of control variables for county i at time t , μ_i captures the unobserved characteristics of individual countries that may affect volatility and are constant over time. This reduces biases related to omitted variables and also controls for any endogeneity. $\varepsilon_{i,t}$ is the variability in output, investment and consumption volatilities not explained by the regressors.

The explanatory variables include a trade openness (TO) measure proxied by the ratio of imports and exports to GDP, a financial sector development measure proxied by the ratio of M2 to GDP (FD), fiscal policy volatility (FS) measured by the standard deviation of the ratio of government consumption to GDP and monetary policy volatility (MP) proxied by the volatility in the growth of domestic credit to the private sector. These variables were considered based on existing empirical literature and on the specific characteristics of the ECCU countries. The relevance of each variable is now elucidated.

The ECCU economies are highly open to trade and there is an unappealing trade-off between the benefits of greater trade openness for economic growth and the adverse impact on growth volatility in terms of greater susceptibility to external shocks. As a

priori the trade openness measure is expected to contribute to the fluctuations in economic performance. The ratio of financial development, M2/GDP reflects the relative size and depth of the financial market; this ratio is fairly high in the region suggesting a reasonably well-developed domestic ²banking system and this may act to reduce volatility. In small open economies like those of the ECCU, macroeconomic policies tend to affect volatility. The measure used to capture the volatility of monetary policy also manifests itself as an insecurity regarding credit conditions for the private sector, which has implications for the perceived, reliable availability of smoothing mechanisms. With regards to the fiscal policy volatility measure, Kouame (2002) finds that public consumption is pro cyclical with output in the Caribbean, higher volatility in public consumption acts as an amplifier for output volatility. As it specifically relates to the ECCU, in lieu of any previous empirical studies conducted, there is no prior expectation as to whether the fiscal policy measure will affect volatility in a pro cyclical or counter cyclical fashion.

Using panel data techniques, first, three baseline specifications with the control variables only are estimated. Second, the financial integration measures are included separately in the estimations. The dependant variables for all regressions are the standard deviation of real GDP, private consumption or investment growth over the period 1986-1989, 1990-1999 and 2000-2003. Some of the independent variables are averages over the same periods, in other cases some of the explanatory variables are volatility measures for each of the same period above constructed as the standard deviation in the growth of the relevant variables. A fixed effects model was estimated by the method of generalised least squares utilising cross sectional weights. The fixed effects model was used as opposed to a random effect model, because from a theoretical premise, it is assumed that the country specific effects are related to the regressors. This paper uses annual data for each of the ECCU countries for the period 1986-2003. All data were sourced from the ECCB data bank. All variables were transformed into logarithms for the usual statistical purposes.

² In the ECCU, the financial system comprises mainly commercial banks.

5.0 RESULTS

Table 3 presents the results of the estimation of equation 1 for the standard deviation of real GDP, consumption and investment growth.

GDP Growth (Output) Volatility

For the baseline regression monetary and fiscal policies are the only two significant variables and are both associated with lower output volatility in the ECCU. The trade openness (TO) coefficient is positive but is statistically insignificant. The financial development indicator enters as a negative but it too is insignificant. When the financial integration measures are each included in the respective estimations they are all statistically insignificant at all levels of significance. As with the baseline regression, monetary and fiscal policies are the only two significant variables maintaining their negative relationship with output volatility. Monetary policies in the ECCU region are fairly stable and as such may act to lessen output volatility. Fiscal policies in the ECCU appear to be counter-cyclical with output; hence lower volatility in public consumption seems not to act as an amplifier for output volatility contrary to the findings of Kouame (2002).

Investment Growth Volatility

In the baseline regression, the fiscal policy measure enters as a negative and it is the only significant regressor. FI1 (CAD/GDP) enters the estimation as a negative but it is not a significant factor in explaining investment volatility in the ECCU. In fact, the fiscal policy measure still remains the only significant regressor, with the coefficient marginally higher as compared with the GDP regression including FI1. FI2 (NFA/GDP) enters its respective estimation as a negative and is statistically significant. In this regression, in addition to the fiscal policy measure, which is negatively associated with investment volatility, the financial development measure is a statistically significant variable and enters as a positive. In the final regression when FI3 (GCF/GDP) is included it enters as a positive but is an insignificant variable. Like the

other three regressions the fiscal policy measure is statistically significant and enters as a negative with a relatively strong coefficient.

