

FINANCIAL INTEGRATION IN THE CARIBBEAN*

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* Earlier versions of this paper were presented at the Caribbean Monetary Studies Conference (St. Kitts, Nov 2008) and at the SALISES Conference (Barbados, March 2009). The authors are grateful for the comments received at those meetings, but responsibility for the arguments and opinions rest with us.

ABSTRACT

Our paper assembles evidence of financial integration in the Caribbean, using information on the cross border ownership of companies, a measure of interpolated arbitrage opportunities on the stock exchange, data on the regional balances of commercial banks, and estimates of interest rate convergence. We find that financial integration in the Caribbean is quite pervasive, even though the pace of implementation of formal arrangements in CARICOM has been slow. Countries with fixed exchange rates that are close neighbours are the most tightly integrated.

JEL: F15, G32, F21

Key words: Financial Integration, Caribbean

INTRODUCTION

Causal evidence of financial integration in the Caribbean is abundant, even though complaints about the failure to implement formal agreements for regional integration are a media staple. The far flung regional implications of the intervention of CL Financial by the government of Trinidad and Tobago are the most dramatic illustration of the extent and strength of regional financial linkages, but there are numerous other examples of cross border ownership links, and announcements of mergers, acquisitions and intra regional lending and investments are common place. It would appear that, at least as far as financial transactions are concerned, the Caribbean region, or parts of it, are already deeply integrated, without the benefit of regional enabling mechanism at the official level.

Several alternatives ways of measuring financial integration have been out forward in the recent literature, and some of them have been applied to the Caribbean. In the next section of this paper, where we review the relevant literature, we identify the following measures: cross border ownership and cooperation; cross border financial flows; the extent to which cross border competition among financial institutions causes interest rates to converge. In the literature review we cite studies that have applied all these measures to the analysis of Caribbean financial integration.

What this paper adds to the discussion is an analysis of how hither to neglected factors such as distances between countries and the exchange rate regime may result in faster integration of some parts of the Caribbean than for the region as a whole. We employ the full range of measures found in the literature, but we distinguish between countries that are close neighbours and those that are separated by long distances, and we explore the plausible hypothesis that interest rate convergence is more likely among countries which have a credible exchange rate peg to the US dollar, than with countries where the domestic currency may depreciate at any time.

The next section of this paper, the literature review, is followed by a brief overview of the formal agreements for financial integration within the CARICOM framework. Our analysis of regional financial integration is covered in sections 3-6, on corporate linkages, stock markets integration, cross border financial flows and interest rate convergence.

1.0 LITERATURE REVIEW

The introduction of the euro in 1999 stimulated renewed interest in measuring financial integration among countries within different regions worldwide. Much of this literature uses measures of financial integration based on the law of one price: in a financially integrated market, assets generating identical cash flows should be priced identically, irrespective of where they are transacted. If there are price discrepancies, arbitragers will take advantage of the opportunity to buy at the lower price and sell at the higher price. Integration can therefore be detected either by testing for the convergence of prices, or by searching for evidence of equilibrating flows of product services. In the literature on financial integration we find both price-based and quantity-based measures (Garcia-Herrero and Wooldrige (2007), Samer and Vacher (2007), Sy (2006), Baele et al (2004), Park (2004) and Cowen et al (2006), Wei and Min (2006)). The cross sectional dispersion of interest rate spreads using sigma convergence and beta convergence tests¹ are the most frequently used price-based indicators mentioned in the literature. Quantity based measures, include cross-border interbank loans, cross-border lending to the public by commercial banks, and the cross listings firms on the securities exchanges of several countries².

Baele et al (2004) quantified the state and evolution of financial integration in the euro area, using price based and quantity based measures of the money market, the corporate bond market, the government bond market, the credit market and the capital market, using price based and quantity-based measures. They found that the unsecured money market is fully integrated, and integration is reasonably high in the government and corporate bond markets and in the equity markets, with the credit market being the least integrated.

Sy (2006) examined the extent of financial integration in the West African Economic and Monetary Union (WAEMU)³, using price based and quantity based measures. In the regional government securities market the volume of cross border transactions was high, but in the banking sector cross border and interbank transactions appear limited.

¹ Adam et al (2002), Sy (2006), Cowen et al (2006) , Saah and Vacher 2007, and Herrero and Wooldridge (2007).

² Wei and Hang (2006) and Baele et al (2004).

³The WAEMU countries are Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal and Togo.

Eichengreen and Park (2004) and Guerin (2006) examined the importance of geography in financial integration globally. Guerin (2006) studied the characteristics that make a country attractive to foreign direct investment, trade and portfolio flows, using the gravity model of international trade to explain financial flows between countries. He tested whether investors choose countries close to them with similar characteristics such as legal systems and language in preference to countries that are far away and have different characteristics. He found that the geographical location of a country has a significant role in explaining the spatial allocation of foreign direct investment, portfolio investment and trade flows, and in determining the degree of financial integration into the world economy.

Park (2004) examines the challenges and prospects of financial integration in East Asia. A shallow form of financial cooperation exists, in two forms: free trade arrangements and financial arrangements. He found that geographically proximate countries trade more intensively with each other and promote financial and exchange rate stability with each other, and that these processes that reinforce each other. The major obstacles to financial integration were identified as the area's lack of historical experience in regionalism and inadequate cooperation in the political area.

Studies which shed light on financial integration in the Caribbean include CARICOM Secretariat (2005), Espinoza and Kwon (2009), Grenade and Moore (2006), Worrell, Craigwell and Mitchell (2008) and Jackman and Moore (2008). The CARICOM Secretariat provides information on corporate linkages within CARICOM, which documented the importance of ownership links as a aspect of regional integration. This data is amplified and updated in our study. Espinoza and Kwon (2009) found that the Caribbean stock markets are not well integrated and the region appears to be considerably less integrated than the EU15⁴ or the ASEN+3⁵ groups, although it fares well compared to other less developed regions. The study does not take account of the likelihood that close neighbours may be more tightly integrated or of differences in exchange rate regimes. Both Grenade and Moore and Worrell et al find evidence of interest rate convergence among Caribbean countries.

⁴ Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and The United Kingdom.

⁵ Brunei Darussalam, Cambodia, China, Indonesia, Japan, Korea, Lao People's Dem. Rep., Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam .

2.0 CARICOM AGREEMENT ON FINANCIAL INTEGRATION

The Revised Treaty of Chaguaramas makes provision for the following arrangements for financial integration:

- The removal of all restrictions on:
 - Equity and portfolio investments;
 - Bank transactions and credit;
 - Interest payments and dividends;
 - The repatriation of investment proceeds;
- Harmonised legal and administrative arrangements for partnerships and companies;
- The free convertibility of currencies; and
- An integrated capital market.

In addition, the revised treaty envisions the convergence of macroeconomic performance and policies.

Haiti, Guyana, Jamaica, Suriname and Trinidad & Tobago no longer have any stipulations on the movement of finance across their borders. However, the removal of restrictions predated the signing of the revised treaty, and it applies to all financial transactions with nonresidents, whether they are from CARICOM or not. The OECS countries have also removed all restrictions on the cross border transfer of funds, without regard to CARICOM membership, in a gradual process. Barbados and Belize retain some provisions requiring the scrutiny of selected cross border financial transactions, again without discriminating in favour of CARICOM residents. Barbados allows an exception for transactions across regional stock exchanges. The Bahamas is not a signatory to this provision of the Chaguaramas treaty.

Formal capital market integration is limited to facilities for the cross listing of securities of companies on the securities exchanges of Barbados, Jamaica, the OECS and Trinidad and Tobago. The securities exchanges of The Bahamas, Belize, Haiti, Guyana and Suriname remain outside this arrangement. No government securities are traded across the regional exchanges.

Cross border trading in government securities is limited to the OECS area, which operates a single securities exchange for the sub-region.

All regional currencies are freely convertible into US dollars and into other regional currencies. Formal restrictions on convertibility were removed prior to the signing of the revised treaty, in all countries. The treaty provision on convertibility is a step backwards from the CARICOM Heads of Government agreement in 1992 for the implementation of a single currency for the region (Farrell and Worrell, 1994).

No progress has been made on the harmonisation of legal and administrative arrangements for partnerships and companies, within the CARICOM region. No concrete steps have been taken towards agreement on a common framework for company law across the region, registration systems vary, and companies need to register as distinct entities in each country where they do business. Administrative procedures remain distinct and uncoordinated.

In sum, the record on formal financial integration is disappointing. The provisions of the Revised Treaty of Chagaramas represent a weakening of commitment to financial integration in the crucial area of the single currency; the implementation of capital market integration is limited to cross listing of private securities and does not include the very important government securities market; the liberalization of cross border financial flows does not discriminate in favour of CARICOM partners anywhere; and legal and administrative barriers to integration remain unchanged.

3.0 CROSS-BORDER OWNERSHIP AND CORPORATE LINKAGES

Table 1. EXAMPLES OF INTER CORPORATE LINKAGES WITHIN CARIBBEAN	
Type of Inter Corporate Linkages	Example
Joint Venture	RGM Limited (TT) : Sagicor Financial Corporation (B'dos) and Guardian Holdings Ltd. (TT)
Strategic Alliance with Cross-Over Equity	Republic Bank (TT) and Barbados National Bank (B'dos)
Mergers and Acquisitions	Neal & Massy (TT) and B.S.&T (B'dos) CMMB (Jam) and CL Financial (TT)
Franchise Arrangements	Rituals Coffee House (TT) and Maritime and Transport Services (Jam)
(Minority) Equity Positions	Sagicor Financial Corporation (B'dos) : Family Guardian (Bahamas)
Management/Marketing Agreements	Super Clubs (Jam): Cuban Properties

Source: Compiled from Company Reports

3.1 CROSS-BORDER OWNERSHIP OF COMPANIES

The largest financial firms and conglomerates in the Caribbean all feature regional linkages and partnerships that take many forms, including joint ventures, exchanges of equity, strategic alliances, mergers and acquisitions, franchise agreements, minority equity positions and management and marketing agreements. Table 1 illustrates the variety of arrangements currently in force across the Caribbean, involving some of the region's largest conglomerates.

3.1.1 Firms listed on the Stock Market

Cross border ownership has become the norm for the largest companies listed on the stock exchanges of Barbados, the OECS region, Jamaica and Trinidad and Tobago. They all have a wide network of branches and agencies throughout the CARICOM region. Eight of the ten largest firms (in terms of assets) are financial institutions, while the other two are major manufacturing/retailing companies; four have their headquarters in Trinidad and Tobago, while the remaining six are headquartered in Barbados, Jamaica and Canada. The financial firms are larger, with assets ranging between US \$1.5 billion and US\$12 billion, while the

manufacturing/retailing companies have assets averaging less than US\$2 billion. Table 2 and Appendix I show firms ranked by asset values.

The major banks in the region, the majority of which are extra-regionally owned, have long been the vehicle for financial integration. The dispersion of operations of the four largest banks in the Caribbean region is shown in Table 2. The major banks have approximately 320 branches, of which 37.1 per cent are owned by Scotia bank, 22.5 per cent by Republic Bank and 21.9 per cent by First Caribbean International Bank (Table 3). Jamaica plays host to the largest number of branches (72), followed by the Bahamas (38) and Barbados (33). Non financial firms listed on the stock exchanges also have an expansive network of branches and associated companies within the Caribbean (see Table 4). Neal and Massey, the most widely dispersed is located in eleven countries in the region while Caribbean Cement Co, present in the fewest number of countries, has a presence in four Caribbean countries.

**Table 2. COMPANIES LISTED ON THE STOCK EXCHANGE
(Ranked by Assets (US\$))**

#	Company	Assets (US\$Mill)	Employment (# of People)	Number of Countries located in	
				The Caribbean	The Rest of the World
1	First Caribbean International Bank	11,855.7	3,538	16	0
2	RBTT	8,465.3		18	30
3	Republic Bank:	6,215.4		7	0
	Barbados National Bank	1,246.3			
4	Sagicor Financial Corporation :	3,941.1		6	2
	Pan Caribbean Financial Services	760.5	227	1	0
5	National Commercial Bank of Jamaica	3,877.5	2,286	2	1
6	Guardian Holdings Ltd.	3,762.2		7	3
7	Scotia Bank:				
	Jamaica	2,746.5	1,226	24	19
	Trinidad and Tobago	2,120.9			
8	Jamaica Money Market Brokers (JMMB)	1,577.4	269	5	0
9	Ansa McAl	1,510.9		6	1
10	The TCL Group:			5	0
	Caribbean Cement Company Ltd.	1,353.2	280		
	Trinidad Cement Limited	596.4			
	Ready mix (West Indies) Limited	27.6			

Source: Compiled from the Various Stock Exchanges and the Various Companies Annual Reports.

