MODELLING THE RELATIVE EFFECTS OF FINANCIAL SECTOR FUNCTIONS ON ECONOMIC GROWTH IN A DEVELOPING COUNTRY CONTEXT USING COINTEGRATION AND ERROR CORRECTION METHODS

David Tennant, Claremont Kirton and Abdullahi Abdulkadri
Department of Economics, University of the West Indies, Mona

This study develops proxies for each of Levine's (1997) five functions of the financial sector, and models the relationship between these functions and economic growth using methods that more accurately conform to theory, and which broadens our understanding of the mechanisms through which the financial sector impacts on growth. Our analytical models provide for inferences about the relative importance of each of the functions of the financial sector and cointegration and error correction methods are used to distinguish between the long and short-run impacts of financial sector intermediation and crisis on economic growth.

1. Introduction

Despite the spread of globalization, the Monterrey Consensus (2002) notes that many developing countries increasingly depend on local funds to finance their development needs. The domestic financial sector in these countries is expected to play an important role in the development process since it is widely accepted that financial institutions facilitate economic growth by mobilizing savings, allocating these savings to the most productive investments, and by facilitating the smooth flow of trade needed in a market-driven economy. Theoretical models supporting this view have been developed by many economists.[1] This large body of theoretical literature presents convincing arguments concerning the ability of a well-functioning financial sector to foster economic growth in developing countries.

Numerous authors have conducted tests of the finance-growth relationship and there is a growing consensus that financial sector development contributes positively to economic growth.[2] Many of these studies, however, use broad proxies of financial sector development, which do not give clear indications of the channels through which the financial sector impacts economic growth. This is important because the theoretical models strongly suggest that the financial sector contributes to economic growth by performing a number of distinct functions. It would therefore be very useful to determine which of these functions have the greatest impact on economic growth, in order to highlight to policymakers the areas in which policy reforms would yield the greatest returns. Such conclusions have, however, not yet been made in the literature, as authors such as Holden and Prokopenko (2001), Levine and Zervos (1998), and De Gregorio and Guidotti (1995) all cite difficulties involved in developing proxies to accurately and comprehensively capture the many different functions performed by the financial sector. Favara (2003) thus asserts that more sophisticated proxies of financial sector intermediation are required to deepen the understanding of the finance-growth relationship.

Our analysis attempts to contribute significantly to the finance-growth literature by developing such proxies. The five basic functions of the financial sector, as outlined by Levine (1997), are used as the basis of this study; attempts are made to derive proxies that accurately reflect the effectiveness with which the financial sector performs each of these functions. Cointegration and error correction methods are used to analyse and compare long and short term impacts of each of the theorized functions of the financial

sector on economic growth. The effect of financial crises on the functioning of the financial sector is also controlled for. Important conclusions are presented regarding the relative importance of these functions to the creation of economic growth, and the impact of financial crises on the economy.

The paper proceeds as follows: Section 2 briefly introduces the Jamaican case study used in this analysis. Section 3 addresses methodology and model specification, and highlights the proxies used for each of the functions of the financial sector, the control variables, and the details of the analytical models. Section 4 documents and analyses the results derived from the study; and Section 5 presents the conclusions.

2. The Financial Sector in Jamaica: A Brief Introduction

Historically, prior to political independence in 1962, the financial sector in Jamaica was dominated by foreign-owned banks. This continued in the decade after independence. Between the 1970s and mid-1980s, the government was much more involved in the ownership and operation of financial institutions, and financial repression was evident (Peart 1995). This was addressed by the liberalization of the financial sector between 1986 and 1988, and, more rapidly, between 1990 and 1991, under World Bank and IMF conditionalities, respectively. Following liberalization, the financial sector experienced a period of rapid expansion and deepening in the early to mid 1990s. The operations of commercial banks and non-bank financial institutions increased significantly, and new large financial conglomerates were established (Stennett et al 1998). In this post-liberalization era, there was also a rapid expansion of lending to the private sector, which

Green (1999) asserts was unsustainable, as loan and investment risks were not properly assessed, collateral was neither adequate nor properly evaluated, and increased lending was mainly for consumer-oriented activities. By the mid 1990s, the growth of private sector credit slowed significantly, non-performing and related-party loans increased, and the profitability of many financial institutions declined. Insurance companies and their affiliated commercial banks faced liquidity problems because of imprudent investments of short-term savings in long-term assets, and there was a significant deterioration in the banking system's capital base.[3]

These problems culminated in the financial sector crisis of the mid to late 1990s, when there was a 'flight to quality' within the domestic financial system, with depositors withdrawing their savings from perceived weak indigenous financial institutions, and depositing them with branches of foreign-owned banks. As a policy response, the government intervened to prevent the collapse of the sector. Legislation was introduced to strengthen the regulatory framework, and two institutions (FIS and FINSAC)[4] were established by the government to facilitate the resuscitation of failed financial institutions and implement the restructuring and reorganization of the financial sector. Whereas the cost of this intervention was massive,[5] the World Bank (2003) notes that the resolution of the crisis was one of the world's fastest, as after only about five years of operation FINSAC was closed.

The financial sector that has emerged following the post-crisis restructuring is now considerably different in size, structure and scope. While all the major types of financial

institutions still operate, their numbers and sizes have fallen. As at March 2004, privately-operated Jamaican financial institutions include: six commercial banks; four building societies; 51 credit unions; five FIA Institutions (merchant banks, trust companies and finance houses); seven life insurance companies; 13 general insurance companies; 55 licensed securities dealers; and one stock exchange. Other critical players in the financial sector are the central bank - Bank of Jamaica (BOJ), which has supervisory responsibility for deposit-taking institutions, and the Financial Services Commission (FSC), which supervises and regulates the securities industry, the insurance industry and soon, the private pensions industry. The World Bank's (2003) assessment notes that these changes in the Jamaican financial sector have "… led to a much stronger financial system, with much better regulation and supervision, but a system that is more concentrated and dominated by fewer banks, and … that is performing less intermediation because the assets corresponding to the deposits are now largely government debt (arising from the crisis) rather than private credit."

3. Methodology and Model Specification

3.1 Proxies of the Specific Functions of the Financial Sector

The World Bank's (2003) assertion that the Jamaican financial sector is now performing less intermediation has important implications for its ability to foster economic growth. This is because the theory indicates that the overarching role of the financial sector is its intermediation between savers and borrowers. In fulfilling this role, Levine (1997) asserts that financial systems perform five basic functions: mobilization or pooling of savings from disparate savers; amelioration of risk; acquisition of information about investment

opportunities and consequent improvement in the allocation of resources; exertion of corporate control after projects have been financed; and facilitation of exchange in the economy, which in turn promotes specialization and technological innovation.