Consumption Growth Volatility

In the baseline regression, the trade openness measure is the only significant variable and is positively associated with the volatility of private consumption in the ECCU. When the financial integration measures are included in their respective estimations, the trade openness measure remains the only significant variable. None of the financial integration measures has any discernible effect on consumption volatility.

5.1 Analysis of Results

Irrespective of the different measures used, there seems to be no link between financial integration and the volatilities of the growth rates of GDP and consumption in the ECCU. This result may be reflecting the limited access to international financial markets by ordinary households and firms in the ECCU. The fact is, government is the only major player with access to the international capital markets, which is reflected in government borrowing. Overall therefore, the extent of the region's use of international financial instruments is relatively narrow. FI2 (NFA/GDP) however, tend to be associated with a lowering of investment volatility. This result may be indicative of the role played by the central bank in absorbing shocks by diversifying its assets on the international financial markets. Theory and empirical evidence show that more financially integrated economies experience lower macroeconomic volatilities because they are able to diversify risks and smooth their consumption. It is evident that in the ECCU the level of financial integration as measured is not providing enough of an avenue for international risk sharing and smoothing mechanisms and by extension not contributing to lower macroeconomic volatility. It appears that both fiscal policy and monetary policy volatilities are associated with lower macroeconomic volatilities. Given that the region has fairly sound monetary policies this result is not surprising. Unlike monetary policies however, fiscal policies are also associated with a lowering of

investment volatilities. The coefficients for these regressions are more significant than the GDP regressions. Within the ECCU, the government is the only major player with access to international capital markets and that is reflected in government borrowing and in fiscal policy as volatility reducing. The trade openness is a significant variable in explaining the volatility in private consumption. This result is as expected. The unique characteristics of the ECCU countries introduce a susceptibility to external shocks while constraining the mechanism to smooth them thereby aggravating volatility. The result that the measure of financial sector development is linked with investment volatility highlights the fact that despite a fairly well developed banking sector, the overall level of financial sector development is not adequate to reduce the volatilities in investment.

³Dummy variables are also included in the panel estimations to capture the effects of natural disasters. Countries are assigned a dummy variable equal to one if they have experienced ⁴five or more catastrophic events over the period 1986 to 2003 and zero otherwise. The dummy variable is highly significant and positive in the GDP and consumption baseline regressions, confirming that countries that have experienced severe natural disasters have higher GDP and consumption volatilities.

5.1.1 Robustness Checks

Although the possibility of shifts in the intercepts over time has been accounted for with the inclusion of the time fixed effects in the panel regressions, this does not rule out the possibility that individual coefficients may have changed. As such, to account for any structural breaks in the data or parameter instability additional regressions are estimated using cross section data for the latter 80s (86-89), the 1990s and early 20s (00-03). To determine which financial integration has the strongest relationship with volatility during the respective periods, following Denizer *et al* (2000) a “horse race” is conducted and all three measures of financial integration are estimated in each

³ Results are not reported

⁴ Antigua, Dominica, St Kitts and Nevis, St Lucia and St Vincent and the Grenadines have all had five or more catastrophic events over the stated period.

regression. These cross section results reveal that the sources of macroeconomic volatility have changed over time (Table 4). In the latter 80s, FI2 (NFA/GDP) is positively linked to the volatility of GDP. FI3 (GCF/GDP) on the other hand, is associated with a lowering of GDP volatility, which makes sense since the inflows of funds to cover the deficits would have been mitigating the negative impacts on GDP volatility. Of the control variables only the financial development measure is statistically significant. The positive signs may be indicative of the underdeveloped state of the banking system and by extension the financial system at the time. During the 90s, FI2 is the only significant financial integration measure and is positively linked with GDP volatility. The other significant variables are the trade openness measure, the financial development measure and the fiscal policy volatility measure. The latter two enter as positives. One explanation for the negative sign on the trade openness measure could be because of the preferential trading arrangements that existed at the time and to some extent favourable commodity prices on the international market. In the early 20s, none of the variables is significant in explaining GDP volatility.

The current account deficit as a ratio of GDP seems to have contributed to the volatility of investment during the latter 80s. Intuitively, this result can be rationalised, given that most on the investment goods are imported. Also during the latter 80s, the development (or lack thereof) of the financial system was a significant variable in influencing investment volatility. So too were monetary and fiscal policies, the latter two associated with a lowering of investment volatility. During the 90s both FI2 (NFA/GDP) and FI3 (GCF/GDP) were positively associated with the volatility of investment. In the early 20s, none of the financial integration measure was significant in explaining investment volatility.

