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Financial Reform and the Mobilization of Domestic Savings

The Experience of Morocco

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Abstract

Using a vector error-correction model, I explore the short-run dynamics and long-run linkages between financial reform and the mobilization of domestic saving in Morocco. In the short run, financial depth (volume of intermediation) is shown to have a positive influence on private saving, while increases in real interest rates have a negative impact. The effectiveness of financial intermediation does not seem to have a *direct* effect on saving but has a significant influence on the volume of intermediation. In the long run, savings have a stable relationship with financial reform but the influence of interest rates remains negative, implying that the income effect dominates in the long run as well.

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1   Introduction

Morocco began to implement significant financial sector reforms from the mid 1980s.[1] Such reforms were quite fashionable in the developing world during those years and were mostly part of a wide range of Structural Adjustment Programmes that extended to reforms of the exchange rate and foreign trade system, deregulation and price liberalization, and fiscal consolidation (Mavrotas and Kelly 2001; Chowdhury 2001). Morocco was one of the first Arab countries to embark on financial liberalization and reform. Early reform programmes resulted in significant changes in real interest rates which were negative during the decades of financial repression in the 1970s and the first half of the 1980s (see Figure 1). During the late 1980s, soon after the early reforms had taken place, real interest rates became positive and quite high, reaching 5.80 per cent in 1987 and 6.14 per cent in 1988.

Figure 1: Private saving and real interest rates
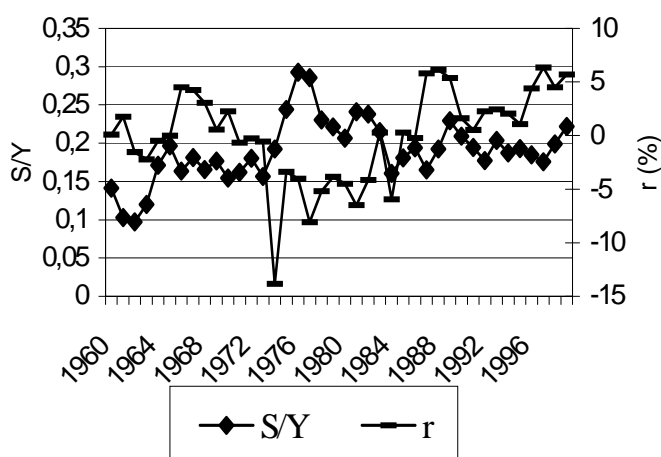
Source: Baliamoune and Chowdhury (2003).

In the early 1980s, Morocco raised the average levels of lending and deposit rates by about 20 per cent and simplified the structure of administered interest. Interest rates on above-one-year deposits were liberalized in 1985 and rates on deposits above six months and above three months were liberalized in 1989 and 1990, respectively. Morocco also introduced a minimum interest rate with the goal of promoting long-term savings. Interest rates on all time deposits were liberalized in 1992. As interest rates rose during the first half of the 1990s, bank deposits increased significantly. The effects were also reflected in a decline in checking deposits which, in general, do not earn interest. The Moroccan government liberalized lending rates in February 1996. In addition, Morocco introduced important institutional changes in order to protect savers

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[1] See Baliamoune and Chowdhury (2003) for a more detailed discussion of these reforms.

and facilitate smooth transactions. These changes included the creation of the Deontological Council of Stocks and Bonds (Conseil Déontologique des Valeurs Mobilières), the modernization and privatization of the Casablanca Stock exchange, and full convertibility of current account balances in 1993. In general, these were additional strategies aimed at promoting domestic savings. These strategies resulted in stronger financial depth or deepening and more effective intermediaries. Finally, it is important to point out that financial liberalization in Morocco was characterized by gradualism which may explain (at least partially) the absence of financial crises in the 1990s when many emerging markets around the world experienced major turbulence.

