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Financial Deepening and Investment in Africa: Evidence from Botswana and Mauritius

Malcolm F. McPherson
and Tzvetana Rakovski

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Abstract

This paper tests an hypothesis proposed by Ronald McKinnon regarding the complementarity of real money demand and real investment in economies with fragmented financial systems. The data used are taken from Mauritius and Botswana. Both single equation and systems estimates are used in the analysis. The results provide strong support for the hypothesis in the case of Mauritius. For Botswana, the complementarity has been between real money demand and real savings. This reflects the pattern and financing of investment in Botswana where the resource base was so potentially rich that the necessary resources were provided from abroad during the initial stages of mine development.

For policy purposes, the basic lesson is that mutual dependence between money demand and investment implies that financial development complements economic growth. To stimulate economic growth, policy makers need to focus on measures that promote financial development. One of these, government self-restraint in the use of the economic surplus, has been a major feature of the economic success of both Botswana and Mauritius.

Keywords: Financial development, Investment, Money balances

JEL Classification Codes: E2, E5, O1

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Malcolm McPherson, Fellow of HIID, is Principal Investigator of the study "Promoting and Sustaining Trade and Exchange Rate Reform in Africa" being conducted under the USAID-financed Equity and Growth in Africa through Economic Research/Trade Regimes and Growth. He is also Principal Investigator of the study "Restarting and Sustaining Growth and Development in Africa" being conducted under the EAGER/Public Strategies for Growth with Equity project.

Tzvetana S. Rakovski is working as a research assistant on the Equity and Growth through Economic Research (EAGER) Project at Harvard Institute for International Development. She holds an M.A. degree in Economics from Northeastern University, Boston and a M.Sc. degree in Mathematics from Sofia University, Bulgaria. Her research interests are in the fields of International Development and Applied Econometrics. Her prior working experience includes a position as a researcher at the Agency for Economic Analysis and Forecasting (AEAF), Sofia, Bulgaria.

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1. Introduction

This essay examines the hypothesis, first proposed by Ronald McKinnon, that in a fragmented financial system money and investment are complementary. We test the hypothesis using data from Botswana and Mauritius. Our intention is to better understand the factors associated with financial development in Southern Africa so that policy makers can devise more appropriate strategies to achieve sustained economic growth.

Over the last three decades, both Botswana and Mauritius have grown rapidly at the same time as their financial systems have expanded and deepened. Their experience provides an opportunity to understand examine some aspects of financial development in Southern Africa and how financial systems might be transformed in ways that support rapid economic growth.

The essay is arranged as follows. Section 2 discusses theoretical developments and practical experience against which McKinnon formulated his hypothesis. Section 3 reports the empirical results and assesses their significance. Section 4 concludes by examining the policy implications of the results.

2. Historical Background

It is now more than twenty-five years since Ronald McKinnon published *Money and Capital in Economic Development.*[1] McKinnon along with Edward Shaw[2] fundamentally changed the way that development economists thought about the contributions of money and finance to economic development. Earlier work by Raymond Goldsmith had identified the key processes involved in financial development and the conditions under which financial systems systematically “deepen” over time.[3] Goldsmith showed that as income rises and economic activity expands financial intermediation leads to the progressive "layering" of financial assets and liabilities. The

intermediation is due to an expansion of traditional banking services and the increasing role of non-bank financial intermediaries (NBFI).

Gurley and Shaw has earlier pointed to the growing importance of NBFI when they argued that their activities posed potentially serious problems for monetary management and monetary policy.[4] Subsequent analysis of these problems led to two conclusions.[5] First, monetary management would not be undermined if the monetary authorities exerted control over the financial system by operating through the financial markets.[6] Second, the growing role of NBFI was stimulated in part by the opportunities for intermediation created by monetary policy measures that placed specific restrictions on banks, at that time the dominant financial entities.

These contributions stressed the relevance for financial development (or financial "deepening") of rising income and wealth and attempts to control the activities of financial intermediaries. Income and wealth stimulate the demand for financial services. Controls and restrictions on financial intermediaries create the incentives for further financial intermediation by generating "quasi-rents" that reflect differences in information and risk among participants in financial and capital markets.