As it pertains to the volatility in the growth of private consumption, during the latter 80s, the evidence shows very poor explanatory powers of the control variable and a missing link between financial integration and consumption volatility. During the 90s the results are poles apart; all of the regressors are statistically significant. With regards to the financial integration measures, FI1 and FI2 enter as positives while FI3 enters as

a negative. In the early 20s both FI1 and FI3 are linked to the volatility of consumption, the latter being associated with a lowering of volatility. It is noteworthy that during the 90s the financial development measure is associated with a lowering of consumption volatility, which may be indicating that as the financial system became more developed, householders were better able to smooth their consumption by widening their investment options.

6.0 CONCLUSIONS/RECOMMENDATIONS

To assess the costs and benefits of financial integration, it is critical to understand exactly how it impacts on key macroeconomic indicators including GDP consumption and domestic investment. This paper has tried to shed some light on the issue. The results suggest that the link between financial integration and macroeconomic volatility may have changed over time. Using a panel dataset for the ECCU countries for the period 1986-2003, no consistent link is found between the measures of financial integration used and the volatilities of GDP and private consumption growth. As it pertains to the volatility of investment, the financial integration measure proxied by the ratio of net foreign assets to GDP is found to be associated with lowering of this volatility. Cross section estimates for the individual periods disclose that the sources of volatility have changed over time. During the latter 80s and the 90s the ratio of net foreign assets to GDP seems to have magnified the volatility of output while doing the same for the volatility of investment in the 90s and private consumption in 90s and the early 20s. On the other hand, the ratio of gross capital flows to GDP seems to have been cushioning the volatilities of output in the latter 80s and consumption during the 90s and early 20s, while adding to the volatility in investment during the 90s. Over the three separate periods, the current account deficit as a ratio of GDP seems to have contributed to sectoral volatilities rather than overall macroeconomic volatility.

What do these results mean for the ECCU region? One may conclude that to a large extent, the ECCU has not realised the full benefits of financial integration in terms of

international risk sharing and consumption smoothing. It must be borne in mind however, that the ECCU is far from being fully integrated into the global financial system for a plethora of reasons already identified. Therefore, it may not be that financial integration in itself is bad for the ECCU. Perhaps low levels of financial interplay between the ECCU and the global financial system could have had a negative impact on macroeconomic volatility. It is against this backdrop that this paper advocates for the ECCU to become more financially integrated into the world financial markets. Of course this conclusion demands further analysis as financial integration is associated with several risks.

To minimise these risks, it is critical that the ECCU strengthen or in some cases implement structural reforms and a sound macroeconomic framework. With regards to structural reforms, the results suggest that the development of the domestic financial sector is crucial as a high level of financial sector development has a dampening impact on macroeconomic volatility. The ECCB must continue to ensure the soundness of the banking system within the ECCU and continue to strengthen supervision and prudential regulations. In addition, gross capital flows appear to be associated with lowering of macroeconomic volatility, as such there is a need to attract more capital inflows that add to the productive capacity of the ECCU economies. It follows that there must be an improvement in human capital, more skilled labour force and adequate infrastructure. In addition, policymakers must ensure that there is less fragmentation in the financial system. Moreover, there is also an urgent need for a widening of the thin capital and money markets that currently exist in order to foster stronger integration into the international financial system and to increase the use of international financial instruments and the capacity to hedge against risks. As it pertains to macroeconomic policies, the findings show that fiscal and monetary policies are important contributors to lower macroeconomic volatility in the ECCU. It is important that the ECCU continue to maintain sound monetary policy consistent with low inflation and member countries continue with prudent fiscal management.

The ECCU has been taking a very cautious approach in liberalising the financial system, and rightly so, given all the financial crises experienced close to home eg, Jamaica and Brazil. It is important to note that this paper is in no way pushing the over acceleration of financial integration for the ECCU. Albeit theory posits and empirical evidence show (Denzier *et at* 2000) that at a mature level of financial integration there will be a reduction of macroeconomic volatility. The implication is that the ECCU countries should go far enough and ensure that financial integration is accompanied by reforms that deliver the institutional quality needed to realise the most favorable relationship between financial integration and economic performance.