**TABLE 3. NUMBER OF BRANCH OFFICES OF THE TOP BANKS OF THE CARICOM REGION
(Listed on the Stock Exchange)**

COUNTRY	SCOTIABANK (Canada)	RBTT (Canada)	REPUBLIC BANK (Trinidad and Tobago)	FIRST CARIBBEAN INTERNATIONAL BANK (Canada)
Antigua and Bermuda	2	1	0	3
Bahamas	20	0	0	18
Barbados	8	4	8	13
Belize	9	0	0	6
Dominica	1	0	0	2
Grenada	2	4	9	5
Guyana	5	0	9	0
Jamaica	43	20	0	14
Monseratt	0	0	0	0
Suriname	0	0	0	0
St. Kitts and Nevis	2	1	0	3
St. Lucia	4	3	4	4
St. Vincent and the Grenadines	1	2	0	1
Trinidad and Tobago	22	24	42	1

Source: Caribbean Trade and Investment Report 2005 and Various Banks Websites

TABLE 4. LOCATIONS OF NON FINANCIAL FIRMS LISTED ON THE STOCK EXCHANGE

COUNTRY	Ansa McAl (TT)	Caribbean Cement Co. Ltd. (TT)	Neal and Massey (TT)	Grace Kennedy (Jamaica)	Goddard Limited (Barbados)
Antigua and Bermuda			X		X
Bahamas			X		
Barbados	X	X	X	X	X
Belize				X	
Dominica					
Grenada	X		X		X
Guyana	X	X	X	X	
Jamaica	X	X	X	X	X
Montserrat			X		
Suriname					
St. Kitts and Nevis	X		X	X	
St. Lucia	X		X	X	X
St. Vincent and the Grenadines	X		X	X	X
Trinidad and Tobago	X	X	X	X	X

Source: Various annual reports of the respective companies.

3.1.2 Firms not listed on the Stock Market

The largest privately held firms in the Caribbean also operate across borders (Table 5). They are engaged in a wide range of activity, including hotel management, manufacturing, financial services, construction, trading and wholesale and retail operations. Among our sample, the conglomerate with the widest network within the Caribbean has operations in 12 countries, and all have operations in at least two Caribbean countries. The median number of countries in which the firms are located in the sample is between five and six.

TABLE 5. LOCATIONS OF SELECTED FIRMS NOT LISTED ON THE STOCK EXCHANGE MARKET

COUNTRY	SOL Group (Barbados)	C.O. Williams Construction Ltd. (Barbados)	CL Financial Group (TT)	Sandals (Jamaica)	Super Clubs (Jamaica)	Rituals Coffee House (TT)	TYE Manufacturing Co.Ltd. (TT)	The Beacon Holdings Ltd. (TT)	SM Jaleel (TT)
Antigua and Bermuda		X	X	X		X	X		
Bahamas			X	X	X				X
Barbados	X	X	X				X	X	
Belize	X						X		
Dominica						X	X	X	
Grenada	X					X	X	X	
Guyana	X		X				X		X
Jamaica			X	X	X	X	X		X
Montserrat									
Suriname	X		X			X	X		
St. Kitts and Nevis	X		X				X		
St. Lucia	X	X	X	X		X	X	X	X
St. Vincent and the Grenadines	X		X				X	X	
Trinidad and Tobago			X			X	X	X	X

Source: Various annual reports of the respective companies.

4.0 STOCK MARKET PRICES OF CROSS LISTED SHARES

As of February 2009 there were three companies cross listed on the four stock exchanges of Barbados, the ECCU, Jamaica and Trinidad and Tobago and fourteen listed on the three older exchanges, Barbados, Jamaica and Trinidad and Tobago (see Table 6). The share prices of the cross listed firms were compared for signs of price equalization across exchanges, graphically (see Appendix II) and by finding pair wise correlations (Tables 7-10).

TABLE 6. CROSS-LISTING ON MAIN REGIONAL STOCK EXCHANGES

COMPANIES	Barbados Stock Exchange	Jamaica Stock Exchange	Trinidad and Tobago Stock Exchange	ECCU Stock Exchange
Ansa Mc Al Limited	Yes	No	Yes	No
Barbados Shipping and Trading Company	Yes	No	Yes	No
Berger Paints Trinidad limited	No	Yes	Yes	No
Capital and Credit Merchant Bank Limited	No	Yes	Yes	No
First Caribbean International Bank	Yes	Yes	Yes	Yes
Grace Kennedy Limited	Yes	Yes	Yes	Yes
Guardian Holdings Limited	No	Yes	Yes	No
JMMB	Yes	Yes	Yes	No
National commercial Bank of Jamaica	No	Yes	Yes	No
Neal and Massy Holdings Limited	Yes	No	Yes	No
One Caribbean Media Limited	Yes	No	Yes	No
RBTT Financial Holdings Limited	Yes	No	Yes	No
Sagicor Financial Corporation	Yes	Yes	Yes	No
Trinidad Cement Limited	Yes	Yes	Yes	Yes

Source: Compiled from the various Stock Exchanges.

The correlations of the share prices of the five firms listed on both the Barbados and Trinidad and Tobago stock exchanges are shown in Table 7. There is a strong correlation for two firms (Barbados Shipping & Trading and Neal and Massey) and moderate correlation for one (One Caribbean Media) but the remaining two had very low correlations. Of the four firms listed on the Jamaica and Trinidad and Tobago stock exchanges (Table 8), only Guardian Holdings Limited shows a strong correlation between the prices of its shares in these two markets.

