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FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH: EXPERIENCES OF SELECTED DEVELOPING ECONOMIES

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The last two decades of the twentieth century witnessed a series of financial reforms in emerging economies of Asia, Africa and Latin America. The seminal works of R. I. McKinnon and E. S. Shaw, which attribute the slow growth of these economies to financial repression, inspired many of these reforms. The McKinnon-Shaw thesis demonstrates how government regulations cause low savings and investment, and ultimately engender financial repression. Financial liberalization, in this view, creates market-based incentives and promotes economic growth. The objectives of the paper are to (1) track financial development and critically review financial liberalization measures in the emerging economies of Brazil, Mexico, and Thailand, and (2) investigate statistically the relationship between financial development and economic growth of these economies.

JEL Classification: E44, E50, 016.

Keywords: *Financial liberalization, Financial deepening, Financial development ratios, Economic growth, Per capita GDP.*

INTRODUCTION

Seminal works of McKinnon-Shaw literature provide the theoretical justification for the liberalization of financial markets for over three decades. McKinnon (1973) and Shaw (1973) charge certain administrative policies and controls with being responsible for repressed financial markets in emerging economies. Controls included, but were not limited to, ceilings on interest rates and credit, high reserve requirements, and lending by specialized credit agencies. Many emerging economies, taking a cue from the McKinnon-Shaw literature, launched a series of measures during the 1980s and 1990s aimed at financial liberalization (FL). Reform would take a two-pronged approach. Liberalization of the internal banking system proceeded first with privatization of the banking system and a comprehensive reform of the banking sector. Next, policymakers liberalized capital accounts to facilitate inflow of foreign capital.

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McKinnon-Shaw argued that an increase in real interest rates led to increased bank deposits, a higher level of saving and investment, and greater economic growth. These benefits notwithstanding, high-interest-rate-policies were not devoid of problems in implementation. First, banking institutions are in an inchoate stage of evolution in most emerging economies. Banking reform, based on higher interest rates, faces serious difficulty in such instances. Second, market exchanges are often transacted on a cash basis in developing economies. This complication for implementation of high-interest-rate-policy is especially acute in rural areas. Third, bank deposits are more dependent on income than on the interest rate. Fourth, high interest rates lead to adverse selection problems as risky borrowers crowd out credit-worthy borrowers (Stiglitz and Weiss, 1981). For these reasons, financial liberalization policies failed to achieve the desired results in some Asian and Latin American economies.

The rapid pace of capital account liberalization contains a recipe for financial disasters in some instances. The Mexican currency crisis in 1994 and the Asian financial crisis in 1997 serve as best examples. The paradigm for financial liberalization has shifted to proper sequencing of policies, and creation of an appropriate macroeconomic environment in advance of liberalization of capital accounts. Contemporary wisdom predicts financial disaster whenever abrupt liberalization of the capital account is not accompanied with development of a sound and responsible banking system. In this view, countries should proceed slowly with financial liberalization.

The objectives of this study are to (1) track financial development and critically review financial liberalization measures and (2) investigate the relationship between financial development and economic growth in the emerging economies of Brazil, Mexico, and Thailand. These countries are selected because they are all developing economies and share similar financial development and liberalization experiences. They all struggled with the liberalization and reform of their financial sectors in the last few decades, with varying degree of success.

The rest of the paper is organized as follows. Section II, following this introduction, reviews the major literature concerning the relationship between financial development and economic growth. Section III documents the extent of financial development and economic growth is documented for all three countries, while Section IV presents a causality analysis between economic growth and financial liberalization. Section V estimates a simple econometric model of the production function to determine the impact of financial development on economic growth. In Section VI, the authors present a summary of results.

A REVIEW OF LITERATURE

Bountiful literature in recent years emphasizes the role of financial sector development in economic growth. Three distinct views on the relationship between financial development and economic growth emerge from this recent literature. The predominant view shows financial development contributing to growth by creating a favorable environment for capital formation and investment activities (Goldsmith, 1969; McKinnon, 1973; and Shaw, 1973). Transmission from financial development to economic growth can occur through various channels.

Financial development stimulates savings in various ways. With financial development, households are faced with a wider range of financial instruments and availability of assets that

suit the needs of particular savers. Financial development also motivates households to switch from gold and real assets to financial investment. Financial intermediaries, by pooling funds from different types of small savers, can package them into suitable loans with appropriate characteristics as desired by investors. Financial institutions are large enough to incur large fixed cost in the administration and monitoring of loans, and as a result, are in a better situation than households for monitoring the performance and progress of projects. This advantage reduces the risk and cost for individual savers. Financial intermediaries partially overcome problems of adverse selection in credit markets, encourage specialization in production, foster development of entrepreneurship, and encourage adoption of new technology.

A second view shows economic development leading to financial development. Financial development becomes the “handmaiden” of economic development by reacting passively to the demands for financial services by a growing economy (Patrick, 1966; Robinson, 1952; and Stern, 1989). A growing economy needs a wider variety of financial services and a growing number of financial institutions. Expansion of financial services is conducive to “financial widening” and “financial deepening.”

A synthesized view of the above two approaches demonstrates a two-way relationship between financial development and economic growth. This relationship depends on the stages of economic growth. Financial development plays a crucial role in the growth process during the early stages of economic growth. As the economy matures, more sophisticated financial instruments and services are needed.

New growth theories focus on technological development as the major driver of sustained growth for long periods of time. Technological advances can overcome the constraints of diminishing returns to labor and capital. Financial development, by encouraging specialization and innovation, can be a positive factor in technological development (Bencivenga and Smith, 1991; Cooley and Smith, 1991).