This paper has limitations. Firstly, the sensitivity of the results is not sufficiently explored despite the robustness checks. Indeed volatility is influenced by several important underlying characteristics of the ECCU economies, which are not included in the estimations. For example, the administrative floor on savings deposits that currently obtains in the ECCU may affect the economy's ability to adjust to external shocks. In addition, there are several variables that affect the financial system, which in turn may be linked with macroeconomic fluctuations, for example, accounting standards, enforceability of contracts and the level of corruption in the system.

Secondly, instrumental variable techniques were not explored to address the issue of endogeneity. At a conceptual level, there is a concern, for instance, an increase in volatility could provoke policymakers in the ECCU to impose restrictions in an attempt to control the component of volatility attributable to volatile capital flows. Moreover, the degree of volatility in the economy can influence the level of capital flows to that economy.

Thirdly, measuring financial integration by the current account deficit may not be the most useful gauge of the degree of financial integration in the ECCU. Fourthly, caution should be exercised when interpreting the results given the limited number of data points.

The paper can be further extended by constructing financial integration indices that would make it easier to gauge the sustainability of macroeconomic policies. For instance, a large current account deficit of net foreign asset position may indicate that the economy is highly integrated, but is this sustainable?

REFERENCES

- Artis, M. J and M. Hoffman, 2004, "Financial Globalisation, International Business Cycles and Consumption Risk Sharing," *Journal of Economic Literature*, vol.55, pp 1-17.
- Belford, c. and K. Greenidge, 2003, "Financial Liberalization and the Challenges for Policy Makers in Developing Economies," in H. Codrington, R. Craigwell and D. Downes (Eds), *Facing Globalisation: Impact and Challenges for Barbados and the Caribbean*, (Central Bank Of Barbados).
- Belgrave, A. and K. Greenidge, 2003, "Financial Liberalization and the Challenges for Policy Makers in Developing Economies," in H. Codrington, R. Craigwell and D. Downes (Eds), *Facing Globalisation: Impact and Challenges for Barbados and the Caribbean*, (Central Bank Of Barbados).
- Blackman, N., "Financial Globalisation: A Small Country Perspective," Paper presented to the Caribbean Institute of Banking, Basseterre, St.Kitts and Nevis, March 1999.
- Bruton, P, and V. Kelsick, "International Finance and Caribbean Development, Paper presented at the Latin American and Caribbean Regional Consultation on Financing for Development, Bogotá, Columbia, November 2000.
- Buch, C, M., and C. Pierdzioch, 2003, "The Integration of Imperfect Financial Markets: Implications for Business Cycle Volatility," Kiel Institute for World Economics.
- Buch, C, M., J. Dopke and C. Pierdzioch, 2002, "Financial Openness and Business Cycle Volatility," Kiel Institute for World Economics.
- Denizer, C., M. Iyigun and A. Owen, 2000, "Finance and Macroeconomic Volatility," International Finance Discussion papers.
- Dookeran, W., 2001, "The Financial Liberalization Agenda: Performance and Prospects," in R. Ramsaran (Ed), *Caribbean Survival and the Global Challenge*, (University of the West Indies).
- Kose, A.,E. Prasad and M. Terrones, 2003, "Financial Integration and Macroeconomic Volatility," IMF Working Paper 03/05.

- Kouame, A. “ Macroeconomic Volatility, Household Vulnerability, Institutional and Policy Responses in the Caribbean Countries,” Paper presented at Seventh Annual Development Conference, Basseterre, St. Kitts, November 2002.
- Nicholls, G., 2001, “Obstacles to Financial Integration- A Case study of the ECCU”, in *Financial Globalisation: Issues for Small States*, Eastern Caribbean Central Bank, 2001.
- Prasad, E., K. Rogoff, S. Wei and M. Kose, 2003, “Effects of Financial Globalisation in Developing countries: Some Empirical Evidence,” IMF Working Paper.
- Razin, A., and A. Ross, “Business Cycle Volatility and Openness: An Exploratory Cross-Section Analysis,” 1992, NBER Working Paper.
- Samuel, W., “Financial Integration and Currency Boards: A Case study of the ECCU,” Eastern Caribbean Central Bank, 2001.