As pointed out in Baliamoune and Chowdhury (2003), financial reform involves the elimination of credit controls, deregulation of interest rates, easing of entry into the financial services industry, development of capital markets, increased prudential regulation and supervision, and liberalization of international capital flows. However, in Morocco the liberalization of international capital flows has not been fully implemented yet, as capital outflows by nationals are still subject to the state's control and allowed only in a small number of specific cases. Moreover, the development of capital markets, despite the modernization and privatization of the Casablanca Stock Exchange, is still weak.

It is worth noting that Morocco follows, in general, French banking practices and does not use Islamic banking (Islamic banking prohibits riba or interest rates and instead uses the practice of profit-sharing and participation). In 1998, The Finance Minister of Morocco indicated that there is *inconsistency* between Islamic banks' operations and Moroccan banking law; this is the main reason for not allowing Islamic banks to open branches in Morocco. Most of Morocco's large commercial banks, including Banque Commerciale du Maroc (BCM), Banque Marocaine du Commerce et d'Industrie (BMCI), and Banque Marocaine du Commerce Exterieur (BMCE), are partially owned by foreign banks.

This paper builds on the study in Baliamoune and Chowdhury (2003) and expands the analysis of the effects of financial reforms on savings in Morocco in two major ways. First, it examines feedback effects (reverse causality) from domestic savings[2] and income to financial reform. Second, the current analysis also examines the decomposition of the variance in the main variables. This study uses a vector error-correction model (VECM) that allows for the analysis of short-run dynamics and long-run effects, as well as for ascertaining the direction of causality. Following Baliamoune and Chowdhury, the indicators of financial reform examined in this study include real interest rates, financial depth, and financial intermediation effectiveness. The remainder of the paper proceeds as follows. Section 2 provides a brief discussion of the theoretical

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[2] The terms 'domestic saving' and 'private saving' are considered in this study to mean 'domestic private saving'.

and empirical links between financial reform and saving and growth. Section 3 presents summarized results from existing studies on financial reforms in Morocco. Section 4 focuses on the major findings from the VECM estimation. Section 5 provides concluding comments.

2 Financial reforms, saving mobilization, and growth

The relationship between financial development and economic growth remains a major topic in the literature on financial intermediation and economic development. While many studies have stressed the important role of the financial sector in economic growth (McKinnon 1973; Shaw 1973), there is no consensus on whether financial development causes economic growth. Indeed, there are scholars who argue that causality is either nonexistent or that it runs in the opposite direction, from economic growth to financial development. Robinson (1952), Lucas (1988), and Stern (1989) have maintained that finance has only a marginal role in economic growth.

There is currently a large body of research on the effects of financial development and financial reforms in developing countries. Since many developing countries were, in the 1980s and early 1990s, urged by international lenders and development agencies to liberalize markets – including financial markets – reasonable data are available to test the success of such policies and reforms. In addition, the financial crises in South East Asia in the 1990s and their impact on economic growth have called into question the rationale and suitability of financial market liberalization.

Recent empirical literature in support of the positive effects of financial development or reforms on savings, investment, and growth includes King and Levine (1993a, 1993b), Bencivenga and Smith (1991), Beck et al. (2000), and Baliamoune and Chowdhury (2003). However, the results in this literature are in general not conclusive. For example, King and Levine (1993a: 730) argue that 'finance seems importantly to lead economic growth'. On the other hand, Demetriades and Hussein (1996) find little empirical evidence in support of the supply-leading proposition (the hypothesis that finance causes growth).

A major rationale for the push for financial liberalization centres on the role of the financial sector in promoting the mobilization of saving, facilitating access to credit, and enhancing resource allocation (McKinnon 1973; Shaw 1973). It seems the effect of financial reforms on economic growth is through the impact of financial liberalization on investment and savings and the resulting enhancement in capital formation. The theoretical rationale behind the idea that financial liberalization (a major component of financial development) promotes growth is fairly straightforward (see Levine 1997). For investment to occur, investors and savers must be given incentives, and savings have to be channelled to investors. Financial liberalization, which is a driving force behind financial development, ensures that this process takes place efficiently. When interest

rates rise, the quality of investments is enhanced since financial repression tends to be associated with investment of relatively poor quality. Higher deposit rates increase the supply of funds, thus the quantity of investment also rises. Calderón and Liu (2003) used pooled data from 109 developing and developed countries, and concluded that financial deepening promotes economic growth through two channels: by causing more rapid capital accumulation and through stimulating productivity growth. But the authors also find causality from growth to financial development.