Table 9 examines the correlation of the five firms listed on the Barbados, Jamaica and Trinidad and Tobago stock exchanges. First Caribbean International Bank's share prices are highly correlated for Barbados/Jamaica, Barbados/Trinidad and Tobago and Jamaica/Trinidad and Tobago, and moderately correlated for Barbados/Trinidad and Tobago. There is high correlation on all the pair-wise comparisons for the share prices of Grace Kennedy. The share price of Sagicor Financial Corporation, JMMB and Trinidad Cement Limited are moderately correlated for the Jamaica/Trinidad and Tobago exchanges, but not for Barbados/Trinidad and Tobago or Barbados/Jamaica. There seems to be no significant correlation with the ECCU stock exchange (Table 10) for either of the companies listed on all four exchanges. In sum, the results indicate a tendency for integration of the Jamaica and Trinidad and Tobago stock exchanges, but correlation of either one of those markets with Barbados is relatively weak.

TABLE 7. CORRELATION OF THE CROSS LISTED FIRMS ON THE BARBADOS AND TRINIDAD AND TOBAGO STOCK EXCHANGE

Companies		Bds	TT
Ansa Mc Al Limited	Bds	1	-0.619
	TT	-0.619	1
Barbados shipping and Trading Company	Bds	1	0.946
	TT	0.946	1
Neal and Massy Holdings Limited	Bds	1	0.736
	TT	0.736	1
One Caribbean Media Limited	Bds	1	0.508
	TT	0.508	1
RBTT Financial Holdings Limited	Bds	1	0.365
	TT	0.365	1

Source: Own calculations

TABLE 8. CORRELATION OF THE CROSS LISTED FIRMS ON THE JAMAICA AND TRINIDAD AND TOBAGO STOCK EXCHANGE

Companies		Jam	TT
Berger Paints Trinidad Limited	Jam	1	0.144
	TT	0.144	1
Capital and Credit Merchant Bank Limited	Jam	1	-0.053
	TT	-0.053	1
Guardian Holdings Limited	Jam	1	0.877
	TT	0.877	1
National Commercial Bank of Jamaica	Jam	1	0.48
	TT	0.48	1

Source: Own calculations

**TABLE 9. CORRELATION OF THE CROSS LISTED FIRMS ON THE BARBADOS ,
JAMAICA AND TRINIDAD AND TOBAGO STOCK EXCHANGE**

Companies		Bds	Jam	TT
First Caribbean International Bank	Bds	1	0.817	0.578
	Jam	0.817	1	0.72
	TT	0.578	0.72	1
JMMB	Bds	1	-0.541	0.014
	Jam	-0.541	1	0.682
	TT	0.014	0.682	1
Sagikor Financial Corporation	Bds	1	0.439	0.108
	Jam	0.439	1	0.800
	TT	0.108	0.804	1

Source: Own calculations

**TABLE 10. CORRELATION OF THE CROSS LISTED FIRMS ON THE BARBADOS , ECCU,
JAMAICA AND TRINIDAD AND TOBAGO STOCK EXCHANGE**

Companies		Bds	ECCU	Jam	TT
Grace Kennedy Limited	Bds	1	-0.818	0.918	0.8812
	ECCU	-0.818	1	-0.839	-0.81
	Jam	0.918	-0.839	1	0.939
	TT	0.8812	-0.81	0.939	1
Trinidad Cement Limited	Bds	1	-0.729	-0.496	-0.028
	ECCU	-0.729	1	0.497	0.259
	Jam	-0.496	0.497	1	0.816
	TT	-0.028	0.259	0.816	1

Source: Own calculations

However, the apparent tendency for integration of the Jamaica and Trinidad and Tobago stock exchanges has made only a small contribution to the financial integration of the region, because stock exchanges do not contribute much to investment in the Caribbean. The contribution of new shares issued averaged about two percent of gross capital formation in Trinidad and Tobago and less than ten percent in Jamaica in the past two decades.

5.0. INTRA REGIONAL LENDING AND BORROWING OF COMMERCIAL BANKS

Cross border lending and borrowing of commercial banks within the region is another broad measure of financial integration proposed in the literature. There appears to be some increase in cross border transactions among banks in most member states of the ECCU (Figures 1-3). Claims outstanding from other banks in the currency union have increased significantly since 2005, and in mid 2008 such claims were in excess of 10 per cent of total assets for banks in Antigua and Barbuda, Dominica, Montserrat and St. Vincent and the Grenadines. In Barbados, claims due from banks in the region have become of some significance only since 2003, and they remain less than four per cent of total assets (Figure 4). Similar data for other countries is not available.

[Insert Figures 1 – 4 about here]

6.0 INTEREST RATE CONVERGENCE

The interest rate convergence test is based on a comparison among countries of the spreads between loan and deposit rates. In an integrated region where banks compete across borders the margins they charge (over the costs of funds) will converge even though the cost of funds may vary across markets.

Exchange rate uncertainty tends to inhibit cross border transactions because of perceived currency risk and fear of speculation against the domestic currency. Therefore if the exchange rate is not pegged, or if the peg lacks credibility, cross border financial flows may be inhibited, and interest rate spreads may not converge. For this reason, we focus the analysis of convergence on countries within CARICOM that have credibly fixed exchange rates.⁶ In addition the literature suggests that factors such as distance and the volume of bilateral trade and travel can have important effects on financial integration. Countries that are located relatively close to each other can be expected have a greater convergence of interest rates⁷ and countries

⁶ Anguilla, Antigua and Barbuda, Dominica, Barbados, Belize, Grenada, Montserrat, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Netherlands Antilles and Aruba .

⁷ Eichengreen (2004) and Guerin (2000).

that have a high level of bilateral trade and travel are expected to have stronger financial ties as well.⁸

4.1. MEASURES OF INTEREST RATE CONVERGENCE

We use three indicators of interest rate convergence: (1) trends in comparable interest rates of country pairs, groups and sub-groups; (2) measures of dispersion (sigma convergence) and (3) the autoregressive behaviour of interest rates in country pairs (beta convergence).