APPENDICES

Table 1
Financial Integration Indicators In the ECCU (averages in per cent of GDP)

	<i>Latter 80s</i> 1986-1989	<i>90s</i> 1990-1999	<i>Early 20s</i> 2000-2003
Current Account Balance			
Antigua & Barbuda	-27.85	-4.84	-11.53
Anguilla	0.00 ⁵	-25.08	-48.34
Dominica	-11.54	-18.98	-22.93
Grenada	-14.30	-20.49	-37.16
Montserrat	-31.34	-41.36	-107.90
St Kitts & Nevis	-15.79	-23.22	-38.65
St Lucia	-6.85	-13.18	-18.70
St Vincent & the Grenadines	-13.12	-22.14	-16.44
ECCU	-14.44	-15.02	-24.03
Gross Capital Flows			
Antigua & Barbuda	-1.62	3.21	-11.53
Anguilla	0.00 ⁶	24.60	33.60
Dominica	7.68	14.59	14.76
Grenada	7.73	10.03	24.11
Montserrat	6.30	2.21	-9.24
St Kitts & Nevis	15.24	20.91	35.94
St Lucia	5.25	11.96	13.71
St Vincent & the Grenadines	6.36	17.65	12.53
ECCU	11.44	11.63	19.28
Net Foreign Assets			
Antigua & Barbuda	7.59	9.22	11.99
Anguilla	4.99	17.67	30.27
Dominica	9.14	11.93	20.46
Grenada	9.83	13.55	23.99
Montserrat	12.87	27.27	51.49
St Kitts & Nevis	8.68	16.58	23.65
St Lucia	9.79	12.58	17.91
St Vincent & the Grenadines	6.36	14.01	19.83
ECCU	10.77	14.85	21.36

⁵ There were no data available for exports and imports for that period.

⁶ No data available for that period.

*Table 2***Volatility in output, investment and Private Consumption growth in the ECCU**

	<i>Latter 80s</i> 1986-1989	<i>90s</i> 1990-1999	<i>Early 20s</i> 2000-2003
GDP			
Anguilla	2.49	4.47	1.46
Antigua & Barbuda	4.20	3.24	2.31
Dominica	3.39	2.03	2.97
Grenada	3.92	3.22	5.30
Montserrat	3.21	12.07	3.78
St Kitts & Nevis	1.73	2.84	1.62
St Lucia	5.65	2.85	5.03
St Vincent & the Grenadines	5.30	3.30	0.52
ECCU	2.38	1.31	2.03
Investment			
Anguilla	9.14	20.48	14.86
Antigua & Barbuda	24.34	12.05	1.53
Dominica	17.26	12.24	19.65
Grenada	4.47	12.51	26.59
Montserrat	29.67	24.55	27.79
St Kitts & Nevis	39.80	14.86	25.54
St Lucia	16.32	7.58	3.71
St Vincent & the Grenadines	7.10	11.55	16.57
ECCU	3.48	4.50	6.79
Private Consumption			
Anguilla	10.32	13.69	5.38
Antigua & Barbuda	21.84	8.21	4.54
Dominica	2.32	7.44	8.12
Grenada	2.60	11.00	6.47
Montserrat	7.28	67.46	47.26
St Kitts & Nevis	14.42	13.38	11.53
St Lucia	9.92	13.13	13.59
St Vincent & the Grenadines	10.58	14.27	5.55
ECCU	10.20	4.16	4.22

Table 3: Determinants of macroeconomic volatility: Panel Regressions -1986-2003

Dependent variables: Volatility in the growth rates of GDP, investment and private consumption.