Each of these functions are vital to the creation of economic growth, and as such, in developing the model being tested, detailed attention is given to careful selection of proxies that would adequately reflect these functions, and for which sufficient data are available. The proxies selected for each function of the financial sector are explained in the pages that follow.

Savings Mobilization

Financial institutions are able to mobilise savings by offering a range of small denomination savings instruments. A useful proxy for measuring the effectiveness of the financial sector in fulfilling the savings mobilization function is identified as: the total value of funds collected through all savings instruments offered by financial institutions operating locally, divided by total assets less loans of institutions through which the funds were collected, i.e. *SMOB = Deposits / (Total Assets – Loans).*[6] This ratio measures the effectiveness of financial institutions in using the resources at their disposal to attract savings.

Given that in Jamaica requisite quarterly data are not available for credit unions, life insurance companies, pension funds and investment companies, the proxy used excluded savings mobilised by these types of institutions. Also omitted from this proxy were

savings mobilised by the stock market. This is because new issues of corporate securities over the review period were negligible, and whereas data are available on shares traded on the stock exchange, the value of these traded shares is used as a proxy for the liquidity of the stock market – an essential factor in the *Ease of Trading* function which is also included in this model. SMOB therefore reflects the effectiveness with which commercial banks, FIA Institutions and building societies mobilize savings.

Although limited, this proxy adequately captures the savings mobilization function, since available annual data suggests that savings mobilized by traditional deposit-taking institutions represent the largest percentage of savings mobilized in the economy; this reflects fairly accurately the movements in savings mobilization over time. Increased effectiveness in savings mobilization will release more funds for investment, thus increasing the possibilities for economic growth. A positive relationship between SMOB and economic growth is therefore expected.

Risk Diversification

The financial sector also plays a crucial role in facilitating the diversification of various types of risk. Levine (1997) distinguishes between liquidity and idiosyncratic risk, and notes that financial institutions alleviate liquidity risk by offering small denomination savings instruments in their effort to mobilize savings. Therefore, because SMOB has already captured the financial sector's effect on liquidity risk, the proxy developed for risk diversification focuses solely on diversification of idiosyncratic risk. Financial institutions ease this idiosyncratic risk by holding diversified portfolios of financial

investments[7] and loans. The ideal proxy for risk diversification should measure the degree to which the financial investment and loan portfolios of financial institutions are effectively diversified.

For management of the financial investment portfolio of financial institutions, the Capital Asset Pricing Model (CAPM) is often used to calculate the incremental effect of a security on financial institution risk in terms of the variance of rates of return. Such data on rates of return of various securities invested in by Jamaican financial institutions are unavailable. Furthermore, categorization of financial investments in the data has changed over time; this therefore does not allow for an accurate inter-temporal comparison of concentration/diversification. Consequently, our proxy is limited in that it does not consider the degree of diversification in financial investment portfolios of the financial institutions. An assessment of the diversification of financial institutions' loan portfolios using traditional portfolio theory is also not possible in the Jamaican context. This is because applying the portfolio theory to loans will require availability of data on the expected return on loans, loan risks, and the correlation of loan default risks (Saunders 1999). None of these data are available for the Jamaican financial sector, and, as such, an alternative technique for assessing the degree of diversification of financial institutions' loan portfolios is used.

The foundation of such a technique is identified in the literature which suggests that loan portfolios ought to be effectively diversified across industries or sectors. Analysts of financial institutions generally argue that, lenders such as banks, finance companies and

life insurance companies are typically highly leveraged, and diversification across sectors reduces their chance of costly financial distress (Winton, 1999).[8] When financial instability occurs because of such practices, Bernanke (1983) argues that the effectiveness of financial intermediation is severely limited, both in terms of efficient allocation of resources and mobilisation of funds for investment. It is, therefore, believed that the degree to which idiosyncratic risk can be alleviated through the diversification of loans across sectors is an important indicator of the functioning of financial institutions.[9]

In Jamaica, a detailed breakdown of loan portfolios of major financial institutions, by sector, is available. Consequently, the measure of risk diversification used in the study focuses on the degree of diversification by sector. This refers to the extent to which the loans given by the financial sector were evenly distributed across all the sectors of the economy, or, alternatively, were heavily concentrated in a small number of sectors. This measure of risk diversification – DRISK – is calculated by first finding the percentage of total loans allocated by sector. If the portfolio is uniformly distributed across all the sectors, then 7.7% of total loans are allocated to each of the thirteen sectors. As the portfolio becomes less diversified, some sectors will receive a share of total loans much larger than the average 7.7%, while others will receive a much smaller share, reflective of a larger spread around the mean. If all loans are concentrated in one sector the maximum standard deviation possible is 26.65;[10] however, if loans are allocated equally to each sector, then no spread around the mean exists, and the minimum standard deviation possible equals zero.[11] Therefore, if the standard deviation of the percentage of total loans allocated to each sector is relatively high, this indicates a greater degree of

concentration in a few sectors and therefore reflects a low level of sectoral risk diversification. Conversely, if it is low, then the share of loans allocated to each sector is closely bunched around the mean, reflecting a low degree of concentration in any sector, but fairly even distribution of loans across all sectors. When this measure of risk diversification is calculated for the loan portfolio of each type of financial institution, a measure of the degree of diversification for the entire financial sector is calculated using a weighted average, wherein the weight given to each type of financial institution is determined by the relative size of that institution's loan portfolio.

This measure of risk diversification has two significant conceptual limitations. The first relates to the obvious absence of threshold limits beyond which any further diversification would represent an allocation of resources away from the most productive usage. It assumes that all sectors have equal potential to create economic growth, and therefore ignores the possibility that a sector(s) can achieve above-average growth rates. It also ignores any benefits that may accrue from specialization, as it may be possible for management to gain expertise, and agency problems may be reduced when institutions focus on a single line of business (Winton, 1999). Nonetheless, in the absence of more data, this measure suffices as a proxy for the degree of diversification of idiosyncratic risk, as it is reasonable to expect that as the share of loans becomes more concentrated in a few sectors, the diversifiable risk associated with the loans in the portfolio becomes greater, thus indicating a need for more diversification.