4.1.1 The Trend in Interest Rate Spreads

The interest rate spread, S is the difference between the lending interest rate (i_L) and the borrowing interest rate (i_B) of the country:

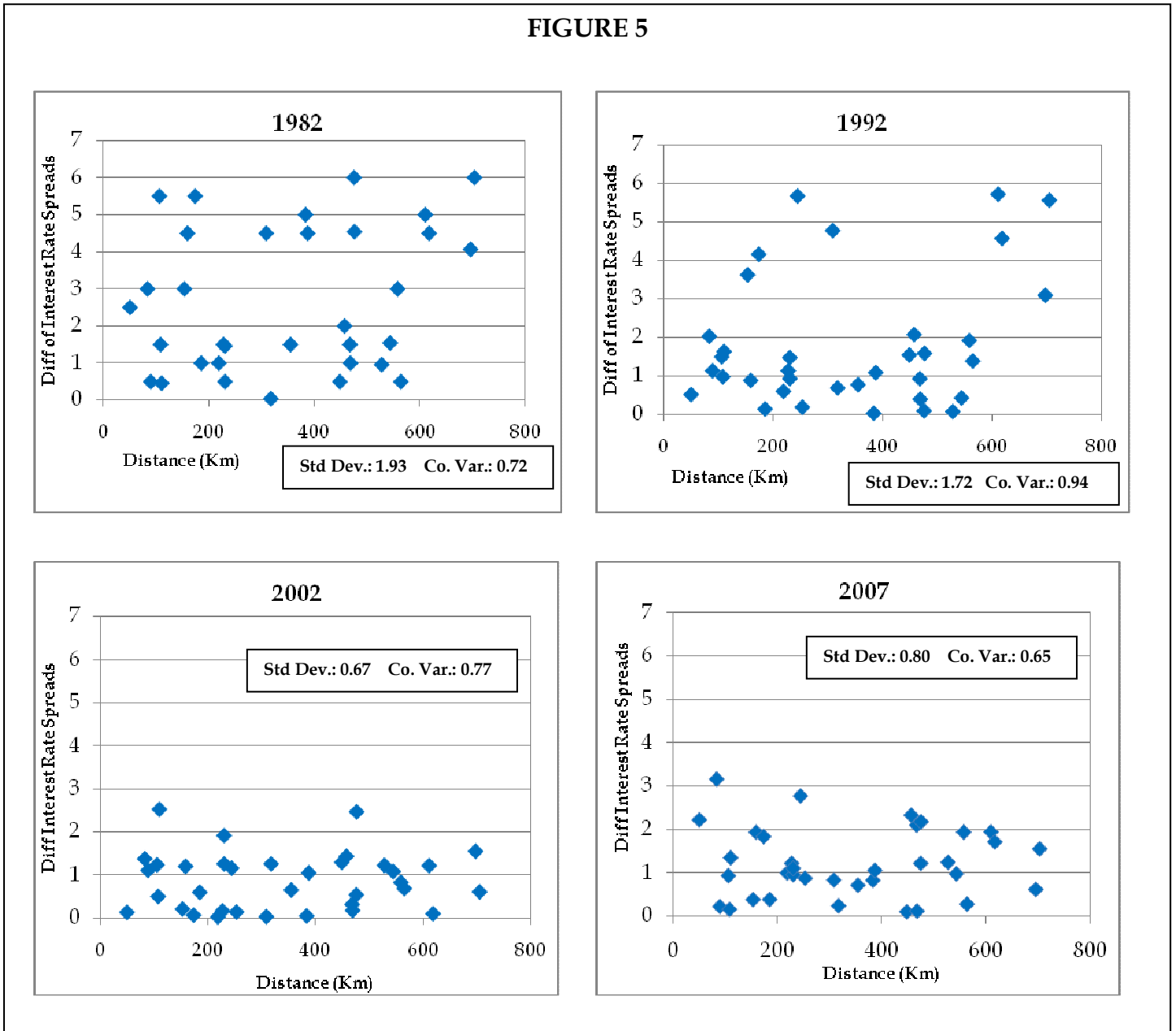
$$S = i_L - i_B$$

The convergence of interest rate spreads of banks over time can be used as an indicator of greater integration, while a decline in the level of the spread can be interpreted as a sign of increased competition between the banks within the converging country.

⁸ Due to data limitations we are unable to examine the roles of trade and travel in interest rate convergence between fixed exchange rate countries of CARICOM.

To allow for the impact of distance on financial integration between countries, we plot the differential of the interest rate spreads against the distance between countries. We examine the resulting patterns at ten year intervals from 1982 for evidence of convergence overtime. Figure 5 shows some tendency for interest rate spreads to cluster more closely over the period, most

FIGURE 5



notably in the decade 1992-2002. However, distance does not appear to be the factor affecting differences in interest rate spread to any noticeable extent.

4.1.2 Sigma Convergence

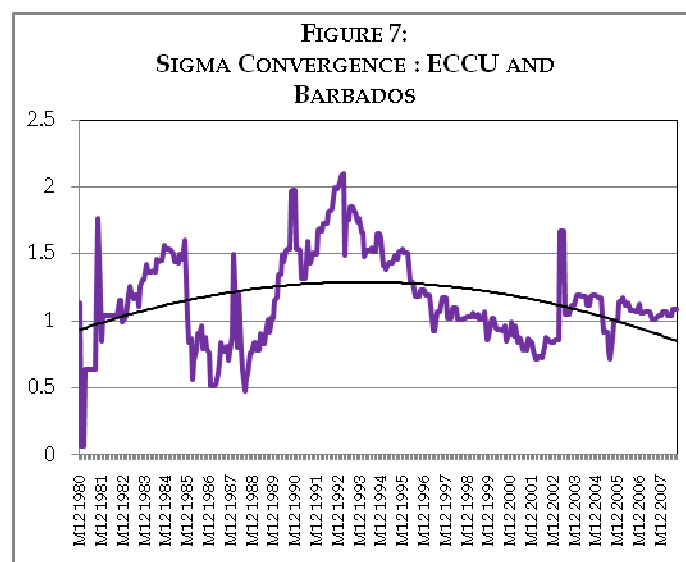
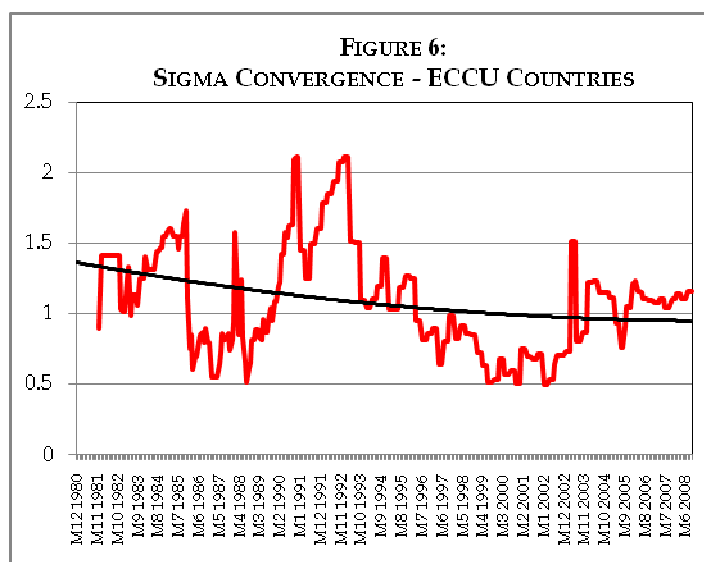
We measure trends in the dispersion of interest rates over the period 1981-2008 as the standard deviation of interest rate spreads, calculated as:

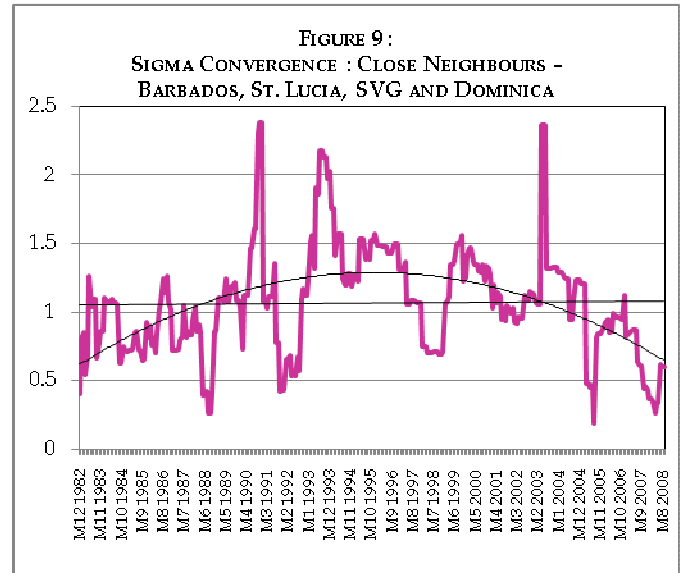
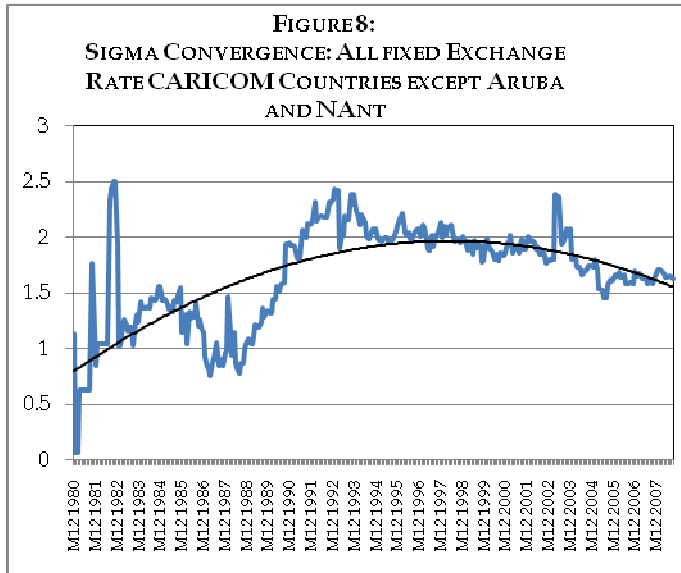
$$\sigma_t = \sqrt{\frac{1}{n-1} \sum_{i=1}^n (\log S_{i,t} - \log \bar{S}_t)^2}$$

$S_{i,t}$ is the interest rate spread of country i at period t and n is the number of countries in the sample. A high degree of financial integration is indicated by a narrow dispersion of interest rate spreads across countries.

We examine four groups of countries within CARICOM:

- (1) The ECCU
- (2) The ECCU and Barbados
- (3) All fixed exchange rate Countries of CARICOM - the ECCU, Barbados, Belize, The Bahamas.
- (4) Countries located close to each other - Barbados, St. Lucia, St. Vincent and the Grenadines and Dominica.





Figures 6-9 show the standard deviations of banks' spreads for the four groups we examine. Financial integration appears to have weakened among non – ECCU member countries of CARICOM in the 1980's, but since the early 1990's there has been a noticeable trend towards strengthening integration between the fixed exchange rate member countries of CARICOM. The convergence is especially marked in the case of four close neighbours in the eastern Caribbean. The ECCU has shown a consistent trend of convergence since 1980.

4.1.2 Beta Convergence

The beta convergence measure is based on the premise that countries with relatively high interest rate spreads need to lower their interest rate spreads in order to become competitive. We estimate the following equation:

$$\Delta S_{i,t} = \alpha_i + \beta S_{i,t-1} + \sum_{i=1}^L \gamma \Delta S_{i,t-1} + \epsilon_{i,t}$$

Where $\Delta S_{i,t}$ is the deviation of the interest rate spread from a benchmark.

$$\Delta S_{i,t} = S_{i,t} - S_{b,t}$$

where: $S_{i,t}$ is the interest rate spread of a country, i .

$S_{b,t}$ is the interest rate spread of the benchmark country, b .