	GDP				Investment				Private Consumption			
	(1) Baseline	(2) With F11	(3) With F12	(4) With F13	(1) Baseline	(2) With F11	(3) With F12	(4) With F13	(1) Baseline	(2) With F11	(3) With F12	(4) With F13
Trade Open	0.004 (0.007)	0.001 (0.008)	0.006 (0.005)	0.003 (0.007)	-0.027 (0.039)	-0.013 (0.043)	0.037 (0.035)	-0.022 (0.040)	0.100 * (0.019)	0.195* (0.026)	0.092 * (0.018)	0.067 (0.026)
Fin Dev	-0.004 (0.009)	-0.006 (0.015)	0.007 (0.014)	0.006 (0.017)	0.062 (0.054)	0.085 (0.063)	0.193* (0.078)	0.056 (0.051)	-0.017 (0.029)	-0.041 (0.045)	-0.010 (0.042)	0.049 (0.055)
Mon Pol	-0.024 * (0.009)	-0.025 ** (0.011)	-0.024* (0.009)	-0.022** (0.010)	-0.065 (0.043)	-0.053 (0.047)	-0.032 (0.042)	-0.058 (0.051)	-0.065 (0.097)	-0.068 (0.098)	-0.014 (0.119)	0.013 (0.113)
Fis Pol	-0.059 ** (0.020)	-0.062 * (0.022)	-0.059* (0.019)	-0.067* (0.024)	-0.242* (0.094)	-0.249* (0.094)	-0.334* (0.094)	-0.251* (0.103)	-0.205 (0.165)	-0.231 (0.164)	-0.131 (0.187)	-0.181 (0.172)
F11		0.016 (0.064)				-0.089 (0.099)				0.108 (0.180)		
F12			-0.085 (0.091)				-0.720* (0.268)				0.001 (0.254)	
F13				-0.061 (0.079)				0.106 (0.352)				-0.387 (0.250)
N	21	21	21	21	24	24	24	24	24	24	24	24
\bar{R}^2	0.81	0.83	0.82	0.77	0.95	0.96	0.98	0.96	0.99	0.99	0.96	0.69
DW	3.07	3.03	3.28	3.00	1.97	2.14	2.56	2.00	3.19	3.43	3.06	3.41

* - Significant at the 5 % level
 ** - Significant at the 10 % level
 *** - Significant at the 1 % level
 White standard errors in brackets

Table 4: Determinants of macroeconomic volatility over time: Cross Sectional Estimates

Dependent variables: Volatility in the growth rates of GDP, investment and private consumption.

	GDP			Investment			Private Consumption		
	1986-1989	1990-1999	2000-2003	1986-1989	1990-1999	2000-2003	1986-1989	1990-1999	2000-2003
Trade Openness	0.003 (0.012)	-0.016** (0.005)	0.163 (0.046)	0.087 (0.043)	0.016 (0.011)	-0.163 (0.180)	0.071* (0.022)	0.114* (0.021)	0.208 (0.207)
Fin Dev	0.086** (0.034)	0.061* (0.017)	0.268 (0.071)	0.658* (0.098)	0.100* (0.017)	0.388 (0.284)	0.333 (0.151)	-0.302* (0.045)	-0.218 (0.321)
Mon Pol	-0.003 (0.012)	-0.097 (0.075)	2.262 (0.603)	-0.117* (0.037)	0.389* (0.066)	0.129 (2.579)	-0.001 (0.019)	1.642* (0.057)	0.669 (2.982)
Fis Pol	-0.025 (0.097)	0.163* (0.031)	0.190 (0.069)	-1.97* (0.484)	-0.081 (0.237)	-0.745** (0.244)	-0.312 (0.171)	0.669* (0.089)	0.054 (0.393)
FI1	0.004 (0.016)	0.015 (0.044)	-0.038 (0.201)	0.472* (0.188)	0.047 (0.129)	-0.457 (0.338)	0.534 (0.349)	0.661* (0.156)	0.594* (0.128)
FI2	0.575* (0.072)	0.269* (0.062)	0.028 (0.334)	0.990 (0.733)	0.825* (0.195)	1.733 (0.862)	0.082 (0.416)	1.523* (0.213)	-0.436 (0.377)
FI3	-0.181** (0.077)	-0.058 (0.056)	-0.018 (0.105)	0.186 (0.768)	0.036* (0.012)	0.319 (0.239)	0.040 (0.392)	-1.231* (0.116)	-0.361** (0.139)
\bar{R}^2	0.99	0.95	0.70	0.99	0.99	0.98	0.64	0.99	0.99

* - Significant at the 5 % level
 ** - Significant at the 10 % level
 *** - Significant at the 1 % level
 White standard errors in brackets