Resource Allocation

Financial institutions improve resource allocation by economizing on information acquisition costs, thereby facilitating acquisition of information about investment opportunities. However, because of unavailability of data that accurately measure such information acquisition costs, in attempting to formulate a proxy for effective resource allocation, researchers typically make a judgement as to what types of projects, firms or managers have the greatest potential to be productive and contribute to economic growth. Numerous authors have argued that a financial system that simply funnels resources to the government is not effectively allocating resources, and assert that credit allocated to private sector firms is likely to be used more effectively. Proxies of financial sector development have therefore been formulated that examine relative levels of credit to the private sector versus credit to the public sector. [12]

Such measures are flawed, as it cannot be assumed that credit allocated to the private sector will be used for productive purposes and will thereby facilitate economic growth. As such, our proxy for resource allocation, *RESAL = credit to private sector production / total loans*.[13] Formulation of this proxy required an examination of data on the allocation of loans by different types of financial institutions, to determine which categories of loans will be considered as credit for production. For commercial banks and FIA institutions, this categorization was straightforward, as credit to the Agriculture, Mining and Manufacturing, Construction and Land Development, Transportation, Storage and Communication, Electricity, Gas and Water, Distribution, Tourism and Entertainment, and Professional and Other Services sectors are considered as productive. For building

societies, mortgages which finance Building Lots and Land, Commercial and Semi-Residential Properties, Agricultural and Other types of projects are productive.[14] It is expected that RESAL will have a positive relationship with economic growth, as it is argued that when credit to private sector production increases as a proportion of total loans, resources are being allocated to the projects most likely to be productive.

The first limitation of this measure of resource allocation is that it ignores the allocation of financial investments due to the lack of a consistent quarterly breakdown of the allocation of financial investments by each type of institution in Jamaica. Also, RESAL does not consider the fungibility of credit, and as such ignores the possibility of funds being borrowed ostensibly for productive purposes, but actually being channelled into consumption activities. Additionally, any optimal measure of resource allocation would have to consider not only whether these resources will be used for production or consumption, but would also factor in the profit potential of the sectors to which they are allocated, the character and business history of the borrower, and the prevailing economic climate. The data available do not allow for such a detailed analysis, hence our proxy is limited in this respect, but improves upon what is now commonly being used in similar studies.

Corporate Control

The fourth function of the financial sector involves the monitoring of managers of firms who have been allocated credit or investment funds by financial institutions. Financial institutions are effective at performing this function because they are able to lower

monitoring costs through economies of scale, and can create financial arrangements that will force managers to operate in the desired manner. This function is important to economic growth creation, because the absence of such monitoring and financial arrangements may impede savings mobilization.

Finding a proxy for the *ex post* monitoring and corporate control function of the financial sector is challenging, since it is extremely difficult to conceptualise a quantitative measure of this relationship, for which data are available.[15] An indirect proxy of the corporate control function is necessary, which focuses on factors that affect the ability of financial institutions to effectively exert that control.[16] A significant part of the power exerted by a financial institution over its clients is determined by its ability to threaten not to enter into any future lending or investment relationships with its client. However, when that client is a connected party, that threat is not usually issued, and even if it is, it will generally not be seen as particularly ominous. It is therefore argued that as connected party loans and/or connected party financial investments increase, then the ability of financial institutions to exert corporate control decreases. This claim is supported by La Porta et al (2002), who show that monitoring is less rigorous for loans and investments issued to related parties than it is for unrelated parties, as evidenced by higher default rates and incidence of non-performing loans for related party transactions.

The proxy used for the corporate control function of the financial sector, *CORPC = connected party loans and financial investments / total loans and financial investments.*[17] CORPC is expected to have a negative relationship with economic growth, as when

connected party loans and financial investments increase, financial institutions are constrained in effectively fulfilling their monitoring and corporate control functions. Firms will therefore not be subject to sufficiently high levels of rigorous external control, and as such are more likely to make imprudent and unproductive business decisions. When potential savers become aware of the heightened risk of the loan and financial investment portfolios of the financial institutions, they may not be as willing to save, thus limiting the flow of funds to productive investments. While this indirect proxy does not fully capture the importance of the corporate control function of the financial sector, it is used in this analysis since it is currently the most logical and the only measurable proxy available.

Ease of Trading

The final function of the financial sector highlighted by Levine (1997) is that of facilitating exchange, otherwise referred to as *ease of trading*. This function relates both to the degree of monetization in the economy and the liquidity of the stock market. The financial sector's role in increasing the use of money as a medium of exchange relates largely to its collection of deposits. The effectiveness of the sector in collecting deposits has already been adequately captured by the savings mobilisation proxy, and is not repeated. Instead, the proxy developed here will focus on another means through which the financial sector facilitates the completion of speedy and relatively inexpensive transactions – via the stock market.

More liquid stock markets '…reduce the disincentives to investing in long-duration projects because the investors can easily sell their stake in the project if they need their savings before the project matures' (Bencivenga et al, 1995). More liquid stock markets are those in which it is less expensive to trade equities. Any proxy used for stock market liquidity, therefore, should reflect the cost of trading equities on the stock market; however, since there are no data on such costs for Jamaica, an indirect proxy is developed. It is argued here that a good indicator of the cost of conducting transactions on a stock exchange is the value of the stocks traded on that exchange. It is reasonable to expect that under normal circumstances there will be an inverse relationship between quantity of transactions conducted and cost of conducting those transactions. The value of shares traded on the Jamaica Stock Exchange is, therefore, used to represent stock market liquidity, because an increase in quantity and price of stocks traded is reflective of greater activity and liquidity in the stock market. Using the approach of Levine and Zervos (1998), *ETRAD = value of shares traded / current GDP*.[18]

Due to the relatively small size of the Jamaican stock exchange, this proxy only captures a small portion of the ability of the financial sector to facilitate exchange. As previously stated, the more prominent role of the sector in supplying and maintaining a stable medium of exchange, is inextricably linked with its savings mobilisation function, which is already proxied by SMOB.

3.2 Control Variables

The control variables used in studies of the relationship between finance and growth vary widely. Factors commonly controlled for include educational attainment, black market exchange rate, openness to trade, and macroeconomic stability. Educational attainment is usually identified as a proxy for the human capital available to the country, and is typically measured as the level of enrolment in primary and/or secondary schools. Based on data availability, the level of primary-level enrolment was initially included as a control variable in this study. It was, however, omitted since it was consistently insignificant. This is consistent with results attained in other studies using Jamaican data, where it has been noted that primary-school enrolment levels are poor proxies for the educational attainment of the workforce, as enrolment is not sufficient for achieving reasonable levels of educational attainment (Francis et al, 2003). The black market exchange rate was also not included in this study due to data unavailability. A measure of trade openness (TRADE) was, however, included, and calculated as the sum of the country's imports and exports divided by current GDP.

The extent to which macroeconomic stability is maintained is proxied by exchange rate volatility. This is an important proxy as it reflects the changes in interest and inflation rates in countries with freely-floating exchange rates. Exchange rate volatility negatively affects demand for a country's exports, and may deter firms from creating employment because of uncertainty of future earnings. These factors have important implications for economic growth and must be incorporated in the model. Exchange rate volatility

(XRATEVOL) for each quarter is calculated as the standard deviation of the percentage change in the US$ real exchange rate for the four preceding quarters.[19]

Attempts were made to control for structural changes affecting the Jamaican financial sector. These included primarily the liberalization of the sector which was completed by 1991, and the financial sector crisis which occurred between 1996 and 1997. Two dummy variables were used to account for these events in our model.