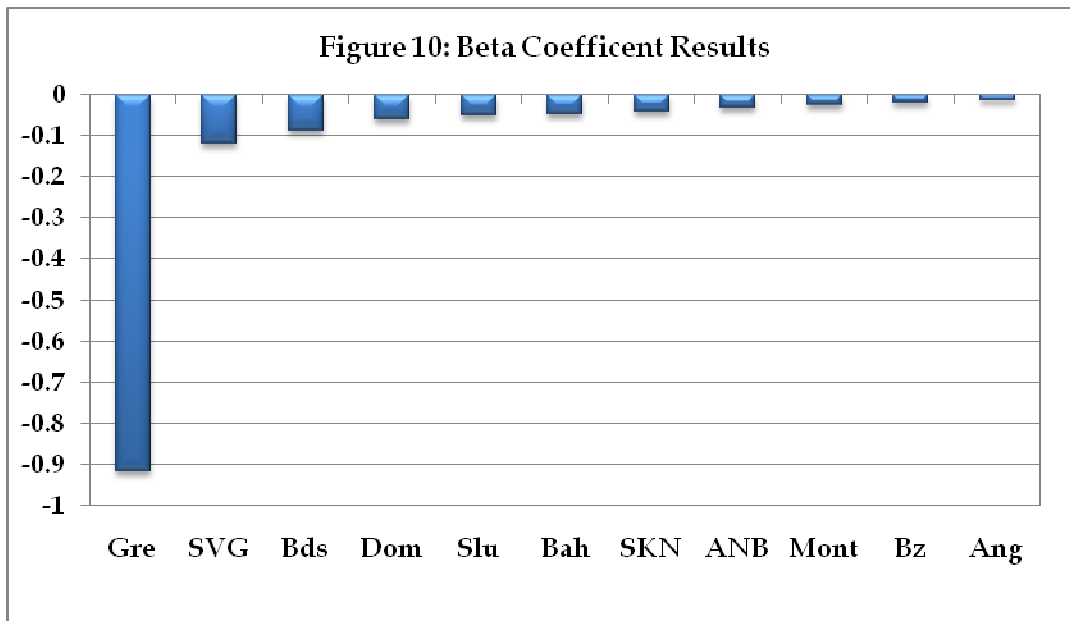
For the fixed exchange rate countries of CARICOM, the benchmark interest rate used is the comparable rate in the US, because financial flows ensure that domestic interest rates in these countries follow the trend of US interest rates.

$S_{i,t-1}$ is the lagged of the interest rate spread of country, i , α_i is the constant, ε_i is the error term, i denotes the country and t denotes the time indices.

In a region with a high degree of financial integration, the interest rate spread tends to decline in countries with initially high levels of interest rate spreads. Therefore a negative coefficient of β is an indication that financial integration is strengthening. The Table 11 summarizes the results of the regressions for each country.

TABLE 11. BETA CONVERGENCE-OLS REGRESSION RESULTS

Country	Time Period	Coefficient (β)	p-value	R-Square
Antigua and Barbuda	M12 1982-M3 2009	-0.033	0.030	0.015
Anguilla	M1 1988- M3 2009	-0.015	0.333	0.005
Bahamas	M1 1988 – M3 2009	-0.049	0.059	0.057
Barbados	M1 1981- M10 2008	-0.087	0.008	0.068
Belize	M8 1985 - M9 2008	-0.02	0.07	0.013
Dominica	M12 1982 – M3 2009	-0.06	0.584	0.031
Grenada	M12 1982 – M3 2009	-0.918	0.000	0.481
Montserrat	M 1 1983 – M3 2009	-0.025	0.078	0.013
St. Kitts and Nevis	M1 1981 – M3 2009	-0.043	0.026	0.04
St. Lucia	M2 1981 – M3 2009	-0.051	0.007	0.028
St. Vincent and the Grenadines	M12 1982 – M3 2009	-0.121	0.000	0.069



5.0 CONCLUSION

The fact that there has been no discernible progress in the implementation of the formal arrangements for financial integration embodied in the Revised Treaty of Chaguaramas does not appear to have inhibited the deepening of financial integration within the CARICOM region. Every one of the techniques used to measure the degree of financial integration shows evidence of this deepening. The largest firms in the Caribbean all have networks covering many countries, in the form of subsidiaries, branches, joint ventures, strategic partnerships, franchise arrangements and minority equity positions. The stock exchanges of Trinidad and Tobago and Jamaica show evidence of integration, though the Barbados exchange is only weakly linked, and the ECCU exchange not at all. All indices of interest rate convergence (trends, sigmas and betas) show evidence of deepening integration among fixed exchange rate countries, with especially strong ties among eastern Caribbean countries which are close neighbours.

However, financial integration does not proceed at the same pace everywhere. Ownership links appear to be dispersed around the CARICOM region, but stock exchanges appear to operate independently of each other, except for Trinidad and Tobago and Jamaica. This appears to be as true for exchanges which have agreed to cross listing of companies, as it is of exchanges which are not part of that agreement. Among the fixed exchange rate countries, close geographical proximity appears to facilitate integration at a faster pace than for countries that are further apart.

Widespread scepticism about the extent of integration in the CARICOM region appears to be unjustified, at least as far as the financial sector is concerned. However, there is reason to be disappointed at the non-implementation of the undertakings agreed in the Revised Treaty of Chaguaramas. The delay in implementation of the harmonisation of legal and administrative arrangements for companies continues to be a serious impediment to integration, and the retreat from commitment to monetary union and a single currency severely limits the pace of integration.

REFERENCES

- Adam, K., J. Tullio, A. Menichini, M. Padula, and M. Pagano . 2002. Analyze, Compare, and Apply Alternative Indicators and Monitoring Methodologies to Measure the Evolution of Capital Market Integration in the European Union. *Centre for Studies in Economics and Finance (CSEF)*, 77 (January).
- Baile L., A, Ferrando, P. Hördahl, E. Krylova, and C. Monnet. April 2004. Measuring Financial Integration in the Euro Area. *European Central Bank, Occasional Paper Series*, No. 14 .
- Caribbean Trade and Investment Report 2005: Corporate Integration and Cross-border Development. *Caribbean Community (CARICOM) Secretariat*.
http://www.caricom.org/jsp/community/regional_issues/ctir2005_index.jsp
- Cowen, D., R. Salgado, H. Shah, L. Teo, and A. Zanello. 2006. Financial Integration in Asia: Recent Developments and Next Steps. *IMF Working Paper* No. 06/196 (Washington: International Monetary Fund).
- Eichengreen, B. and Y.C. Park. 2004. Why has there been Less Financial Integration in Asia than in Europe? *Monetary Authority of Singapore, Staff Paper* No.28. (Berkeley: Monetary Authority of Singapore).
- Espinoza, R. and G. Kwon .2009. Regional Financial Integration in the Caribbean : Evidence from Financial and Macroeconomic Data. *IMF Working Paper* No. 09/139 (Washington: International Monetary Fund).
- Farrell, T.M.A. Mergers, Acquisitions and inter corporate Linkages in the Context of CSME.
http://www.centralbank.org.bb/Publications/TFarrell_Paper1.pdf
- Farrell, T.M.A. 2003. Caribbean Economic Integration – What is happening now; What needs to be done. Presented at the CARICOM Thirtieth anniversary Conference on Regional Governance and Integrated Development .
- Farrell, T. and D. Worrell .1994. Caribbean Monetary Integration, Port-of-Spain: *Caribbean Information Systems and Services*.
- European Commission, Internal Market and Services DG. 2005. Financial Integration Monitor 2005-Background document. http://ec.europa.eu/internal_market/finances/docs/cross-sector/fin-integration/050708background.pdf
- Galindo, A., A. Micco and C. Serra. 2002. Beyond Borders: The New Regionalism in Latin America. *Inter-American Development Bank, John Hopkins University Press, Washington D.C.* 101-124.
http://www.iadb.org/res/publications/pubfiles/pubB-2002E_7384.pdf