Thus, a useful approach to assess the impact of financial liberalization is to study its effects on savings. Studies that have examined such effects in developing countries include Fry (1995), Hussain (1996), Jbili et al. (1997), Dayal-Gulati and Thimann (1997), Demetriades and Luintel (1997), Bandiera et al. (2000), and Baliamoune and Chowdhury (2003). There is, however, no clear consensus on the impact of financial liberalization and reforms on savings. Hussain (1996) shows that, in the three years following financial reforms in Egypt, savings rose by about 6 per cent of gross domestic product (GDP) above the level that would have resulted if no financial liberalization had occurred. In the case of Morocco, Baliamoune and Chowdhury (2003) find that financial reform has a positive impact on saving. Mavrotas and Kelly (2001) have demonstrated that financial reform that leads to higher interest rates and lower risk may increase the level of savings by expanding the range of available savings instruments and increasing the expected return. However, other studies have argued that financial reform may actually decrease savings by reducing liquidity constraints through, say, improved access to consumer credit. Chowdhury (2001) shows that there was a decline in private savings following financial liberalization in Bangladesh. Similarly, Chapple (1991) has found a decline in both household and corporate savings in New Zealand following liberalization. Finally, Uygur (1993) reported that during the 1970s and 1980s in Turkey the negative income effect[3] from higher interest rates was stronger than the positive substitution effect, and concluded that financial liberalization had a negative impact on private saving.

There is also no consensus regarding the impact of interest rates. Some scholars have found a positive link between real interest rates and saving (see for example Fry 1978). Cheng (1980: 54) contends that in Pacific Basin Countries 'real deposit interest rate played a critical role in setting the rate of each nation's financial growth. Positive real deposit rates maintained over a number of years, invariably led to financial deepening'. However, other scholars have not found such a link. For example, Arestis and Demetriades (1997: 791) report that '[h]igh real interest rates completely failed to increase savings or boost investment – both actually fell as a proportion of GNP over the period'. Also, Modigliani (1986: 304) argues that 'despite a hot debate, no

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[3] In theory, the effect of higher interest rates is ambiguous. Higher real interest rates imply higher rates of return on savings and, thus, would lead to a shift of funds to savings (substitution effect). An increase in real interest rates may also lead to a decline in saving, as lower saving is required to reach a given level of funds in the future due to higher returns (income effect).

convincing general evidence either way has been produced, which leads me to the provisional view that *s* [the saving ratio] is largely independent of the interest rate'. Dornbusch and Reynoso (1989: 205) also note that 'virtually no study has demonstrated a discernable net effect [of real deposit rates on saving ratios]'.

Some studies have found that there is a negative and significant effect of real interest rates on investment (Greene and Villanueva 1991) or that interest rates do not necessarily have a positive effect on investment (Morisset 1993). But other studies have obtained different results. In the case of sub-Saharan Africa, for example, Ndikumana (2000) shows that higher financial development causes higher domestic investment, which suggests that financial development can cause economic growth by enhancing capital accumulation.

Bencivenga and Smith (1991) show how the introduction of financial intermediation shifts the composition of savings toward capital and hence acts to promote economic growth. However, Akinboade (2000) finds that during the period of financial liberalization in Tanzania the association between financial deepening and economic growth is negative but no evidence of causality between the two variables was found. Finally, Baliamoune-Lutz (2003) shows that economic growth in Morocco caused financial reform but financial reform had no effect on growth.