Most country-level studies found strong linkages between different indicators of financial development and economic growth. Goldsmith (1969) conducted a cross-country study of 35 countries to determine the impact of financial development. Using the value of bank assets as a percentage of GNP to measure the size of the banking system, he found that for some countries, rapid growth has been accompanied by the above-average rate of financial development. King and Levine (1993), using a bigger sample of 80 countries over the period 1960-1989, found that economic growth was positively correlated with the level of financial development over time. Their studies showed, as did other studies, that initial level of financial development was a good predictor of subsequent rates of economic growth, physical capital accumulation, and economic progress. Cooley and Smith (1991) suggested that financial markets promoted economic growth by encouraging specialization and technological innovation. Benhabib and Spiegel (2000) found evidence that financial development helped both capital accumulation and productivity growth. Using firm level data, Rajan and Zingales (1998) found that younger firms in higher productivity sectors tended to depend more on the external finance and were likely to benefit more from lower cost of financing in a developed financial system.

Many empirical studies indicate that the positive impact of financial development on growth depends on the quality of financial regulations and supervision. Financial development increases

productivity by choosing high quality entrepreneurs and superior projects. Banks, by virtue of their specialization and experience, can identify innovative entrepreneurs who help channel funds to investment projects with high return (Thangavelu and Jiunn, 2004). In a study of the Australian economy, Thangavelu and Jiunn (2004) found that economic growth Granger-caused development of financial intermediaries, but development of financial market does not Granger-cause economic growth. Country level studies for Ecuador, Mexico, Chile, and Indonesia also indicate that FL leads to a more efficient allocation of resources by small firms (Harris, Schiantarelli and Siregar, 1994; Jaramillo, Schiantarelli and Weiss, 1996; Gelos and Werner 1999; and Gallego and Loayza, 2001).

An ample number of cross-country studies address the impact on financial liberalization on different macroeconomic indicators including interest rate, savings and national income. More recent research does not find any evidence of positive effect of financial liberalization on savings (Bandiera 2000). Several cross country studies show that financial liberalization leads to financial deepening which in turn stimulates growth (Levine, 2001). Experiences of Mexico, Chile and Indonesia indicate that FL is conducive to efficient allocation of resources and eases the credit constraint for small firms (Gelos and Werner 1999; Gallego and Loayza, 2001). Experiences with FL in many countries indicate that FL can also create a crisis if a proper sequencing path is not followed. The combination of a sound banking system and a strong portfolio are important preconditions for FL policies to succeed. FL may also lead to crisis because previous banking environment developed weak bank portfolios and did not develop a good credit culture (Lora, Panizza and Quispe-Agnoli, 2004).

FINANCIAL DEVELOPMENT–EXPERIENCE FOR THREE ECONOMIES

Brazil

Special credit programs were designed in the late 1960s to channel resources to so-called “high priority sectors.” Accordingly, shares of loans by banks declined from 86 per cent in 1963 to 41 per cent in 1985. Measures in the mid-1960s also resulted in greater banking concentration. The number of existing banks declined significantly in the 1960s (Baer, 2001). High inflation in the 1970s and 1980s was partially responsible for the explosive growth in banks that took place during these two decades. The number of bank branches grew from 5576 in 1970 to 8902 in 1984. Banks were making huge profits when the inflation rate reached 3-digit level in the 1980s and 4 digit-level in the 1990s. High inflation helped Brazilian banks in 3 ways: (1) inflation allowed banks to collect revenue by paying low interest rates, (2) real value of liabilities declined, and (3) borrowing to repay loans became much easier (Baer, 2001). Banks, encouraged by huge profits, started making riskier loans. Bank profit fell after the mid-1990s with the end of the high inflation period.

Brazil had all the symptoms of a dysfunctional or repressive financial system in the early 1980s. The country had multiple budgets and the government provided subsidized credit to lending institutions including insolvent state and financial institutions. Directed lending increased the cost of allocating funds. Extensive financial reform took place in the 1990s which included withdrawal of the monetary budget and elimination of the subsidized credits. The financial system benefited from participation of foreign institutions, high capitalization and prudent

banking regulations, and the strengthening of fiscal and monetary discipline (Santos, 2005). The improvement in the monetary environment helped Brazil achieve a GDP growth rate of 5.2 per cent in 2004, the highest in the decade. However, institutional and legal problems still abound with limited access to capital markets and high banking spreads that raise the cost of capital. Credit currently amounts to only 25 per cent of GDP, compared to more than 70 per cent in many developed countries (Santos, 2005).

Mexico

Limited financial reforms, introduced in the 1970s, allowed banks to increase their range of operations which resulted in some degree of financial innovation (Gonzalez-Anaya and Marrufo, 2001). The system was still too rigid for financial markets to work efficiently. The Mexican government, trying to deal with adverse productivity shock originating from the dramatic rise of oil prices, conducted expansionary monetary and fiscal policy. This strategy resulted in high inflation and large public deficits, and in turn, put upward pressure on the real exchange rate (Gonzalez-Anaya and Marrufo, 2001).

Mexico, like many other countries in Asia and Latin America, initiated reforms of the financial system in the mid-1980s. With about three-quarters of commercial bank credit flowing to the private sector, these measures were only half-hearted and led nowhere. Brokerage houses and insurance companies were privatized in 1984 as a first step toward financial liberalization. A comprehensive financial liberalization program was launched in 1988 with the introduction of market-based treasury certificates (CETES). Yields on CETES were allowed to float freely and secondary markets were established for trading. Credit quotas for priority sectors, as well as reserve requirements, were eliminated by the end of the 1990s. Stricter regulations on commercial banks were implemented and the role of specialized development-banks was reduced. The share of development bank credit to private sector decreased from 60 per cent in 1987 to 25 per cent in the early 1990s.