3.3 Model

The use of time series data is most appropriate in analyzing the impact of financial sector intermediation on real sector performance in an economy. However, econometric estimation using time series data run the risk of achieving spurious results when the data series are non-stationary. Non-stationary data series are those that do not have constant means and fixed variances, and hence do not return to their long-run averages after short-run deviations. Cointegration analysis and the Error Correction Model are two time series models that have been widely applied to investigate long-run relationships as well as short-run dynamics among sets of economic variables. If cointegrated, indicating that they have long-run relationship, the results derived from non-stationary data series are not spurious.

In this study, we are interested in finding relationships that may exist between financial sector intermediation and economic growth (as measured by GDP) in Jamaica. Using the proxies for financial sector functions, we seek to establish if GDP has a long-run

relationship with the proxies. To avoid obtaining any spurious relationships, we examined the data series for stationarity by performing the augmented Dickey-Fuller test on each proxy. Having established that some of the series are non-stationary at the level, a cointegration analysis was then conducted to determine if the series are cointegrated. Based on the properties of the data series of the proxies, a deterministic trend case considered by Johansen (1995) is used, wherein it is assumed that the level data have no deterministic trends and the cointegrating equations have intercepts. Also, because quarterly data are being used, the lag interval in first differences is assumed to be 1 to 4.[20]

Initially, we represented the long-run relationship between GDP and the financial sector functions by the double-log functional form as follows:

$$\begin{aligned}\ln GDP_t = {} & \alpha_0 + \alpha_1 \ln TRADE_t + \alpha_2 \ln XRATEVOL_t + \alpha_3 \ln ETRAD_t + \alpha_4 \ln CORPC_t \\ & + \alpha_5 \ln DRISK_t + \alpha_6 \ln RESAL_t + \alpha_7 \ln SMOB_t + \alpha_8 STRUCTURE_t + e_t\end{aligned} \qquad (1)$$

where GDP, ETRAD, TRADE, XRATEVOL, SMOB, CORPC, DRISK and RESAL are as previously defined. STRUCTURE represents a dummy variable that provides for structural change in the model. Two dummy variables - CRISIS and LIBERAL - were used interchangeably in our specification. The CRISIS variable refers to the financial sector crisis of the mid 1990's and takes on the value of one for post-financial crisis years and zero otherwise. Similarly, the LIBERAL variable represents the liberalization of the economy and assumes the value of one for post-liberalized years and zero otherwise. In

addition, ln represents the natural logarithm of the variables, α_i 's are model coefficients and e_t is an error term.

The above model suggests that each of the functions of the financial sector have independent effects on growth. We are, however, concerned that this is neither intuitive nor theoretically sound. For example, savings mobilization (SMOB) may not have an independent impact on GDP since savings which are mobilized but not invested in the real sector are not likely to influence growth. According to theoretical models, economic growth is created through the allocation of the savings mobilized to the real productive sector (RESAL) and the diversification of the risk associated with the allocation of these savings (DRISK). On the other hand, without mobilizing savings, financial institutions will have no funds to allocate, thereby making RESAL and DRISK irrelevant. This concern led us to specify an alternative model in which interaction terms were used. Since SMOB and DRISK are not expected to have independent effects on GDP, an interaction term was used to replace the individual variables. In the case of RESAL, we include both its interaction term with SMOB, as well as the variable itself. This was done because as Goldsmith (1969:394-395) noted, the growth-inducing effect of financial institutions can come not only from an increase in saving and investment, but also from the 'increase in the marginal rate of return on investment that results from a more efficient allocation of savings among potential investments, the reallocation reflecting the operation of financial institutions.' He further asserts that the effect on economic growth derived from improved allocation of resources may be of more significance for economic growth than increased aggregate saving and investment. Our specification incorporates

both effects of resource allocation on GDP due to aggregate savings and the independent impact of RESAL on GDP. Ease of trading (ETRAD) is also not expected to have an independent effect on GDP, but will only effectively facilitate growth through SMOB. This is because SMOB works in conjunction with ETRAD as transactions in the economy are facilitated through both monetization of the economy and liquidity in the stock market. CORPC is the only financial sector function that has a direct impact on GDP independent on SMOB. This alternative model is specified as follows:

$$\begin{aligned}\ln GDP_t = {} & \delta_0 + \delta_1 \ln TRADE_t + \delta_2 \ln XRATEVOL_t + \delta_3 \ln CORPC_t + \delta_4 \ln RESAL_t \\ & + \delta_5 \ln SMOB_t * \ln RESAL_t + \delta_6 \ln SMOB * \ln ETRAD_t + \delta_7 \ln SMOB_t * \ln DRISK_t \\ & + \delta_8 STRUCTURE_t + e_t\end{aligned} \quad (2)$$

The coefficients of the interaction terms of SMOB with ETRAD and DRISK, respectively, indicate how a percentage change in GDP due to a percentage change in ETRAD and DRISK will vary depending on the level of SMOB. The marginal effect of a percentage change in RESAL on GDP is captured through the coefficients of RESAL and the interaction term of SMOB with RESAL, implying that this effect depends on the level of SMOB in addition to the independent effect of RESAL. The coefficient of CORPC shows how a percentage change in this variable will affect GDP.

As reported later in the Results section, this alternative model performed better both in terms of conformity with *a priori* theoretical expectations and statistical significance of coefficients. It was therefore selected as the equation representing the long run

relationship among variables. If the data series included in this equation are cointegrated, we expect that the error term will be stationary and the coefficient of each variable will indicate the long-run effect of that variable on GDP. The short-run relationships are captured through an Error Correction Model, which is specified as follows:

$$\Delta \ln GDP_t = \alpha + \gamma ECT_{t-1} + \sum_{l=0}^{L} \beta_{1l} \Delta \ln TRADE_{t-l} + \sum_{l=0}^{L} \beta_{2l} \Delta \ln XRATEVOL_{t-l} + \sum_{l=0}^{L} \beta_{3l} \Delta \ln CORPC_{t-l}$$
$$+ \sum_{l=0}^{L} \beta_{4l} \Delta \ln RESAL_{t-l} + \sum_{l=0}^{L} \beta_{5l} \Delta \ln SMOB_{t-l} * \ln RESAL_{t-l} + \sum_{l=0}^{L} \beta_{6l} \Delta \ln SMOB_{t-l} * \ln ETRAD_{t-l}$$
$$+ \sum_{l=0}^{L} \beta_{7l} \Delta \ln SMOB_{t-l} * \ln DRISK_{t-l} + \beta_8 STRUCTURE_t + \varepsilon_t \qquad (3)$$

where ECT_{t-1} is the lagged residual from the cointegrating equation and ε_t is a white noise error. This specification allows for lags of explanatory variables to be included in estimation, with the lag length (L) for each variable being chosen on the basis of the Akaike and Schwartz Information criteria (AIC and SIC). In all instances the lags chosen conform to *a priori* expectations

The dependent variable, $\Delta \ln GDP_t$, represents change in growth of economic activity in the country at period *t* and provided that the series are all cointegrated, the coefficient of ECT_{t-1} represents the short-run adjustment towards the long-run equilibrium level of this growth. Specifically, it indicates the proportion of disequilibrium in economic growth in one period that is corrected for in the next period. The sign of γ is expected to be negative, as the short-run adjustment towards long-run equilibrium will be in the opposite

direction to the disequilibrium. In the case of any short-run impact of our proxies on GDP, we would expect the $\beta's$ to be statistically significant.