3   Summary of previous studies of Morocco's experience

Two existing studies have specifically explored the links between financial reforms and domestic savings in Morocco: Jbili et al. (1997)[4] and Baliamoune and Chowdhury (2003). The first study failed to find evidence of a significant impact of financial reforms on savings while the second study reported that financial deepening enhanced the mobilization of private savings. Jbili et al. (1997) use Moroccan data for 1970-95 and show that the correlation between the ratio of M2 to GDP and the saving rate was 0.37 in the entire sample and -0.86 (negative) in the reform period (1986-95). In addition, their regression results indicate that financial deepening (or the volume of intermediation) does not influence saving in Morocco. But the authors did report a significant and negative coefficient on real interest rates and on the proxy for the effectiveness of financial intermediation (the ratio of reserve money to quasi money). However, the proxy for the cost of capital (real interest rate), financial depth, and financial intermediation effectiveness all showed insignificant coefficients in the reform period. This suggests that financial reform had no impact on the saving rate in Morocco. As pointed out in Baliamoune and Chowdhury (2003), the study in Jbili et al (1997) suffers from major econometric problems, in addition to the short length of the data (only about three to five years) subsequent to major reforms.

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4 Jbili et al. (1997) also examine the effects of financial reforms in Algeria and Tunisia.

In contrast, the second study (Baliamoune and Chowdhury 2003) used cointegration models and similar indicators of financial reforms, together with a number of control variables including income, the share of agriculture in GDP, public saving, and the dependency ratio. Using Moroccan data for 1960-99, Baliamoune and Chowdhury distinguish long-run behaviour from short-run dynamics and show that in the long-run income and the ratio of broad money to GDP (M2/GDP) have a positive influence on saving but real interest rates do not affect the saving rate. In the short-run, however, the coefficients on M2/GDP and real interest rate were significant and negative. The coefficient on financial intermediaries' effectiveness was insignificant in the short-run, and significant but with the wrong sign (positive) in the long-run. Also, the authors find strong support for Ricardian Equivalence[5] in both the long- and short-run. Overall, the authors show that in Morocco financial deepening (the ratio of broad money to GDP) has caused private savings to increase. However, an important issue that was not addressed in Baliamoune and Chowdhury (2003) was feedback and reverse causality between the variables of interest.

A third study, Odedokun (1996), used annual data for 1964-88 from a group of developing countries and found that financial intermediation did not have an effect on growth in Morocco. However, the period 1964-88 does not capture the major financial reforms undertaken by the Moroccan government in the 1990s. On the other hand, Baliamoune-Lutz (2003) shows that there is unidirectional causality from growth to financial reform in Morocco.

4   VECM estimation and variance decomposition

4.1 Estimation

To try to remedy some of the weaknesses in the existing studies on financial reform in Morocco, I estimate a vector error-correction model using Moroccan annual data for the period 1960-99. Data are from *International Financial Statistics* (IFS) published by the International Monetary Fund and from the database of *La Direction de la Statistique* in Morocco.

Descriptive statistics and correlations among the main variables are reported in Tables 1a and 1b, respectively. The dependent variable, private saving ratio (PRIVSAV) is defined as the ratio of private saving to GDP. Due to the lack of published reliable data on private saving in Morocco, I follow Dayal-Gulati and Thimann (1997) and Baliamoune and Chowdhury (2003) and calculate private savings as national domestic

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5 The concept of Ricardian Equivalence refers to the case where an increase in government expenditures or an isolated cut in taxes leads to an equivalent rise in private saving because individuals would expect an equivalent tax increase in the future. Thus exogenous shifts in public saving are matched by offsetting shifts in private saving. In such cases, fiscal policy is unable to directly affect savings (see Barro 1974).

saving plus the current account balance minus public savings. Following Baliamoune and Chowdhury (2003), I use the share of agriculture in GDP (AGR), public saving ratio (PUBLICSAV), and income in log form (LOG(Y)) as control variables. I also use the same indicators of financial reforms the authors use: namely, real interest rates (REALR) as a measure of financial liberalization; the ratio of broad money to GDP (M2/GDP) as a measure of financial depth or volume of intermediation; and the ratio of reserve money to total deposit (RES/TD) as an indicator of the effectiveness of financial intermediaries. A decline in this ratio implies higher efficiency. Andersen and Tarp (2003) argue that increased competition in the banking sector (following financial liberalization) will not necessarily induce efficient financial intermediation. Thus, we also need to examine indicators of financial intermediaries' efficiency and effectiveness to get a less incomplete view of the effect of financial reforms.