During the early 1990s, financial innovations evolved on a limited scale with banks offering diversified deposit and saving instruments to the public. The process of privatization of nationalized banks was completed in 1992. One central element of the liberalization process was the opening up of the public securities market to foreigners. Foreign investment in Mexican securities and foreign participation in domestic money markets were allowed. Restrictions on inward foreign direct investment were reduced. The Stock Exchange Act, passed in 1989, expanded possibilities of access to security markets by foreign investors through creation of new forms of investment. *Fondo Neutro* (neutral funds) permitted investors to acquire Series-A shares. Public securities were opened to non-resident investors in 1990. Transactions of treasury certificates between financial intermediaries and foreign investors were authorized in December of 1991. The government also abolished limits on foreign borrowing by commercial banks. Prudential banking regulations, introduced in the early 1990s, created supervisory agencies for various financial activities, set capital requirements, and established valuation and accounting practices a la Basil accord (Gonzalez-Anaya and Marrufo, 2001). Further reforms introduced a simple and anonymous mechanism for repatriating resources invested abroad, subject to a flat rate tax of one percent. Partial liberalization of transactions in foreign currency began in 1986. The dual exchange rate system, which had been in effect since 1982, was abolished in November of 1991.

Financial liberalization policies were successful in promoting financial development. The Financial Reform Index and International Financial Liberalization Index of Latin American countries indicated a move for Mexico from a level below the average of Latin America in 1982 to the highest level by the end of 1991. Gonzalez-Anaya and Marrufo (2001) employed the “broadest measure of financial depth” that included stock market and private bond capitalization, and development bank assets. By this measure, the financial depth of Mexican financial system grew significantly from 40 per cent in 1985 to 100 per cent in 1994 and then declined to 70 per cent of GDP in 1999.

Thailand

The first step toward FL was implemented in 1980 when the upper limits on lending and depository rates were relaxed from the statutory limits imposed on them since 1924. Interest rate deregulation was interrupted in the first half of the 1980s when the economy faced a serious macroeconomic crisis in the form of recession and large current account deficits. Many financial institutions were in the red because of a large volume of bad loans and weak banking practices (Kawai and Takayasu, 2000). Thailand embarked on a comprehensive financial liberalization program with the launching of a first 3-year financial system development plan (1990-1992) in the early 1990s. Goals included deregulation of interest rates, development of new financial instruments and services, and improvement in supervision of financial institutions. Longer maturity time deposit rates were allowed to float in 1992. All interest rate ceilings on time deposits and loans were removed in 1990. Controls on interest rates were eliminated on all saving deposits in 1992. Other measures included liberalization of transactions in which banks were allowed to engage in foreign exchange, debt underwriting, market making in government securities and development of alternative financial markets. The credit allocation quota system was relaxed in 1992.

The second 3-year plan, which spanned from 1993 to 1995, aimed to enhance financial market efficiency, increase domestic savings through reform of the pension system, and transform Thailand into a regional banking center by establishing Bangkok International Banking Facility (BIBF). The BIBF (1) encouraged foreign-currency-denominated-deposits bank loans into Thailand, (2) attracted foreign banks with sound international reputations to open up branches in Thailand, and (3) allowed foreign banks to extend loans, via Bangkok, to the greater Indo-China area (Kawai and Takayasu, 2000). Financial market deregulation was still not accompanied by prudent bank supervisory practices or proper accounting standards. The Thai government announced in 1995 that the number of full branch banking licenses would be increased by nearly 50 per cent by the following year and foreign banks would be allowed to compete with domestic banks for licenses. Government reduced ownership stakes in the banking system in 1995. Deregulation resulted in greater competition among commercial banks and between commercial banks and finance companies.

Between 1990 and 1996, assets of commercial banks and finance companies increased at an average of 21 and 30 per cent per annum, respectively, while nominal GDP rose by only 13 per cent. The volume of financial sector credit extended to the private sector, as a proportion of GDP, increased significantly from 83 per cent in 1990 to 147 per cent in 1996 (Table 1). A high proportion of loans was used to finance speculative, non-productive investments. Financial

Table 1
Growth in Real GDP and Different Indicators of Financial Deepening

Year	Brazil	Mexico	Thailand	Brazil	Mexico	Thailand	Brazil	Mexico	Thailand	Brazil	Mexico	Thailand
	% change in GDP	% change in GDP	% change in GDP	RQMY	RQMY	RQMY	RM2Y	RM2Y	RM2Y	RDCY	RDCY	RDCYP
1971	11.3	3.8	4.9	3.5	4.0	17.8	17.25	15.26	29.4	37.3	34.3	20.6
1972	12.1	8.2	4.3	1.7	4.1	20.8	16.85	14.94	32.0	41.8	33.8	21.0
1973	14.0	7.9	10.2	1.4	4.6	19.7	16.27	14.93	30.1	44.1	31.6	22.5
1974	9.0	5.8	4.5	1.1	4.3	20.0	15.35	14.13	29.1	48.2	28.8	24.2
1975	5.2	5.7	5.0	1.2	3.8	22.6	15.23	13.78	31.6	54.9	29.2	27.6
1976	9.8	4.4	9.3	1.2	6.2	24.3	13.20	14.85	33.0	54.6	32.3	35.0
1977	4.6	3.4	9.8	1.8	17.1	26.1	12.29	20.87	34.3	54.4	17.5	38.9
1978	3.2	9.0	10.3	2.6	18.3	25.8	12.26	26.26	33.9	50.3	19.4	42.1
1979	6.8	9.7	5.4	2.5	19.2	25.4	11.88	26.90	34.5	50.2	20.0	43.5
1980	9.1	9.2	5.2	1.5	18.3	27.2	9.63	25.19	34.5	42.5	19.4	41.7
1981	-4.4	8.8	5.9	1.7	21.2	28.8	8.64	26.45	35.8	43.8	19.6	42.8
1982	0.6	-0.6	5.4	2.2	20.7	33.8	7.78	25.50	38.9	44.0	15.3	45.7
1983	-3.4	-4.2	5.6	3.4	19.6	39.7	7.30	22.37	44.0	47.1	12.6	53.0
1984	5.3	3.6	5.8	5.2	20.4	45.5	7.32	22.52	49.9	45.4	14.1	56.8
1985	7.9	2.6	4.6	5.9	17.5	48.0	8.40	21.20	53.5	41.9	13.0	58.3
1986	8.0	-3.8	5.5	7.5	18.3	50.2	12.55	20.21	55.8	21.5	13.1	56.9
1987	3.6	1.9	9.5	7.4	18.8	52.0	13.11	17.88	56.9	22.6	12.9	59.5
1988	-0.1	1.3	13.3	34.4	4.3	51.8	22.67	10.58	56.6	84.8	11.1	64.1
1989	3.3	4.2	12.2	37.3	10.7	55.6	24.16	11.59	58.2	81.7	15.6	71.9
1990	-4.3	5.1	11.2	17.3	15.3	61.1	13.54	16.80	62.7	38.9	17.5	83.4
1991	1.3	4.2	8.6	27.4	13.9	64.2	20.17	20.99	67.1	42.7	21.0	89.1
1992	-0.5	3.6	8.1	48.8	15.4	66.0	30.17	23.71	69.8	67.3	28.1	98.5
1993	4.9	1.9	8.4	70.8	15.6	69.7	40.64	25.31	72.9	96.3	31.8	111.2
1994	5.9	4.4	9.0	34.4	18.3	68.3	22.42	26.28	73.4	52.9	38.7	127.6
1995	4.2	-6.2	9.3	24.7	20.9	69.7	26.12	25.61	73.2	35.0	29.3	139.6
1996	2.7	5.2	5.9	22.3	18.4	71.5	26.15	23.86	76.1	30.4	18.8	146.8
1997	3.3	6.8	-1.4	23.4	19.9	82.5	27.01	24.69	85.1	30.6	20.3	165.5
1998	0.2	5.0	-10.8	24.7	19.9	93.2	29.30	25.63	98.3	34.1	19.4	155.8
1999	0.8	3.7	4.2	24.9	17.6	92.7	30.26	24.81	106.0	34.5	16.3	132.5
2000	4.5	6.9	4.3	22.0	12.9	91.9	28.23	21.63	104.2	37.6	13.2	108.8