Figure 1

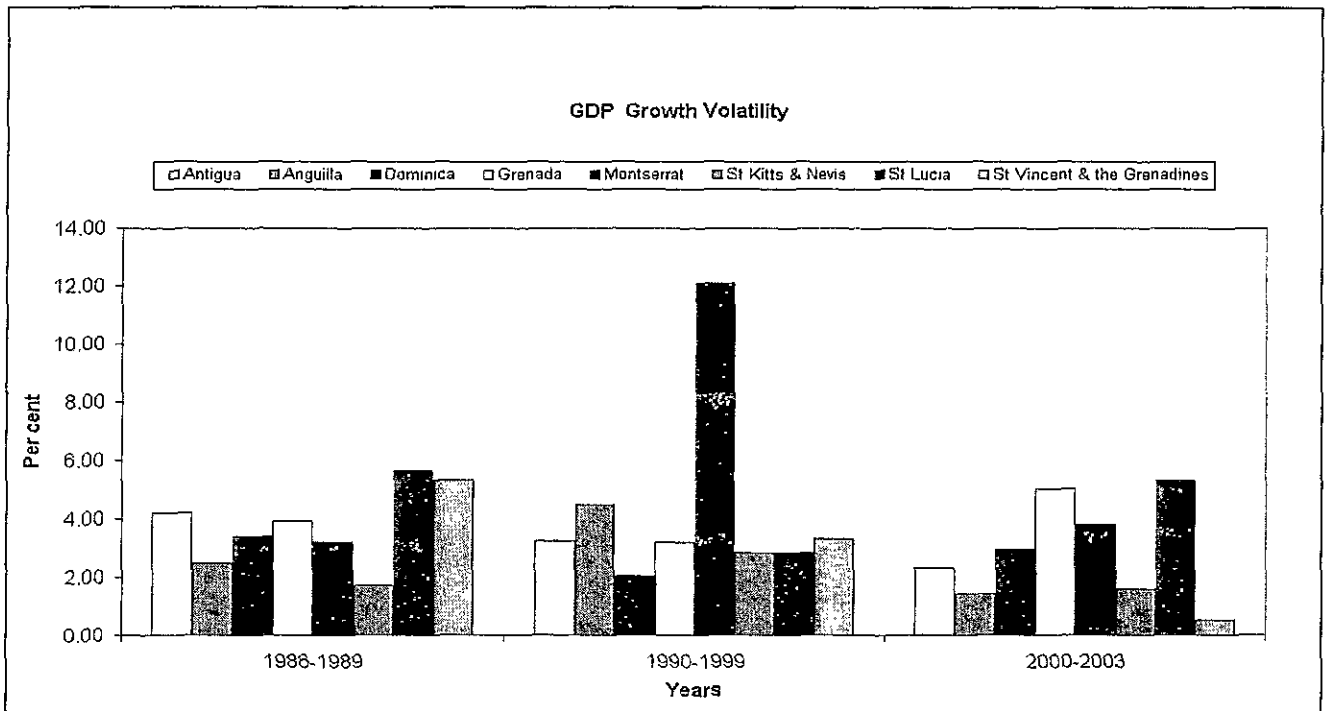


Figure 2

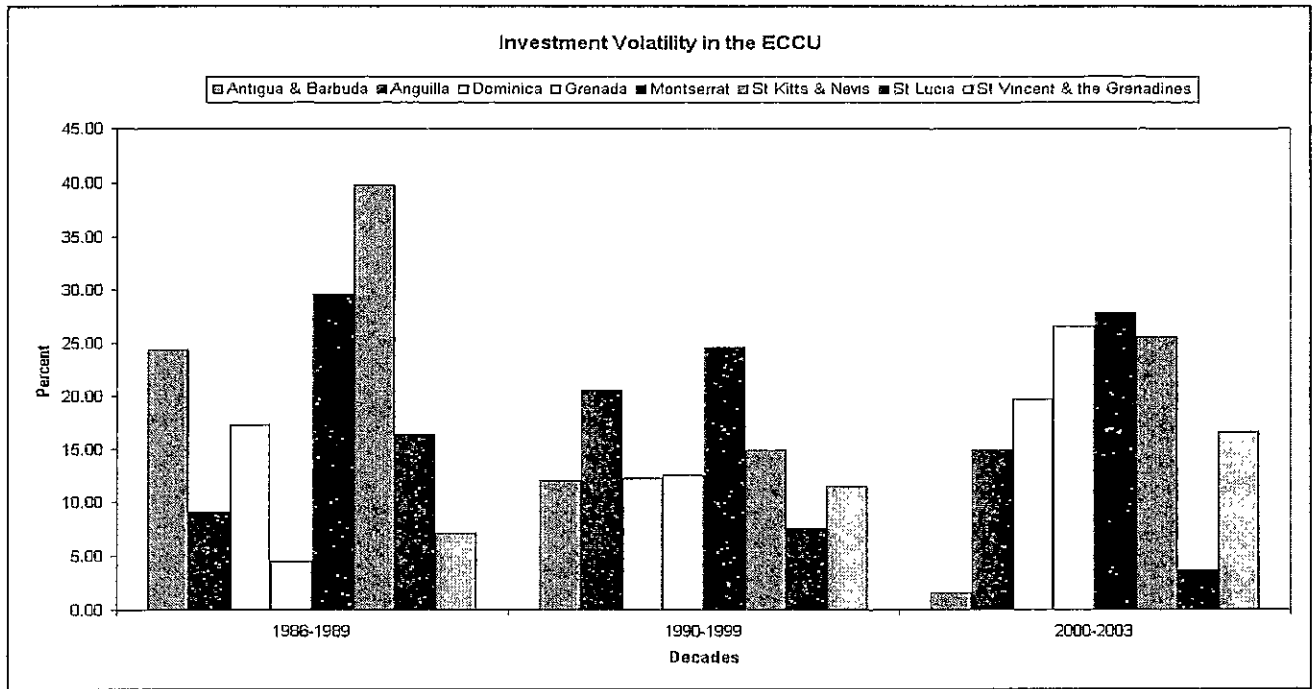