It is important to note that financial development in developing countries tends to be associated with the development of money and financial intermediation rather than the development of capital markets, as is more prevalent in developed economies. Thus, in developing economies, financial deepening is often associated with the growth of activity of financial intermediaries such as savings institutions and commercial banks.

The statistics reported in Table 1a indicate that while the mean and the median of private savings have remained almost the same in the pre- and post-reform periods, the variance (and standard deviation) have decreased significantly. At the same time, we observe that financial depth, the efficiency of financial intermediaries, and real interest rates are all higher in the post-1986 period. The correlation coefficients displayed in Table 1b indicate that there is a strong positive association between private saving, income, and financial deepening (M2/GDP). We also note the negative correlation between private saving and the indicator of financial intermediaries' efficiency, RES/TD (recall that the lower the ratio, the higher the efficiency). Interestingly, the correlation between the saving ratio and the real interest rate is negative; suggesting that the income effect outweighs the substitution effect. The coefficients of correlation among the other variables are all statistically significant and have the expected signs. It is worth noting that there is strong correlation (-0.861) between financial deepening (M2/GDP) and the efficiency of financial intermediaries (RES/TD). Higher financial depth is associated with higher efficiency in financial intermediation.

Because of the nature of the data, it is important to ascertain their time series properties. In particular, we need to test for unit root and cointegration. Phillips-Perron unit root tests were used to test for stationarity. The variables were all non-stationary in levels but stationary in first difference. The Phillips-Perron test is more reliable than the Augmented Dickey-Fuller (ADF) test for unit root when the presence of structural breaks is suspected. To test for cointegration, I used the Johansen and Juselius (1992) test and the results indicate that the variables are cointegrated and provide evidence in

support of a single cointegrating vector. Also Wald tests were performed in order to test for the inclusion of lags in the VECM equations.[6]

Table 1a: Descriptive statistics

1960-86	PRIVSAV	Y	M2/GDP	RES/TD	REALR	PUBLICSAV	AGR
Mean	0.19	8197.33	0.37	0.68	-1.80	-0.07	20.68
Median	0.18	8322.00	0.35	0.68	-0.58	-0.05	19.50
Std. Dev.	0.05	1559.69	0.06	0.12	4.02	0.04	3.72
Maximum	0.29	10755.00	0.46	0.86	4.51	-0.02	31.00
Minimum	0.10	5691.00	0.30	0.46	-13.84	-0.18	16.50
Obs.	27	27	27	27	27	27	27
1987-99	PRIVSAV	Y	M2/GDP	RES/TD	REALR	PUBLICSAV	AGR
Mean	0.19	11351.31	0.61	0.43	3.70	-0.03	17.64
Median	0.19	11432.00	0.62	0.42	4.41	-0.03	18.00
Std. Dev.	0.02	491.04	0.10	0.06	2.11	0.01	2.17
Maximum	0.23	12202.00	0.79	0.52	6.36	-0.01	20.50
Minimum	0.16	10360.00	0.46	0.35	0.51	-0.05	14.90
Obs.	13	13	13	13	13	13	13
1960-99	PRIVSAV	Y	M2/GDP	RES/TD	REALR	PUBLICSAV	AGR
Mean	0.19	9222.38	0.45	0.60	-0.01	-0.05	19.69
Median	0.19	9471.00	0.43	0.62	0.28	-0.04	19.10
Maximum	0.29	12202.00	0.79	0.86	6.36	-0.01	31.00
Std. Dev.	0.04	1983.47	0.13	0.16	4.35	0.04	3.58
Minimum	0.10	5691.00	0.30	0.35	-13.84	-0.18	14.90
Obs.	40	40	40	40	40	40	40