A well-known historical example is the development of the Euro-dollar market.[7] This market gained its impetus from several directions. A number of countries (particularly the Soviet Union and other Eastern European countries) had begun to accumulate large U.S. dollar balances as their incomes rose and they began to participate more extensively in world trade. Due to the Cold War, these countries were unwilling to hold dollar deposits in the United States. Banks in London began offering dollar-denominated deposits that they then loaned to customers who found it convenient to borrow dollars outside the U.S. The market was given a boost during the 1960s by restrictions imposed in the United States to reduce the balance of payments deficit. The U.S. was unwilling to devalue the dollar at the time because such action would have risked destabilizing the international financial system. The various controls introduced in the U.S. --- the interest equalization tax in 1963, restrictions on foreign borrowing in the U.S. in 1965 and attempts to force U.S. corporations to borrow abroad in 1968 --- were costly for both Americans and foreigners.[8] These measures encouraged those who required U.S. dollars to seek

accommodation in jurisdictions unhampered by U.S. controls. With a growing supply of dollars abroad and increasing demand to avoid the various restrictions, many opportunities for intermediation emerged.

In contrast to this experience where controls on money and finance created opportunities for financial intermediation, evidence from developing countries was showing that controls and restrictions often resulted in financial disintermediation. The most obvious case at that time was Latin America where financial development had stalled. Indeed, capital flight was becoming problem. In Asia, controls on financial intermediaries were creating a number of problems giving a boost to informal markets and exacerbating inflation.[9]

This was the intellectual and practical background against which McKinnon and Shaw framed their analyses of the problems of promoting financial development in developing countries. Both of them clearly recognized that increasing income and wealth expanded the demand for money and financial assets. They also understood that official controls could create the opportunities and incentives for financial intermediation. What their analyses (and those of other scholars) were showing, however, was that controls and restrictions could be overdone. When markets are dynamic and robust, controls generate opportunities for financial intermediation. But controls can just as readily intensify the fragmentation of financial (and other) markets and discourage financial intermediation.

McKinnon and Shaw sought to explain how government interference could block financial development. A major problem was the excessive use by governments of "captive markets." These are financial intermediaries, such as banks, insurance companies, and pension funds that are required to accommodate government borrowing irrespective of the costs involved. The adverse effects were compounded when governments placed limits on interest rates that could be paid on deposits or charged on loans and fixed a rate of exchange for the national currency. Almost invariably these financial prices were inconsistent with the particular country's capacity to export, import, and attract foreign investment. The outcome was a set of policy-determined distortions in the financial system. These eroded the incentive for further financial development leaving the financial system "shallow" and less dynamic than it might otherwise have become.[10]

In their respective books, McKinnon and Shaw sought to develop approaches to the management of money and credit that would help reduce the degree to which financial markets were fragmented. For McKinnon, financial market fragmentation and the limited opportunities for intermediation in developing countries were symptomatic of the broader problem of economic underdevelopment. He noted:

> The economy is "fragmented" in the sense that firms and households are so isolated that they face different effective prices for land, labor, capital, and produced commodities and do not have access to the same technologies.[11]

But, fragmentation was not only a consequence of lack of economic development. McKinnon's point was that it could be accentuated by inappropriate public policy. He stated:

> ... that fragmentation in the capital market --- endemic in the underdeveloped environment without carefully considered public policy --- causes the misuse of labor and land, suppresses entrepreneurial development, and condemns important sectors of the economy to inferior technologies. Thus, appropriate policy in the domestic capital market is the key to general liberalization, and particularly to the withdrawal of unwise public intervention from commodity markets.[12]

Having made the connection between intervention and fragmentation on the one hand and capital accumulation and development on the other, McKinnon asserted that removing distortions from the capital markets was essential to the promotion of broad-based financial and economic development. He concluded:

> … unification of the capital market, which sharply increases rates of return to domestic savers by widening exploitable investment opportunities, is essential for eliminating other forms of fragmentation.[13]

This conclusion has been confirmed by many subsequent contributions.[14] The practical implication, examined empirically below, is that in a fragmented economy money and physical

capital (and the investment expenditure augmenting that capital) are complements. McKinnon was explicit:

> … the demand for real money balances will be strongly influenced by the propensity to save (invest). More precisely, *if the desired rate of capital accumulation (and hence private saving) increases at any given level of income, the average ratio of real cash balances to income will also increase.* (italics in original).[15]

Thus, in an economy that is developing financially we should expect to find a strong positive association between investment (and savings) and money demand. Only when an economy reaches a stage of advanced financial maturity with low degrees of fragmentation in capital and goods markets would we expect the positive association between investment and money demand to weaken and even reverse (as implied by neoclassical portfolio theory).

3. Empirical Analysis and Results

This section reports empirical tests of McKinnon's hypothesis using both single and simultaneous equation techniques. The single equation estimates provide a direct test of degree to which money demand and investment are complementary. The simultaneous equation estimates indicate the strength of that relationship within the broader context of a system that allows for dependence among the money, investment and other macroeconomic variables.