Both the cointegration equation and the Error Correction Model were estimated using quarterly data from March 1986 to December 2005. All variables represent aggregate data for the financial sector, comprising of commercial banks, FIA institutions and building societies. The primary sources of data were the Bank of Jamaica's Statistical Digest, The Planning Institute of Jamaica's Economic and Social Survey of Jamaica and the IMF's International Financial Statistics.

4. Results

The results of unit root tests indicate that all the variables in our models are integrated to the first order, with the exception of lnGDP, which is integrated to the second order, and lnETRAD and lnTRADE, which are stationary. In the initial specification of the long-run model (1), the Johansen Cointegration test indicated that nine cointegrating equations exist, suggesting numerous possible long-run relationships.[21] From these cointegrating equations we selected the one which adheres most closely to the relationship between the real and financial sectors, as suggested by Levine (1997). The selected cointegrating equation is reported in Table 1.

Table 1 shows where five out of eight variables are statistically significant using a 1% significance level. However, of all the variables, five have signs not conforming to *a priori* expectations, while among the five significant variables, three have the wrong

signs. This is an indication of, *inter alia*, possible model misspecification. It is strongly supported by the fact that a commonly used variable, such as TRADE is insignificant, and one such as XRATEVOL has a sign in contrast to basic economic theory. Many studies accept that the openness of the economy should have a statistically significant and positive impact on economic growth, and volatility of the exchange rate should have a significant negative effect on economic growth.[22] There is nothing peculiar to the Jamaican economy suggesting anything to the contrary. These are strong reasons to doubt the validity of the results of our initial model.

As for the alternative model (2), out of six cointegrating equations we selected the one most closely adhering to theory, as previously described.[23] The results of this specification are presented in Table 2. These results suggest that there is a long-run relationship among the variables, and all variables are significant at the 1% level. Importantly, in contrast to the initial model, all the variables except for lnSMOB*lnETRAD and CRISIS have signs conforming to theoretical expectations. The negative coefficient for lnSMOB*lnETRAD may, however, be reflective of the fact that there are alternative views about the effects of stock market liquidity on long-term economic growth. Levine (1996) notes that, 'some analysts argue that very liquid markets encourage investor myopia. Because they make it easy for dissatisfied investors to sell quickly, the liquid markets may weaken investors' commitment and reduce investors' incentives to exert corporate control… According to this view, enhanced stock market liquidity may actually hurt economic growth.'[24] The fact that the coefficient of lnSMOB*lnETRAD is relatively small (-0.361), however, suggests that it would require

fairly large increases in stock market liquidity to have any substantially adverse impact on economic growth in the long term. This is probably due to the small size of the Jamaican stock exchange.

The positive coefficient for CRISIS is also unexpected, but may be justified when the peculiar circumstances in the Jamaican case are considered. For example, the impact of financial crises on financial sector functioning in Jamaica was examined by Tennant and Kirton (2006) and it was shown that a number of institutions had achieved improved performance relative to their asset size, highlighting that stringencies associated with periods of financial instability can force institutions to become more effective in the utilization of resources, which could have a positive impact on GDP in the long-run. Furthermore, the World Bank (2003:88) notes that the restructuring of the Jamaican financial sector following the crisis has '…led to a much stronger financial system, with much better regulation and supervision…' This has resulted in increased confidence in the financial sector in the post-crisis era, which could increase savings mobilization and investment, both of which are expected to have a positive impact on GDP.

Of the other variables representing the theorized functions of the financial sector, lnRESAL has the largest coefficient (1.342), followed by lnSMOB*lnRESAL (1.232). This suggests that the financial sector makes the largest impact on economic growth by an increase in savings mobilization and investments, and, more significantly, by ensuring that those funds are allocated to productive uses. In fact, these results indicate that this function of the sector is so critical, that both variables have coefficients greater than one,

indicating that a 1% improvement in their performance will lead to a greater than proportional increase in economic growth (at fixed levels of savings mobilization for the latter variable). Whilst the other functions of the sector – corporate control and risk diversification – can also facilitate the creation of economic growth, their impact is much smaller than that of resource allocation at comparable levels of savings mobilization.

The control variables included in this model also have the signs predicted by economic theory. The openness of the economy to international trade, as represented by lnTRADE had the expected positive relationship with economic growth, whilst the impact of exchange rate volatility (lnXRATEVOL) had the theorized negative impact on long-run economic growth.

These results suggest that the alternative specification of the model considerably improves upon the initial model and more closely adheres to theory. As indicated earlier, savings mobilization appears to be a major driving force through which the other functions of the financial sector significantly influence economic growth. The alternative model, which accounts for the interactions between the variables, produces results which indicate a strong long-run relationship between the functions of the financial sector and economic growth.

This model, however, does not account for the short-run dynamics of the relationship. This is captured using an error correction model. The results of the error correction model are highlighted in Table 3. These results show that ECT is the only statistically

significant variable in the model. The fact that the error correction term is statistically significant confirms the long-run relationship between the variables, as highlighted in Table 2. The coefficient value of the ECT variable indicates the quarterly change in GDP that is attributable to the disequilibrium between the long-run and the observed values. An estimate of -0.35, in this case, indicates that the speed of adjustment in the current quarter to last quarter's disequilibrium is 35%.

All the other variables in this model are insignificant. This suggests that the functions of the financial sector do not have a short-term impact on economic growth. This is logical, as typically one would not expect quarterly changes in the performance of the financial sector to have an immediate impact on economic growth. A similar argument can be posited for the control variables lnTRADE and lnXRATEVOL. This is because there is a time interval between which gradual changes in economic and financial activities yield tangible improvements in economic performance. Even though the inclusion of lagged variables improves model specification (as reflected by improved AIC and SIC results) this did not result in statistically significant variables.

5. Conclusion

This study represents a significant contribution to the finance-growth literature in building on existing research by implementing Favara's (2003) recommendation for the formulation of more sophisticated proxies of financial sector functioning. By developing proxies for each of Levine's (1997) five functions of the financial sector, we have been able to model the relationship between financial sector functioning and economic growth

in a manner that more accurately conforms to theoretical models, and which broadens our understanding of the mechanisms through which the financial sector impacts on growth. Our results allow us to make vital conclusions about the relative importance of each of the functions of the financial sector, and the cointegration and error correction methods allow us to distinguish between the long and short-run impacts of financial sector intermediation on economic growth.