Table 1 b: Correlation matrix

	PRIVSAV	LOG(Y)	M2/GDP	RES/TD	REALR	PUBLICSAV	AGR
PRIVSAV	1	0.664	0.601	-0.325	-0.473	-0.922	-0.579
LOG(Y)	0.664	1	0.836	-0.642	-0.567	-0.643	-0.737
M2/GDP	0.601	0.836	1	-0.861	-0.472	-0.697	-0.422
RES/TD	-0.325	-0.642	-0.861	1	0.360	0.4876	0.173
REALR	-0.473	-0.567	-0.472	0.360	1	0.4871	0.213
PUBLICSAV	-0.922	-0.644	-0.697	0.487	0.487	1	0.405
AGR	-0.579	-0.738	-0.422	0.173	0.213	0.405	1

The empirical results displayed in Table 2 indicate that, in addition to a long-run stable relationship (based on the cointegration equation), there are some interesting short-run dynamics among the variables of interest. First, interest rates seem to have a long-run negative effect on private saving (income effect). This is a plausible relationship given Morocco's increased openness to international trade and integration in world markets, and the expansion of consumer lending; both of which have contributed to an increase

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[6] To save space, these results are not included in the paper but may be obtained from the author upon request.

in consumption.[7] In fact, Baliamoune and Chowdhury (2003) argue that this took place in Morocco since the early 1990s, as consumer credit institutions relaxed their requirements for providing consumer loans. The same relationship between saving and real interest rate holds in the short-run as well.

Table 2: Co-integration and vector error-correction equations

Co-integrating Equation					
PRIVSAV(-1)	1.000000				
LOG(Y(-1))	0.011295				
	[0.42814]				
RES/TD(-1)	0.040308				
	[0.87644]				
M2/GDP(-1)	-0.003430				
	[-0.06187]				
REALR(-1)	-0.003276				
	[-2.50015]				
Constant	-0.319041				
Error Correction:	D(PRIVSAV)	D(LOG(Y))	D(RES/TD)	D(M2/GDP)	D(REALR)
CointEq1	-0.884868	-0.453748	-0.446941	0.244212	14.21622
	[-8.04306]	[-1.21743]	[-1.74414]	[1.42405]	[0.53403]
D(PRIVSAV(-1))	0.240836	-0.119606	0.294340	0.156217	-4.804945
	[2.35881]	[-0.34579]	[1.23768]	[0.98156]	[-0.19449]
D(PRIVSAV(-2))	0.079990	-0.318090	0.138313	0.273393	3.074885
	[0.69154]	[-0.81175]	[0.51338]	[1.51631]	[0.10986]
D(LOG(Y(-1)))	-0.023758	-0.055408	0.049525	0.087343	-16.37543
	[-0.31440]	[-0.21644]	[0.28138]	[0.74152]	[-0.89559]
D(LOG(Y(-2)))	0.057802	-0.107494	-0.037524	0.129788	-22.09728
	[0.71963]	[-0.39504]	[-0.20057]	[1.03662]	[-1.13696]
D(RES/TD(-1))	-0.051316	0.432026	-0.120121	-0.314815	-1.603379
	[-0.53723]	[1.33507]	[-0.53990]	[-2.11436]	[-0.06937]
D(RES/TD(-2))	0.080806	0.167965	0.220414	-0.108560	-35.41812
	[0.88799]	[0.54484]	[1.03990]	[-0.76533]	[-1.60853]
D(M2/GDP(-1))	0.153985	0.935907	0.319348	-0.650543	-61.35111
	[1.02579]	[1.84035]	[0.91334]	[-2.78018]	[-1.68905]
D(M2/GDP(-2))	0.373943	0.087453	0.136396	0.229527	-69.77697
	[2.57193]	[0.17755]	[0.40275]	[1.01275]	[-1.98337]
D(REALR(-1))	-0.002407	-0.000592	0.001640	0.001824	-0.501393
	[-2.79995]	[-0.20315]	[0.81930]	[1.36144]	[-2.41052]

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[7] See Bayoumi (1993) for a similar explanation on the consumption boom in the United Kingdom.