The data for Mauritius cover the period 1967 to 1997. For Botswana, they relate to the period 1971 to 1997. Unless we note otherwise, the source is the country data set in the *International Financial Statistics,* June 1999 (CD-ROM data set) from the International Monetary Fund.

a. Single Equation Estimates

We specify the following relation:

(1) $$(M/P)^D = f\,[y, I/Y, \pi^e]$$

where **y** is the real income, **I/Y** is the ratio of investment to GDP and π^e stands for expected inflation. Apart from one detail, (1) is the same relation proposed by McKinnon. The difference is that McKinnon included the real rate of interest where we have included expected inflation as an analogous indicator of the opportunity cost of holding real money balances. Following a simple version of the adaptive expectations hypothesis we approximate π^e with the rate of inflation from the previous period.

All variables are in logarithms. The growth rates are calculated as first differences in logs of the respective variable. Expected inflation is the first difference of the price level in logs lagged by one period. Standard errors are shown in parentheses. Two asterisks indicate statistical significance at the 5 percent level. One asterisk denotes significance at the 10 percent level. All real variables are deflated using the consumer price index of the respective country.[16]

The estimated real money demand function for Mauritius is:

$$\ln(M/P) = -3.87 + 1.32 \ln y + 0.31\,(I/Y) - 0.61\,\Delta \ln P[-1]$$

(0.50)** (0.06)** (0.52) (0.36)*

$R^2 = 0.97$ DW = 0.65

The estimated coefficients of real income and the investment/GDP ratio have the expected positive sign. Only the former is statistically significant. The demand for real money balances is negatively and significantly related to expected inflation. This is consistent with the theory as expected adverse changes in the price level reduce the demand for real money balances.

To deal with collinearity between real income and the investment/GDP ratio we dropped **lny** from the equation. This change accentuates the effect of the investment/GDP ratio but at the expense of a much lower r-squared and more severe autocorrelation.[17]

$$\mathbf{ln(M/P) = 7.76 + 7.50\,(I/Y) - 2.45\,\Delta lnP[-1]}$$
$$(0.51)^{**} \quad (2.00)^{**} \quad (1.66)$$
$$R^2 = 0.35 \quad DW = 0.31$$

Financial developments in Mauritius have been consistent with McKinnon's hypothesis.

For Botswana, the estimated money demand equation is:

$$\mathbf{ln(M/P) = -0.04 + 0.90\,lny - 2.44\,(I/Y) + 2.57\,\Delta lnP[-1]}$$
$$(1.02) \quad (0.10)^{**} \quad (0.83)^{**} \quad (1.83)$$
$$R^2 = 0.93 \quad DW = 1.39$$

Real money demand is positively and significantly related to real income. The sign on the coefficient on the investment/GDP ratio, which is highly statistically significant, suggests that McKinnon's hypothesis should be rejected in Botswana. The lagged inflation rate has an unexpected positive sign that it not statistically significant.

A possible explanation for this result is that the majority of Botswana's investment has been undertaken by the mining sector and the government, both of which were not resource-constrained due to the limited degree of financial intermediation within the economy. In this regard, Botswana has been atypical of developing countries with its pattern of investment deviating from "normal" (in the Chenery-Syrquin sense) trends. During the initial expansion of the mining sector, investment rates were inordinately high.[18] They have since tapered off as the mining sector has reached sustainable levels of production and the public sector has caught up its backlog of infrastructure and other development expenditure.

These results suggested that it might be useful to explore the relationship between real money demand and domestic savings in Botswana.[19] Including the savings/GDP ratio in the real money demand function gives:

$$\mathbf{ln(M/P) = - 2.54 + 1.07\ lny + 0.46\ (S/Y) + 4.23\ \Delta lnP[-1]}$$

(0.66)** (0.11)** (0.88) (2.68)

$R^2 = 0.90$ DW = 0.95

These results suggest that in Botswana savings and real money demand have been complementary.[20]

$$\mathbf{ln(M/P) = 2.45 + 5.89\ (S/Y) + 18.66\ \Delta lnP[-1]}$$

(0.96)** (1.59)** (5.18)**

$R^2 = 0.46$ DW = 0.93

These results confirm the McKinnon hypothesis for Botswana using domestic savings in place of investment.