In comparing the results of our two long-run models, it is evident that while it is important to account for the individual functions of the financial sector, some of these functions are so interrelated that it is counterintuitive to expect them to have independent effects on economic growth. Whereas this does not justify the use of the excessively broad proxies of financial sector development currently employed in many studies, it does suggest that interaction between critical functions of the financial sector must be accounted for. By so doing, we have indicated that savings mobilization is a major driving force through which the other functions of the financial sector significantly influence economic growth. When the interaction between savings mobilization and three other functions of the financial sector were modelled, all had statistically significant long-run effects on economic growth, and two of three had the relationships predicted by theory. The other two functions of the sector which were expected to have independent impacts on growth were also significant with the correct signs. The results indicate that the financial sector generates the largest impact on economic growth by mobilizing savings and ensuring that those funds are allocated to productive uses (resource allocation). Whilst the other functions of the sector – corporate control and risk

diversification – can also facilitate the creation of economic growth, their impact is much smaller than that of resource allocation at comparable levels of savings mobilization.

It is also interesting to note that it is only for the most debated function of the financial sector - ease of trading (proxied by the liquidity of the stock market) that the results of our study contradicted Levine's (1997) predictions. Our results support Zhu et al's (2002) findings that more liquid stock markets may not necessarily lead to economic growth. In fact, our results suggest that increased stock market liquidity may actually have a small adverse impact on growth. This coincides with the view that liquid markets may encourage investor myopia and weaken investors' commitment to economic performance.

These results have important policy implications, as costly financial sector reform programs, which emphasize enhancing stock market liquidity, should be considered carefully, as positive impacts on economic growth are not guaranteed. If governments are to maximize the benefits from financial sector reforms, more focus has to be placed on mechanisms through which savings mobilization can be maximized, and the allocation of resources to productive uses can be facilitated. In market-driven economies this is best achieved through the removal of government distortions in financial markets in the forms of excessive domestic borrowing and prolonged issuance of high-yielding government securities. Such measures not only crowd-out productive investors from access to funds in the domestic financial sector, but also militate against the sector's ability to mobilize

savings from the public, as they are typically viewed by risk-averse savers as signals of macro-economic instability.

Our results also suggest that policymakers should not expect immediate results from financial sector reform programs, as although the functions of the financial sector were shown to have statistically significant long-run impacts on GDP, none of the functions had significant short-term effects on growth.

There is growing acceptance of Stiglitz' (1993) assertion that financial markets are the brain of the entire economic system – if they work, economic performance will be enhanced, but if they fail, the performance of the entire economic system may be impaired. Many analysts accept the importance of the 'brain', but do not fully understand how it works. This study has broadened our understanding of how the financial sector functions so as to facilitate, and in certain circumstances, impair economic performance. Further research to develop universally-accepted proxies for the functions of the financial sector should be encouraged as a means of further deepening the debate on this critical issue.

Table 1 – Estimates of Initial Model Cointegrating Equation with lnGDP as Dependent Variable		
Variable Name	**Coefficient**	**t-Statistic**
C	-6.972*	-10.329
lnSMOB	1.206*	4.691
lnRESAL	-1.870*	-3.503
lnCORPC	0.224	1.432
lnDRISK	-1.507*	-9.442
lnETRAD	-0.145*	-5.513
CRISIS	0.270	0.791
lnTRADE	0.271	0.736
lnXRATEVOL	0.286*	8.085

* indicates significance at 1% level

Table 2 – Estimates of Alternative Model Cointegrating Equation with lnGDP as Dependent Variable		
Variable Name	**Coefficient**	**t-Statistic**
C	-6.441*	-48.186
lnCORPC	-0.222*	-7.686
lnRESAL	1.342*	15.490
lnSMOB*lnRESAL	1.232*	9.985
lnSMOB*lnDRISK	-0.785*	-7.704
lnSMOB*lnETRAD	-0.361*	-12.317
CRISIS	0.797*	15.474
lnTRADE	1.110*	13.285
lnXRATEVOL	-0.117*	-15.842

* indicates significance at 1% level

Table 3 – Estimates of Error Correction Model with lnGDP as Dependent Variable		
Variable Name	**Coefficient**	**t-Statistic**
C	0.008*	2.092
$\Delta \ln CORPC_t$	0.003	0.196
$\Delta \ln CORPC_{t-1}$	-0.013	-0.924
$\Delta \ln RESAL_t$	-0.021	-0.407
$\Delta \ln RESAL_{t-1}$	0.063	1.238
$\Delta \ln SMOB_t * \ln RESAL_t$	-0.032	-0.160
$\Delta \ln SMOB_{t-1} * \ln RESAL_{t-1}$	-0.038	-0.427
$\Delta \ln SMOB_{t-2} * \ln RESAL_{t-2}$	-0.057	-0.743
$\Delta \ln SMOB_t * \ln DRISK_t$	-0.055	-0.923
$\Delta \ln SMOB_t * \ln ETRAD_t$	-0.008	-0.575
$CRISIS_t$	-0.006	-1.396
$\Delta \ln TRADE_t$	-0.027	-0.921
$\Delta \ln TRADE_{t-1}$	-0.003	-0.103
$\Delta \ln TRADE_{t-2}$	0.002	0.092
$\Delta \ln TRADE_{t-3}$	-0.014	-0.553
$\Delta \ln TRADE_{t-4}$	0.010	0.424
$\Delta \ln XRATEVOL_t$	0.003	0.702
ECT_{t-1}	-0.346**	-2.911
$R^2 = 0.3009$		
$\overline{R}^2 = 0.0531$		
Log likelihood = 183.0225		
AIC = -5.0007		
F-stat = 1.2146		
Durbin-Watson = 1.9647		