Figure 3

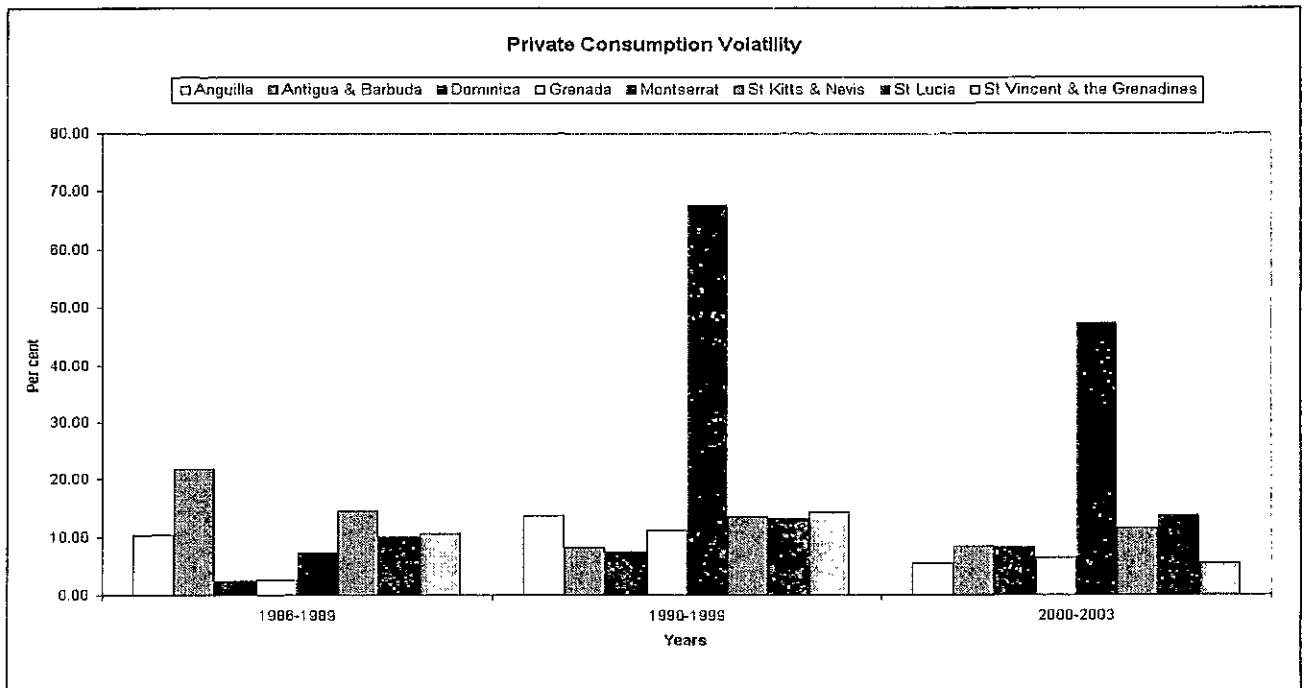


Figure 4