b. Simultaneous Equations Estimates

The simultaneous equations system consists of three equations in three endogenous variables: the growth of real money demand, real income and real investment. Our intention was to capture the spirit of McKinnon's hypothesis in a simultaneous equations context so that the direct and indirect effects among the variables (including potential feedback) are taken into account. Table 1 reports the results for Mauritius.[21]

Table 1. **Mauritius**

	Dependent variables				
	Δlnm		Δlny		Δln(inv)
Δlny	0.74	Δln(inv)	0.29	Δlne	0.74
	(0.20)**		(0.06)**		(0.32)**
Δln(inv)[-1]	0.17	Δln(inv)[-1]	0.05	Δlnm[-1]	0.94
	(0.07)**		(0.06)		(0.38)**
		Δln(ex)	0.20		
			(0.10)*		
Constant	0.03	Constant	0.02	constant	-0.02
	(0.02)		(0.02)		(0.05)

To better reflect the dynamic nature of financial development, we specified the relationships in terms of growth rates. We estimated the system using 3SLS. We tested different specifications of the equations for each country and experimented with several lag structures and instrumental variables. The results proved to be robust and theoretically plausible.

Relative to the single equation estimates, the system estimates point to a complex pattern of mutual dependence among the real money, investment, and income. The effect of the income growth and the lagged investment growth on real money growth is positive and statistically significant. Real income growth rate, not surprisingly, is strongly related to investment growth and the growth of exports. The investment growth equation confirms that depreciation of the real

exchange rate depreciation helped improve the balance of payments and raised the rate of investment. Feedback from money to investment is captured in the coefficient on the lagged value of the growth of real money balances. This variable is positively and significantly related to the growth of investment.

Table 2 has system estimates for Botswana.

Table 2. **Botswana**

Dependent variables					
	Δlnm		Δlny		Δln(inv)
Δlny	2.05	Δln(inv)	0.12	Δlnm	0.41
	(0.50)**		(0.08)		(0.19)**
Δln(inv)[-1]	-0.56			Δlne[-1]	-0.78
	(0.21)**				(0.33)**
		Δln(ex)	0.30		
			(0.08)**		
constant	-0.03	constant	0.05	constant	0.03
	(0.06)		(0.02)**		(0.05)

There are many similarities between the results for the two economies. This reflects their shared history of sustained, export-driven growth and development. The results show that there has been positive mutual dependence between the growth of real investment and the growth of real money demand. The growth of real exports is positively and significantly related to the growth of real

income. Reflecting the dynamics of investment noted above the growth of real income has not been significantly related to the growth of real investment. Once underway, income growth has been sustained by investment derived from high rates of profit in the mining sector and taxes on those profits.[22]

4. Concluding Comments

The results presented here provide some empirical details of the trends associated with financial development in two of Southern Africa's most successful economies. Considered broadly, the results support McKinnon's hypothesis. Both Botswana and
Mauritius have moved from a situation characterized by a high degree of market fragmentation to one, where their officials see them becoming important international financial services centers. Throughout this process, both economies have experienced significant financial deepening, more so in Mauritius than in Botswana. In both countries, the financial deepening has involved the simultaneous increase in savings, investment, real income, and real money demand.

The empirical results also point to some of the factors that have supported this process. Two are noteworthy: the high income elasticity of demand for money and the positive impact of changes in the real exchange rate, particularly in Mauritius. The consistently high values for the income elasticity of demand for money (the coefficients on **lny** in the money demand regressions) point to a broad pattern of macroeconomic management that has maintained macroeconomic stability and fostered the demand for money and, by extension, a broader range of financial assets.[23]

The impact of the real exchange rate highlights the fact that exchange rate management (and all associated policies related to trade, debt, and foreign aid) have been such that a general pattern of external balance has been maintained in both countries. Indeed, Botswana has experienced a major sustained increase in foreign exchange reserves.

These results confirm what the last three decades have shown, namely that the economies of Botswana and Mauritius have been managed in ways that have fostered high rates of growth and

development. The results also confirm that financial development (as reflected in the strong correlation among investment/savings, money and income) has been an important feature of this broader pattern of economic transformation.

This outcome has lessons for other countries in Southern Africa. From Botswana, we learn that it is possible to be richly endowed with resources and grow rapidly. From Mauritius, we learn that it possible to be poorly endowed with resources, be geographically isolated, and yet still grow rapidly as well. The factor common to both countries has been that their respective governments have fostered the conditions needed to exploit their comparative advantages. Vital dimensions of those conditions were the self-restraint by government needed to prudently manage the economic surpluses being generated and the commitment to macroeconomic stability required to stimulate and sustain financial deepening of the type that would enhance economic growth.