institutions increasingly relied on borrowing to supplement their deposits for extending loans. The financial sector became vulnerable, which ultimately led to the financial crisis in 1997, because of (1) increase in nondeposit borrowing, particularly foreign borrowing made easier by the pegged exchange rate, (2) deterioration in the quality of bank assets, (3) excessive lending without prudent management of assets and liabilities, and (4) inadequate regulatory and supervisory frameworks (Kawai and Takayasu, 2000).

VARIOUS INDICATORS OF FINANCIAL DEVELOPMENT

Various qualitative and quantitative indicators have been suggested to measure the extent of financial development. Conventionally, financial development has been measured using ratios of some monetary aggregate to GDP that reflect the extent of financial deepening such as M2/GDP, Private credit/GDP, M1/M2, and Private credit/Total credit. Other used measures are: interest rate spread, quality of bank supervision, credit availability and accessibility. Several

studies question the reliability of ratios of monetary aggregates to GDP as measures of financial development and deepening for less developed nations. Pill and Pradhan (1997) point out that these measures ignore the degree of openness and the legal and regulatory environment of these economies. Gelbart and Sergio (1999) argue that poor national income accounts and unreliable private credit data in these countries obscure the importance of these measures.

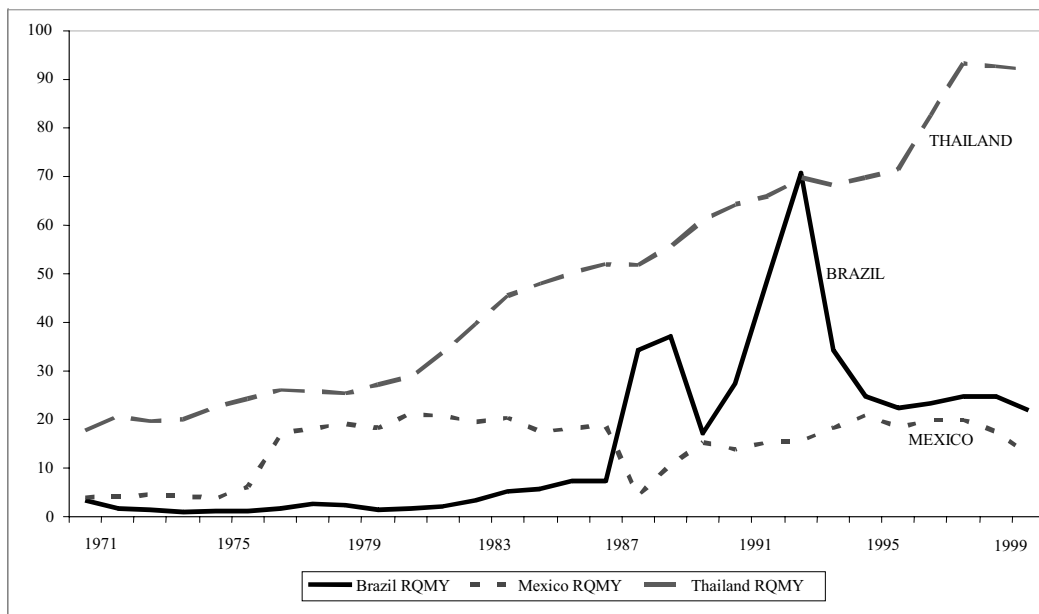
This study analyzes financial sector growth and the resultant impact on economic development by computing the following financial development ratios:

1. RQMY= Ratio of quasi money to nominal GDP.
2. RM2Y = Ratio of M2 to nominal GDP.
3. RDCY = Ratio of private domestic credit to nominal GDP