* indicates significance at 1% level
** indicates significance at 5% level

End Notes

[1] See Schumpeter (1934), Goldsmith (1969), McKinnon (1973), Shaw (1973), Bencivenga and Smith (1991), Greenwood and Jovanovic (1990), Stiglitz and Weiss (1981), Bernanke (1983), Diamond (1984) and Fama (1985).
[2] See King and Levine (1993), Odedokun (1996), Rajan and Zingales (1998), Arestis et al (2001), Fisman and Love (2002) and Berger et al (2003).
[3] Kirkpatrick and Tennant (2002)
[4] Financial Institutions Services Limited (FIS) and Financial Sector Adjustment Company (FINSAC)
[5] The FINSAC debt is estimated to be approximately two-thirds of GDP (Chen-Young 1998).
[6] Loans are subtracted from total assets so as to ensure that when deposits increase, assets will not necessarily increase by the same proportion.
[7] Financial investments (or investments in financial instruments) refer to the purchase of various types of securities, including government bonds and notes, corporate bonds and notes, and shares traded on the stock exchange (Rose 1996). It should not be confused with the economic meaning of investments, defined as, 'the purchase of real capital assets, such as new buildings and equipment' (Rose and Kolari 1995).
[8] This does not imply that specialist institutions, such as building societies, are inherently riskier than non-specialist commercial banks, but rather suggests that even within their area of specialization, some amount of diversification is needed. Therefore in our analysis of building societies, we considered their diversification of mortgage loans across the type of projects that they were used to finance.
[9] It must, however, be acknowledged that there is a potential conflict between diversification across sectors and the benefits of specialization. Winton (1999) notes that even though sectoral diversification is important to the minimization of risk, more specialized financial institutions may benefit from reduced agency costs and the increased expertise of their managers, as they focus on a single line of business. Such benefits are overlooked in the proxy formulated, and this is one of the limitations of adopting this approach.
[10] That is: $\sqrt{[12*(0-7.7)^2 + 1*(100-7.7)^2]/13} = 26.65$
[11] For building societies the maximum standard deviation possible is slightly larger, as there are fewer sectors to which loans are allocated. New mortgage loans are allocated by building societies to seven sectors. The mean is therefore 14.3, and the maximum standard deviation is calculated as $\sqrt{[6*(0-14.3)^2 + 1*(100-14.3)^2]/7}$, which is equal to 34.99
[12] See King and Levine (1993), De Gregorio and Guidotti (1995), Demetriades and Hussein (1996), Arestis and Demetriades (1997), Levine (1997), Levine and Zervos (1998), Beck et al (2000), Levine, Loayza and Beck (2000), Beck and Levine (2001), Fisman and Love (2002), Andersen and Tarp (2002), and Favara (2003).
[13] We argue that credit allocated to the domestic private sector that is used to enhance the production of an economy is more likely to create economic growth than credit used to finance consumption. This is because production activities conducted locally are more directly related to growth creation, as domestic factors of production are likely to be used at some stage in the production process. Economic theory suggests that increased investment in a local firm or industry will have a multiplied effect on the level of GDP. However, whereas autonomous increases in consumption spending may create a similar multiplier effect on the economy, this effect tends to be significantly dampened because consumer goods financed by credit are usually durable goods not typically produced in developing countries.
[14] Mortgages for Owner Occupied Properties, Housing Schemes and Tenanted Properties are noted to be for consumption.
[15] Beck and Levine (2001) and Holden and Prokopenko (2001) concur by noting that no quantitative proxies currently exist to measure the degree to which financial institutions ease the costs of collecting information. This problem is particularly acute as it relates to the monitoring function of the financial sector, because unlike other functions, such as resource allocation, it is virtually impossible to measure the end result of the monitoring or corporate control exerted by the financial institutions.
[16] This is based on the principle that if one can measure the key factors that influence the ability of financial institutions to carry out its monitoring role, then one would be able to indirectly quantify the extent to which the role is being effectively undertaken. Developing such an indirect proxy was therefore dependent

on the identification of the crucial factors that affect the monitoring function of the financial sector, and for which data are available.

[17] Figures for connected party loans and investments are sourced from the Bank of Jamaica prudential reports.

[18] The changes in the value of shares traded on the stock market are used as an indication of the degree to which the ownership of companies are changing hands in the economy in an uninhibited manner. Levine (1991) notes that this is one of the ways in which stock markets accelerate growth, as they thus facilitate the ability to trade ownership of firms without disrupting the productive processes occurring within these firms.

[19] This measure is similar to that used by Vergil (2002) to examine the effects of exchange rate volatility on trade.

[20] The VAR lag order selection criteria results are as follows: SIC 1 lag and AIC 4 lags.

[21] The Trace test indicated nine cointegrating equations, while the Max-eigenvalue test indicated six cointegrating equations.

[22] See Edwards (1997), Arize et al (2004) and Belke and Kaas (2002)

[23] The Trace test indicated six cointegrating equations, while the Max-eigenvalue test indicated five cointegrating equations.

[24] Zhu et al (2002) provide some empirical support for this view. They note that Levine and Zervos' (1998) conclusion that stock market liquidity is a robust predictor of real per capita GDP is erroneous, as it is driven by outliers in their model. Zhu et al (2002) conduct a replication exercise and show that the significance of the stock market liquidity variable is completely driven by the contributions of five Asian Tiger economies. They therefore conclude that, 'once one utilizes various appropriate measures to control for outliers, one can no longer conclude that countries will enjoy faster economic growth through operating more liquid stock markets.'

References

Andersen, Thomas Barnebeck and Tarp, Finn (2002) Financial liberalization, financial development, and economic growth in LDCs. Institute of Economics, University of Copenhagen, mimeo

Arestis, Philip and Demetriades, Pancios (1997) Financial Development and Economic Growth: Assessing the Evidence. *The Economic Journal* 107, pp. 783-799

Arestis, Philip, Demetriades, Pancios O. and Luintel, Kul B. (2001) Financial Development and Economic Growth: The role of stock markets. *Journal of Money, Credit and Banking* 33 (1), pp. 16-40

Arize, Augustine C., Osang, Thomas, and Slottje, Daniel J. (2004) Exchange Rate Volatility in Latin America and its Impact on Foreign Trade. http://faculty.smu.edu/tossang/pdf/latin2.pdf

Bank of Jamaica. *Statistical Digest* (Bank of Jamaica: Kingston)

Bank of Jamaica. Unaudited Assets and Liabilities of Commercial Banks, FIA Institutions and Building Societies. http://www.boj.org.jm/fin_data.asp

Beck, Thorsten, Demirguc-Kunt, Asli, Levine, Ross and Maksimovic, Vojislav (2000) Financial structure and economic development: Firm, industry, and country evidence. www.worldbank.org/research/interest/prr_stuff/workingpapers/2423.pdf

Beck, Thorsten and Levine, Ross (2001) Stock markets, banks, and growth: Correlation or causality. http://econ.worldbank.org/files/2389_wps2670.pdf

Belke, Ansgar and Kaas, Leo (2002) The Impact of Exchange Rate Volatility on Labour Markets: Europe versus United States. http://mailbox.univie.ac.at/leo.kaas/belkekaas.pdf

Bencivenga, Valerie R. and Smith, Bruce D. (1991) Financial Intermediation and Endogenous Growth. *Review of Economic Studies* 58, pp. 195-209

Bencivenga, Valerie R, Smith, Bruce D. and Starr, Ross M. (1995) Transaction costs, technological choice, and endogenous growth. *Journal of Economic Theory* 67, pp. 153 - 177

Berger, Allen N, Hasan, Iftekhar, and Klapper, Leora F. (2003) Further Evidence on the Link between Finance and Growth: An international analysis of community banking and economic performance. World Bank Policy Research Working Paper No. 3105