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Endnotes

[1] McKinnon 1973

[2] Shaw 1973

[3] Goldsmith 1969

[4] Gurley and Shaw 1955, 1956, 1957, 1960

[5] Johnson 1962

[6] This has been confirmed by subsequent developments particularly the movement by central banks away from direct controls over money and credit and the more extensive use of indirect controls. For Sub-Saharan Africa, this topic was examined in Duesenberry and McPherson (1991).

[7] McKinnon 1979:Ch.11; Kindleberger 1987

[8] McKinnon 1979:259-261

[9] Relevant literature includes Bottomley 1964; de Oliviera Campos 1964; Johnson 1966, 1967:67-78; Patrick 1966; Adams 1971; and Friedman 1973. A major conference was sponsored by USAID summarizing the experience with credit programs in Latin America and Asia. These studies provide numerous examples of the negative effects of controls on financial development (cf. USAID 1973).

[10] Gillis, Perkins, Roemer and Snodgrass 1996: Ch 14, esp.376-380

[11] McKinnon 1973:5

[12] McKinnon 1973:8

[13] McKinnon 1973:9

[14] Some of which include Cole and Park (1983), von Pischke, Adams and Donald (1983), Fry (1988), World Bank (1989), von Pischke (1991), White (1993), and Mehran *et al.* (1998). An appreciation of the intellectual history of McKinnon's contribution to the field of financial development can be gained by comparing the attention the topic received in Meier's editions of *Leading Issues in Economic Development.* In the 1970 edition, financial development has three entries (pp.210-229). By contrast, the sixth edition in 1995 devotes close to a chapter to the issue.

[15] McKinnon 1973:57

[16] Preliminary analysis of the stationarity of real money, real income, savings and investment for both countries using augmented Dickey-Fuller unit root test and Phillips-Perron unit root test indicates that all the variables are I(1) in levels and I(0) in growth rates.

[17] This strong positive effect of the investment/GDP ratio remains when the lagged value of real income is used in the real money demand function instead of the contemporaneous value:

$$\mathbf{ln(M/P) = -3.06 + 1.23\, lny[-1] + 1.20\,(I/Y) - 1.29\,\Delta lnP[-1]}$$
$$\text{(0.57)** (0.06)** (0.60)** (0.42)**}$$
$$R^2 = 0.96 \quad DW = 0.82$$

[18] During the 1970s the average investment share in Botswana was 39.9 percent. In the period 1990-1997 – the average investment share was 28.3 percent.

[19] Recall the quote from McKinnon above: "….the demand for real money balances will be strongly influenced by the propensity to **save** (**invest**)" (emphasis added).

[20] One explanation for the positive coefficient on the expected inflation term for Botswana is that Botswana's price history is largely a function of what happens in South Africa. As a member of the Southern African Customs Union, Botswana is directly linked to the South African economy. As shown in McPherson (1999) South Africa has had a long history of elevated inflation due largely to chronic budget deficits. This has led to "imported inflation" in Botswana.

[21] Lower case letters denote variables in real terms. Only growth rates of the variables have been used in the system. Instruments are all the exogenous variables (real export growth, real exchange rate depreciation) and their lags, the lags of the three endogenous variables, and contemporaneous and lagged values of real interest rates, budget deficit, external debt and foreign aid growth. Exports are measured in US dollars. The exchange rate is measured in end of period units of domestic currency per US dollar. Real exchange rate is defined as the nominal exchange rate times the ratio of the U.S. WPI and domestic CPI. The source for exports, external debt and foreign aid is *World Development Indicators*, 1999, World Bank.

[22] We also estimated the relationship between the growth of real money demand, real *savings* and real income for Botswana using 3SLS. Table 3 has the results.

Table 3. **Botswana**

	Dependent variables				
	Δlnm		Δlny		Δln(sav)
Δln(sav)	0.34 (0.21)*	Δln(sav)[-1]	0.10 (0.06)*	Δlnm[-1]	-0.21 (0.14)
Δlne[-1]	0.60 (0.39)			Δlny	2.16 (0.38)**
		Δln(ex)	0.29 (0.08)**		
constant	0.09 (0.05)	constant	0.04 (0.02)**	Constant	-0.08 (0.05)

The growth of savings have a positive effect on the growth of real money demand, and on real income growth. Both coefficient estimates are significant at 10 percent. Not surprisingly, the association between money demand and savings is significantly different from that of money demand and investment.

[23] See McPherson (1999) and the sources cited there.