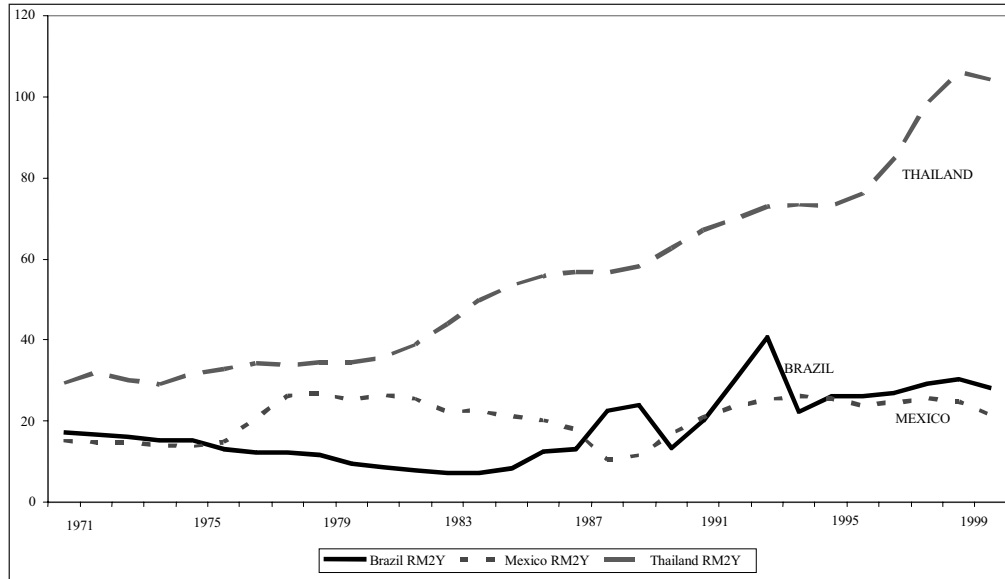
These measures have been widely used in the literature as indicators of financial development. Lack of data prevents the use of the stock market as a measure of the depth of the capital market. The ratio of M2 to GDP is probably the most widely used indicator of financial development. For less developed economies, domestic credit represents the single most important source of funds. Domestic credit is also an important productivity enhancing financial service, which is crucial for achieving a high rate of growth. All data originate from international financial statistics and span a period from 1971 to 2000.

Table 1 and Figures 1 to 3 show the ratios of quasi-money, M2 and domestic credit to GDP for the three countries. All the three ratios steadily increased for Thailand, exhibiting a particularly stronger growth since the early 1980s. The three financial ratios, RQMY, RM2Y and RDCY reached a peak in 1997, 1998, and 1999. All three series tapered off gradually after reaching a

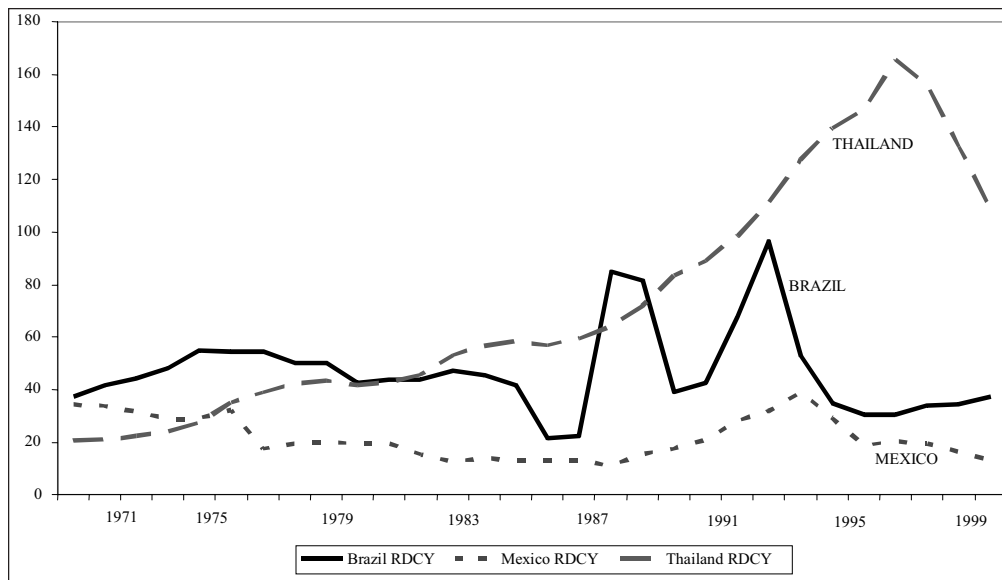
**Figure 1: Ratio of Quasi-money to GDP (RQMY)
(In Per cent)**



**Figure 2: Ratio of M2 to GDP (RM2Y)
(In Per cent)**



**Figure 3: Ratio of Private Domestic Credit to GDP (RDCY)
(In Per cent)**



peak in the three countries. Brazil experienced a sharp fluctuation in the ratio of monetary aggregates. For Brazil, RQMY remained low at less than 10 per cent until 1977 and then made a significant jump in 1988. All the three ratios reached a peak in 1993 and gradually declined since then until recently. Brazil's monetary aggregates as percent of GDP exhibit two peaks,

one in 1988 and the other in 1993. Mexico had higher RQMY and RM2Y than Brazil until the mid-eighties, then it fell lower than that of Brazil. In Mexico, both RQMY and RM2Y remained flat around 5 per cent and 15 per cent, respectively, until 1976; both series experienced a big jump in 1977 and remained flat until 1988. The RDCY ratio also stayed flat until 1976, showed a declining trend until 1991, and then showed some increase until 1996.