Bernanke, Ben S. (1983) Nonmonetary Effects of the Financial Crisis in the Propagation of the Great Depression. *American Economic Review* 73(3), pp. 257-276

Chen-Young, Paul (1998) With all Good Intentions: The Collapse of Jamaica's Domestic Financial Sector. *Policy Papers on the Americas* 9(2), pp. 1-22

De Gregorio, Jose and Guidotti, Pablo E., 1995. Financial Development and Economic Growth. *World Development* 23(3), pp. 433-448

Demetriades, Pancios O. and Hussein, Khaled A. (1996) Does financial development cause economic growth? Time-series evidence from 16 countries. *Journal of Development Economics* 51, pp. 387 - 411

Diamond, Douglas W. (1984) Financial Intermediation and Delegated Monitoring. *Review of Economic Studies* 51, pp. 393-414

Edwards, Sebastian (1997) Openness, Productivity and Growth: What Do we Really Know? NBER Working Paper Series, Number 5978

Fama, Eugene F. (1985) What's Different about Banks. *Journal of Monetary Economics* 15, pp. 29-39

Favara, Giovanni (2003) An Empirical Reassessment of the Relationship between Finance and Growth. IMF Working Paper WP/03/123

Fisman, Raymond and Love, Inessa (2002) Patterns of Industrial Development Revisited: The role of finance. World Bank Policy Research Working Paper No. 2877

Francis, Alfred, Harriott, Anthony, Kirton, Claremont, and Gibbison, Godfrey (2003) Crime and Development: The Jamaican Experience. Report Prepared for the World Bank

Goldsmith, Raymond W. (1969) *Financial Structure and Development*. (Yale University Press: New Haven)

Green, Pauline M. (1999) Preserving the integrity of the Jamaican financial system: The challenges. Paper prepared for the Central Bank responsibility for financial stability workshop.

Greenwood, Jeremy and Jovanovic, Boyan (1990) Financial Development, Growth, and the Distribution of Income. *Journal of Political Economy* 95(5i), pp. 1076-1107

Holden, Paul and Prokopenko, Vassili (2001) Financial Development and Poverty Alleviation: Issues and policy implications for developing and transition countries. IMF Working Paper, WP/01/160

International Monetary Fund. *International Financial Statistics*. (International Monetary Fund: Washington D.C.)

King, Robert G. and Levine, Ross (1993) Finance, entrepreneurship, and growth. *Journal of Monetary Economics* 32(3), pp. 513-542

Kirkpatrick, Colin and Tennant, David (2002) Responding to financial crisis: The case of Jamaica. *World Development* 30(11), pp. 1933-1950

La Porta, Rafael, Lopez-De-Silanes, Florencio and Zamarripa, Guillermo (2002) Related Lending. NBER Working Paper Series, No. 8848

Levine, Ross (1997) Financial development and economic growth: Views and Agenda. *Journal of Economic Literature*, Vol. 35, pp. 688-726

Levine, Ross (1996) Stock Markets: A Spur to Economic Growth. www.imf.org/external/pubs/ft/fandd/1996/03/pdf/levine.pdf

Levine, Ross (1991) Stock Markets, Growth and Tax Policy. *The Journal of Finance* 46(4), pp. 1445-1465

Levine, Ross, Loayza, Norman and Beck, Thorsten (2000) Financial intermediation and growth: Causality and causes. http://econ.worldbank.org/docs/671.pdf

Levine, Ross and Zervos, Sara (1998) Stock markets, banks, and economic Growth. *The American Economic Review* 88(3), pp. 537-558

McKinnon, Ronald I. (1973) *Money and capital in economic development*. (The Brookings Institution: Washington D.C.)

Monterrey Consensus (2002) Agreed Draft Text. Final Unedited Version. www.un.org/esa/ffd/aac257-32.htm

Odedokun, M.O. (1996) Alternative econometric approaches for analyzing the role of the financial sector in economic growth: Time-series evidence from LDCs. *Journal of Development Economics* 50, pp. 119 - 146

Peart, Kenloy (1995) Financial system reform and financial sector development in Jamaica. *Social and Economic Studies* 44, pp. 1-22

Planning Institute of Jamaica. *Economic and Social Survey Jamaica*. (Planning Institute of Jamaica: Kingston)

Rajan, Raghuram G. and Zingales, Luigi (1998) Financial Dependence and Growth. *The American Economic Review* 88(3), pp. 559-586

Rose, Peter S. (1996) *Commercial Bank Management*. (Irwin: Chicago)

Rose, Peter S. and Kolari, James W. (1995) *Financial Institutions: Understanding and Managing Financial Services (Fifth Edition).* (Irwin Publishers: Chicago)

Saunders, Anthony (1999) *Credit Risk Measurement*. (John Wiley and Sons: New York)

Schumpeter, Joseph A. (1934) *The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle*. (Cambridge, Mass: Harvard University Press)

Shaw, Edward S. (1973) *Financial deepening in economic development*. (Oxford University Press: New York)

Stennett, Robert R., Batchelor, Pauline M. and Foga, Camille S. (1998) Stabilization and the Jamaican Financial Sector 1991-1997. Mimeo, Bank of Jamaica

Stiglitz, Joseph E. (1993) The Role of the State in Financial markets. Proceedings of the World Bank Annual Conference on Development Economics, World Bank: Washington D.C.

Stiglitz, Joseph E. and Weiss, Andrew (1981) Credit Rationing in Markets with Imperfect Information. *American Economic Review* 71(3), pp. 393-410

Tennant, David and Kirton, Claremont (2007) The Impact of Foreign Direct Investment, Financial Crises and Organizational Culture on Managers' Views as to the Finance-Growth Nexus. *Journal of Economic Issues* 41(3), pp. 625-660

Tennant, David and Kirton, Claremont (2006) Assessing the Impact of Financial Instability: The Jamaican Case Study. *Iberoamericana Nordic Journal of Latin American and Caribbean Studies* 36(1), pp. 9-36

Vergil, Hasan (2002) Exchange Rate Volatility in Turkey and its Effect on Trade Flows. http://jesr.journal.fatih.edu.tr/ExchangeRateVolatilityinTurkeyandItsEffectonTrade.pdf

Winton, Andrew (1999) Don't Put All Your Eggs in One Basket? Diversification and Specialization in Lending. http://fic.wharton.upenn.edu/fic/papers/00/0016.pdf

World Bank (2003) *Jamaica: The road to sustained growth – Country Economic Memorandum*. (World Bank: Washington D.C.)

Zhu, Andong, Ash, Michael and Pollin, Robert (2002) Stock Market Liquidity and Economic Growth: A Critical Appraisal of the Levine/Zervos Model. Political Economy Research Institute Working Paper Series, Number 47