Garcia-Herrero,A. and p. Wooldrige. 2007. Global and Regional Financial Integration: Progress in Emerging Markets. *BIS Quarterly Review*.

Girvan,N. 2005. The CARICOM Single Market and Economy A View on Status on Priorities . *The CSME: Status, Issues and Priorities Regional Seminar: 40 years since the creation of INTAL* .
http://www.iadb.org/Intal/aplicaciones/uploads/ponencias/Foro_INTAL_2005_14_Girvan1.pdf

Guerin, S. 2006. The Role of Geography in Financial and Economic Integration: A Comparative Analysis of Foreign Direct Investment, Trade and Portfolio Investment Flows. *The World Economy*, Vol. 29, No.2, pp.189-209.

Levine, R., H. Edison, L. Ricci and T. Beck . 2002. International Financial Integration and Economic Growth. *Journal of International Money and Finance*, Vol.21, pp. 749-776.

Park, Y.C. 2006. Regional Financial Integration in East Asia: Challenges and Prospects in Regional Financial Cooperation, ed. Jose Antonio Ocampo.(Washington: Brookings Institution Press).

Saab, S.Y. and J. Vacher .2007. Banking Sector Integration and Competition in CEMAC . *IMF Working Paper* 07/03 (Washington: International Monetary Fund).

Sy, Amadou N.R. 2006. Financial Integration in the West African Economic and Monetary Union. *IMF Working Paper* 06/214. (Washington: International Monetary Fund).

Williams, E.S. 2006. Financial Integration in the Caribbean: History, Prospects and Challenges , 21st *Adlith Brown Memorial Lecture*
http://www.ccmfuwi.org/files/publications/adlith_brown/2006_Ewart_S_Williams.pdf

Wei,Y. and H. Min. 2006. Banking Integration in EU: Lessons for the Opening and Reform of the Chinese Banking System. *International Conference on European Financial Integration and China*
<http://www.cesfd.org.cn/paper/conferences/2006-5-12/Ying%20Wei/Banking%20Integration%20in%20EU%EF%BC%9A%20Lessons%20for%20the%20Opening%20and%20Reform%20of%20the%20Chinese%20Banking%20System.pdf>

APPENDIX I

COMPANIES LISTED ON THE STOCK EXCHANGE (Ranked by Assets (US\$))

#	Company	Assets (US\$M)	Employment (# of People)	Number of Countries located in	
				The Caribbean	The Rest of the World
1	First Caribbean International Bank	11855.7	3,538	16	0
2	RBTT	8465.3		18	30
3	Republic Bank: Barbados National Bank	6215.4 1246.3		7	0
4	Sagicor Financial Corporation : Pan Caribbean Financial Services	3941.1 760.5	227	6 1	2 0
5	National Commercial Bank of Jamaica	3877.5	2,286	2	1
6	Guardian Holdings Ltd.	3762.2		7	3
7	Scotia Bank: Jamaica Trinidad and Tobago	2746.5 2120.9	1,226	24	19
8	Jamaica Money Market Brokers (JMMB)	1577.4	269	5	0
9	Ansa McAl	1510.9		6	1
10	The TCL Group: Caribbean Cement Company Ltd. Trinidad Cement Limited Ready mix (West Indies) Limited	1353.2 596.4 27.6	280	5	0
11	Neal and Massy Holdings: Barbados Shipping and Trading Company	1245.8 552.7	2,800	6	1
12	Grace Kennedy Limited: Hardware & Lumber Limited	1168.9 42.3	1672 234	7 1	3 0
13	Cable and Wireless : Jamaica Barbados	490.5 46.4	1,694	15	24
14	Lascelles .de Mercado and Company Ltd.	474.7	2,029	1	0
15	Light and Power Holdings Limited	418.9			
16	Mayberry Investments Limited	377.6			
17	Capital and Credit Merchant Bank	355.4			
18	Goddard Enterprise Limited	329.9		16	4
19	Jamaica Producers Group	196.5		1	2
20	Insurance Company of Barbados	169.5		2	3
21	Pan Jamaica Investments Trust limited	151.7	27		
22	Desnoes and Geddes Limited	144.0			
23	British American Tobacco Company : Carrears Limited West Indian Tobacco Company Limited	150.7 53.5	72		
24	Jamaica Broilers Limited	142.5		1	0
25	First Jamaica Investment Limited	141.5			
26	One Caribbean Media	127.2	369	4	0
27	Kingston Wharves Ltd.	126.1	202	1	0
28	Seprod Group of Companies	95.8		1	0
29	Jamaica Pegasus Limited	63.3		1	0
30	Supreme Ventures Limited	60.8		1	0
31	Agostini's Limited	60.0			
32	Gleaner	52.6		1	3
33	Montego Freeport	28.7		1	0
34	Radio Jamaica Ltd	20.4		2	0
35	Pulse Investments	18.3			
36	Goodyear Jamaica	10.7	17		
37	Berger Paints Limited: Berger Paints (Jm) Ltd.	10.2			
38	Jamaica Live Stock Association	8.8			
39	BICO Limited	7.3			
40	Salada Foods	5.3			
41	Palace Amusement Company Limited	4.6			
42	Dyoll Corporation	2.4			
43	Mobay Ice	1.4			
44	Caribbean Metal Producers	1.3			

Source: Compiled from the Various Stock Exchanges and the Various Companies Annual Reports.

APPENDIX II