Tables 2A, 2B and 2C show growth in real GDP and per capita real GDP and three financial development ratios. Brazil experienced the highest growth in real GDP in 1971-75 and 1976-80 when both its RQMY and RM2Y were low. In both these periods, RDCY was relatively high in Brazil. Mexico shows positive per capita growth in 1976-1980 and 1996-2000. Its three ratios were in the range of 15 to slightly over 20 per cent. For Mexico, these ratios did not change significantly over the years. Mexico experienced relatively high growth rate of 4 per cent after years of negative growth rates, even though its three financial indicator ratios did not improve, in fact the average RDCY was lower in 1996-2000 period than that in 1991-1995. Of the three countries, Thailand recorded the strongest growth in all the three financial ratios. The per capita GDP growth attained highest levels in 1986-1990 and 1991-1995 periods. The

Table 2A
Economic Growth and Financial Indicators: Brazil (1970 – 2000)

<i>Year</i>	<i>RQMY</i>	<i>RM2Y</i>	<i>RDCY</i>	<i>Real GDP Growth (gy)</i>	<i>Growth in Per-Capita Real GDP (gpy)</i>
71 – 75	1.8	16.2	45.3	10.3	
76 – 80	1.9	11.8	50.4	6.7	4.2
81 – 85	3.7	7.9	44.4	1.2	-0.9
86 – 90	20.8	17.2	49.9	2.1	0.3
91 – 95	41.2	27.9	58.8	3.2	1.6
96 – 00	23.5	28.2	33.4	2.3	0.9

Table 2B
Economic Growth and Financial Indicators: Mexico (1970 – 2000)

<i>Year</i>	<i>RQMY</i>	<i>RM2Y</i>	<i>RDCY</i>	<i>Real GDP Growth (gy)</i>	<i>Growth in Per-Capita Real GDP (gpy)</i>
71 – 75	4.1	14.6	31.5	6.3	
76 – 80	15.8	22.8	21.7	7.1	4.3
81 – 85	19.9	23.6	14.9	2.0	-0.2
86 – 90	13.5	15.4	14.0	1.7	-0.2
91 – 95	16.8	24.4	29.8	1.6	-0.2
96 – 00	17.7	24.1	17.6	5.5	4.0

Table 2C
Economic Growth and Financial Indicators: Thailand (1970 – 2000)

<i>Year</i>	<i>RQMY</i>	<i>RM2Y</i>	<i>RDCY</i>	<i>Real GDP Growth (gy)</i>	<i>Growth in Per-Capita Real GDP (gpy)</i>
71 – 75	20.2	30.4	23.2	5.8	
76 – 80	25.8	34.1	40.2	8.0	5.4
81 – 85	39.2	44.4	51.3	5.4	3.6
86 – 90	54.1	58.0	67.2	10.3	8.5
91 – 95	67.6	71.3	113.2	8.7	7.5
96 – 00	86.4	93.9	141.9	0.4	-0.3

growth rate in per capita GDP was negative in 1996-2000 in the wake of the Asian financial crisis, even though all the three ratios reached their highest levels in that period.

**FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH–
A CAUSALITY ANALYSIS**

Granger causality tests are employed in this section to check for both unidirectional and bidirectional causality between the different indicators of financial development and growth of real per capita income. The procedure underlying the Granger test is to determine whether the inclusion of the causal variable significantly reduces the forecast error. The model uses the lagged values of both the causal and the dependent variable. A null hypothesis of no causality is tested in a joint test that the coefficients of the lagged causal variables are significantly different from zero. The following two equations, showing the short-term dynamics between financial development and economic growth, are used for causality tests:

$$gPY_t = \gamma_0 + \sum \gamma_{1s} gPY_{t-s} + \sum \gamma_{2s} FD_{t-s} + u_t \tag{1}$$

$$FD_t = \delta_0 + \sum \delta_{1s} FD_{t-s} + \sum \delta_{2s} gPY_{t-s} + v_t \tag{2}$$

where:

gPY = growth of real per capita income and

FD = financial development ratios as defined above.

Equation (1) and (2) can provide causality tests for the following possible causal relationships.

- (a) Unidirectional causality from *FD* to *gPY* exists if $\sum \gamma_{2s} \neq 0$ and $\sum \delta_{2s} = 0$.
- (b) Unidirectional causality from *gPY* to *FD* exists if $\sum \delta_{2s} \neq 0$ and $\sum \gamma_{2s} = 0$.
- (c) Bidirectional causality between *FD* and *gPY* exists if $\sum \gamma_{2s} \neq 0$ and $\sum \delta_{2s} \neq 0$.
- (d) No causality is established between *gPY* and *FD* if $\sum \gamma_{2s} = 0$ and $\sum \delta_{2s} = 0$.

The optimal lag length has been chosen on the basis of AIC and FPE, SC and HQ criteria. The results of the causality tests are reported in Tables 3A to 3C. Results of these tests indicate no evidence of causality running from various financial development indicators to economic growth, or vice-versa, for Brazil. Although results fail to establish any causality between RQMY and RM2Y and GDP growth for Mexico, evidence of bidirectional causality between domestic credit and growth of per capita GDP is found. Strong evidence of unidirectional causality running from RM2Y to growth of per capita GDP is detected for Thailand. The authors also find evidence of bidirectional causality between domestic credit and growth of per capita GDP for Thailand. The presence of bidirectional causality between domestic credit and per capita GDP growth for

**Table 3A
Results of Causality Tests for Brazil**

Lags	Direction of Causality	F value	P value	Accept/Reject H_0
1	RQMY → GPY	0.15	0.86	Accept
	GPY → RQMY	1.77	0.19	Accept
1	RM2Y → GPY	0.02	0.89	Accept
	GPY → RM2Y	0.005	0.94	Accept
1	RDCY → GPY	0.47	0.50	Accept
1	GPY → RDCY	1.46	0.24	Accept

Table 3B
Results of Causality Tests for Mexico

Lags	Direction of Causality	F value	P value	Accept/Reject H_0
1	RQMY → GPY	0.0001	0.99	Accept
	GPY → RQMY	0.42	0.52	Accept
2	RM2Y → GPY	0.05	0.95	Accept
	GPY → RM2Y	1.15	0.34	Accept
1	RDCY → GPY	4.46	0.04	Reject at 5%
	GPY → RDCY	5.05	0.03	Reject at 5%

Table 3C
Results of Causality Tests for Thailand

Lags	Direction of Causality	F value	P value	Accept/Reject H_0
2	RQMY → GPY	0.20	0.82	Accept
	GPY → RQMY	2.17	0.13	Accept
3	RM2Y → GPY	9.70	0.0003	Reject at 1%
	GPY → RM2Y	1.64	0.21	Accept
4	RDCY → GPY	7.62	0.04	Reject at 5%
	GPY → RDCY	2.98	0.0005	Reject at 1%

Mexico support the synthesized view discussed in Section II above that financial development leads to economic growth and economic growth creates, by creating demand for new and varied financial services, lead to financial development.

FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH – ECONOMETRIC MODELING AND EMPIRICAL RESULTS

The following Cobb-Douglas type production function is used with some modifications to determine the effect of financial development on economic growth:

$$Y = e^h K^\alpha L^\beta FD^\gamma \quad (3)$$

where:

Y = Real gross domestic product

K = Capital in physical units

L = Labour input in physical units

FD = A measure of financial development.

After taking a natural log of both sides and differentiating equation (3) with respect to time and adding an error-term that satisfies the standard assumptions, the above equation can be rewritten as follows:

$$gY_t = h + \alpha gK_t + \beta gL_t + \gamma gFD_t + u_t \quad (4)$$

The constant “ h ” in equation (4) is expected to capture the possible productivity effects of Hicks-neutral technological progress. gY_t , gK_t , gL_t and gFD_t measure the growth rates of output, capital, labour and an indicator financial development respectively. α , β , and γ represent elasticity of output with respect to capital, labour and financial development. In the absence of reliable data on growth of capital stock, the ratio of gross capital formation to GDP (I/Y) has been used as a proxy variable for gK_t (See Park, 1992).

In a modified version of equation (4), growth of output has been substituted for the growth of per capita output, because an increase in the standard of living is associated with an increase in real per capita income (Salvatore and Hatcher, 1991). As discussed in the previous section, economic growth is facilitated by financial intermediation in three different ways: (1) higher efficiency of intermediation, (2) improved efficiency of capital stock, and (3) an increase in the savings rate. Instead of using growth of financial development variables, we have used three measures of financial development as explanatory variables.

Based on the discussion above, the estimated versions of Equation (4) are:

$$gY_{it} = h_i + \alpha_i (RIY)_{it} + \beta_i gL_{it} + \Gamma_i FD_{it} + u_{it} \quad (5)$$

$$gPY_{it} = h_i + \alpha_i (RIY)_{it} + \beta_i gL_{it} + \Gamma_i FD_{it} + u_{it} \quad (6)$$

where:

$$i = 1, 2, 3, \quad \text{and} \quad t = 1, 2, \dots, T.$$

A brief description of all the variables used in the model and their sources can be shown as:

gY = Growth of real GDP

gPY = Growth of per capita real GDP

gL = Growth of labour force

RIY = Gross fixed capital proportion as a proportion of GDP.

FD = Three financial development ratios as defined earlier.

Annual data from 1971 to 2000 are used to estimate equations (5) and (6). Data are taken from International Financial Statistics and World Development Indicators provided by IMF and World Bank, respectively. As the data involves both cross-sectional and time series observations, this model employs the pooling approach. Various techniques are available to estimate panel data. Two approaches are employed here: (1) Fixed effects approach, and (2) Random effects approach. The fixed effects approach, which allows the intercept to vary across countries, is appropriate if evidence exists to suggest that individual nations have different intercepts. The reasonable observer could expect different intercept due to the cross-country differences in the macroeconomic conditions, growth rates and growth prospects of the selected economies. Random-effects model is appropriate as individual specific constant terms are drawn from a large population. The Hausman specification test has been employed to test whether the fixed or random effects model should be used. This testing is done using Wald χ^2 tests with $K-1$ degrees of freedom where k is the number of regressors (in our case, 4). The test evaluates whether there is a significant correlation between the unobserved country-specific random effects and the regressors. If no such correlation exists, the random effects model is deemed to be more appropriate (Yaffee, 2003).

Table 4 presents the results of the estimation of GDP growth model as represented by equation (5). Specifications (1), (2) and (3) refer to the three definitions of financial development, RQMY, RM2Y and RDCY, respectively. The coefficients of both growth of labour (gL) and investment-GDP ratio (RIY) are found to be positive as expected and are statistically significant in all three equations in the fixed effects model. The variable gL is found to be positive and statistically significant only in specifications (2) and (3) of the random effects model. RIY is

statistically significant both in fixed and random effects models in all three specifications. Both RQMY and RM2Y are found to be statistically insignificant in specifications (1) and (2) for both fixed effects and random effects model. Although RDCY is found to be statistically significant in both fixed and random effects model, the effect of DC/Y is found to be negative on GDP growth. This result is puzzling in view of the expectation that expansion in domestic credit should stimulate economic growth. The Hausman test statistic indicates that the random effects model is preferable to the fixed effects model.

Table 4
Results of the Pooled Time-Series and Cross Section Model
Dependent Variable: Growth of Real GDP (gY)

	Specification (1)		Specification (2)		Specification (3)	
	Fixed effects	Random effects	Fixed effects	Random effects	Fixed effects	Random effects
C	–	–0.09 (–2.73) ^a	–	–0.11 (–3.37) ^a	–	–0.08 (–2.38) ^b
gL	1.35 (2.16) ^b	1.12 (1.41)	1.69 (1.92) ^c	1.74 (2.37) ^b	1.25 (2.75) ^a	1.18 (1.97) ^c
RIY	0.004 (4.57) ^a	0.005 (4.91) ^a	0.007 (4.63) ^a	0.004 (5.27) ^a	0.005 (4.90) ^a	0.005 (5.96) ^a
RQMY	–0.05 (–1.25)	–0.0005 (–1.51)	–	–		
RM2Y			4.85E-05 (0.06)	–0.0001 (–.56)		
RDCY					–0.0005 (–2.98) ^a	–0.0004 (–3.02) ^a
R ²	0.38	0.32	0.33	0.21	0.39	0.38
Hausman test (χ^2)		1.68 (0.84)		1.73 (0.86)		1.91 (0.96) ^{Fd}
(<i>p</i> -value)						
F ^d	0.55	0.40	0.43	0.62	0.31	0.29

Notes: *t*-values are in parentheses

Notes: *t*-values are in parentheses

^asignificant at the one percent level using a two tailed test

^bsignificant at the five percent level using a two tailed test

^csignificant at the ten percent level using a two tailed test

^d*F*-values derived from the Chow break test

Most financial reforms started taking place in the late 1980s. Eyeball examination also indicates some break in financial development indicators of Brazil and Mexico in 1989. Therefore, a Chow break test was conducted for a possible structural break in 1989. Both fixed and random effects model were estimated separately for the period from 1971 to 1988 and from 1989 to 2000. The Chow break test (Heij. *et al.*, 2004) is calculated using:

$$F = \frac{(RSS_1 - RSS_2 - RSS_3)}{\frac{k}{RSS_1}} \frac{1}{(n_1 + n_2 - 2k)}$$

Where,

RSS_1 = sum of squares of residuals for the period from 1971 to 2000
 RSS_2 = the sum of squares for the period from 1971 to 1988
 RSS_3 = sum of squares for the period 1989 to 2001
 $k = 4$ (number of regressors)
 $n_1 = 18$ (number of observations from 1971 to 1988)
 $n_2 = 12$ (number of observations from 1989 to 2000)

The F-values are reported in Table (4). Since the calculated values of the F-statistics are less than the tabulated ones for both models, we fail to reject the null hypothesis of no structural break. One finds no statistically significant difference between the estimated models for years before 1989 and after 1989.

Results of estimated equation (6) that use per capita income growth (gPY) as the dependent variable are reported in Table 5. The growth of labour force is found to be positive and statistically significant only in specification (1) for both fixed and random effects models. Investment-GDP ratio (RIY) is found to be statistically significant in all three specifications. Both RQMY and RM2Y have negative signs and are found to be statistically insignificant in all specifications, both in the fixed and random effects models. As in the case of equation (5), RDCY is found to be statistically significant, but has negative sign contrary to expectation. As in estimated equation (4), the Hausman test statistic indicates that the random effects model is preferable to the fixed

Table 5
Results of the Pooled Time-Series and Cross Section Model Dependent Variable:
Growth of per Capita Real GDP (gPY)

	Specification (1)		Specification (2)		Specification (3)	
	Fixed effects	Random effects	Fixed effects	Random effects	Fixed effects	Random effects
C	–	–0.08 (–2.75) ^a	–	–0.10 (–3.28) ^a	–	–0.08 (–2.41) ^b
gL	1.06 (1.71) ^c	0.28 (0.37)	0.55 (0.68)	0.96 (1.33)	0.44 (1.02)	0.43 (0.72)
RIY	0.005 (4.62) ^a	0.005 (6.03) ^a	0.005 (5.85) ^a	0.004 (5.40) ^a	0.005 (5.05) ^a	0.005 (6.13) ^a
RQMY	–0.0005 (–0.91)	–0.0004 (–1.62)	–	–	–	–
RM2Y	–	–	–0.05 (–1.28)	–0.0001 (–0.60)	–	–
RDCY	–	–	–	–	–0.0004 (–2.97) ^a	–0.0004 (–2.83) ^a
R ²	0.35	0.31	0.31	0.31	0.38	0.37
Hausman test (χ^2)		1.77		1.54		1.92
(p-value)		(0.41)		(0.46)		(0.64)
F	0.32	0.95	0.57	0.61	0.11	0.27

Notes: *t*-values are in parentheses

^asignificant at the one percent level using a two tailed test

^bsignificant at the five percent level using a two tailed test

^csignificant at the ten percent level using a two tailed test

^dF-values derived from the Chow break test

effects model. Equation (6) was also estimated for the two sub-periods, 1971-1989 and 1990-2000. The F-statistics from the Chow break test, which are reported in Table 5, indicate no structural break in the estimation period, 1971-2000. Overall, this study did not find any statistical evidence of economic growth being positively affected by financial development as measured by different financial development ratios. These results are not surprising in view of the fact that some broad macro-economic indicators cannot adequately represent the extent of financial development.

CONCLUSION

This study critically reviewed the major financial development in the three emerging economies of Brazil, Mexico and Thailand. Using panel data from 1971 to 2000, a traditional Cobb-Douglas type production function was estimated to determine the impact of financial development on economic growth for the three economies, based on theoretical justifications provided by McKinnon and Shaw. The model has been estimated employing both fixed and random effects methods. From the panel data estimation of these countries, the most important variable in economic development is the fixed capital formation. Growth of labor, which is used as a proxy for population growth, is found to be positive and statistically significant only in some specifications of our estimated model. The most striking result is the lack of evidence on the positive impact of financial development on economic growth as measured by both growth of real GDP and per capita real GDP. What is more striking and puzzling is that domestic credit has negative, statistically significant effect on economic development. One explanation of this puzzling result is that a high proportion of domestic credit went to finance non-productive and speculative investments in these countries. Many authors contend that the positive impact of financial development depends on the establishment of a proper financial architecture that incorporates a prudential regulatory and supervision system, transparency of the financial system, proper risk management, and granting of loans based on proper risk-return calculation instead of being motivated by non-economic factors. Although all three countries experienced a substantial increase in financial development with Thailand being the top, empirical facts and country-by-country investigations show that the financial sectors of these countries were never fully liberalized. For all these countries, banks did not conduct sound risk-return analysis while granting loans, implicit and explicit insurance provided by the government allowed banks to meet demand for credit, and the expansion of credit was not accompanied by sound and prudential measures until recently. All these factors contributed to the failure to obtain a positive, statistical linkage between financial development and economic growth despite the fact that significant financial development took place in the three economies during our estimation method, as reflected in the growth in monetary aggregates. A more comprehensive financial index that includes both quantitative and qualitative measures may be a better indicator of financial maturity of a country which may play a more positive role in economic development.

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