D(REALR(-2))	-0.001199	2.95E-05	0.000658	6.88E-05	-0.302309
	[-1.43014]	[0.01040]	[0.33672]	[0.05267]	[-1.49010]
Constant	-0.017368	-0.087669	-0.104788	0.111879	4.038624
	[-0.71558]	[-1.06620]	[-1.85356]	[2.95717]	[0.68767]
PUBLICSAV	-0.879921	-0.617559	-0.321191	0.489346	25.35791
	[-6.75160]	[-1.39871]	[-1.05807]	[2.40877]	[0.80411]
AGR	-0.001856	0.003577	0.003844	-0.004042	-0.029197
	[-1.47930]	[0.84176]	[1.31566]	[-2.06689]	[-0.09619]
Log likelihood	280.8028				

Note: t-statistic in brackets.

Source: see text.

In the short-run financial deepening has an effect on savings but with a two-year lag. It is shown that the coefficient on the second lag of the variable M2/GDP is positive and significant at least at the 5 per cent level, but the coefficient on its first lag is not significant. As expected, there is a significant and negative relationship between the private saving ratio and the public saving ratio. The coefficient on the variable PUBLICSAV is negative 0.89 suggesting the presence of Ricardian Equivalence (see Baliamoune and Chowdhury 2003).

VECMs are quite useful when trying to determine whether there are feedback effects or reverse causality, or an indirect relationship between the variables. It is clear from the results shown in Table 2 that such effects do exist. When discussing the coefficients of correlation earlier we noted that there is a strong association between financial deepening and the efficiency of financial intermediaries in Morocco. The error-correction (short-run) equations indicate there is unidirectional causality from financial intermediaries' effectiveness to financial deepening. While private saving does not seem to cause financial depth, public saving seems to have a positive influence on financial depth (M2/GDP). In addition, there is negative causality from M2/GDP to real interest rates. It seems that an increase in broad money causes real interest rates to fall. This could be due to an excess-supply-of-funds effect.

We also note that a higher share of agriculture in GDP causes M2/GDP to decline. This result is consistent with the low monetization in rural areas. However, in the saving equation while the coefficient on agriculture is negative, it has low statistical significance, so we cannot conclude that the share of agriculture has a significant impact on private saving. In theory, the high uncertainty of rural income makes a strong case for higher saving rates in rural areas. Yet, low monetization may prevent higher saving. In the pre-1990s, informal financial institutions were quite predominant, especially in Morocco's rural areas. One objective of financial reform was to increase the number and proximity of formal financial institutions. This is thought to be an important strategy in financial reform programmes. As maintained by Rosenzweig (2001: 53), 'the proximity of formal financial institutions increases financial savings and crowds out

informal insurance arrangements, thus in principle better facilitating financial intermediation'. Focusing on the rural sector is beyond the scope of this paper but we should note that there are linkages between increases in financial activity in rural areas and both financial depth and the effectiveness of financial intermediation in general.

4.2 Variance decomposition

Table 3 shows the decomposition of the variance in the variables. Variance decomposition provides information about the relative importance of each random innovation in affecting the endogenous variables in the vector autoregressive (VAR) model. There seems to be an important contribution (40-45 per cent) of the innovation in real interest rates, M2/GDP and income to the variance in private saving in the long-run.

Interestingly, income seems to be insensitive to innovations in the other variables, including the indicators of financial reform. This is consistent with the findings in Baliamoune-Lutz (2003) where it is shown that growth leads financial reform in Morocco (demand-following proposition). On the other hand, shocks to private saving seem to have some influence on the variance of RES/TD in the short- and the long-run. Similarly, innovations in private saving affect the variance of M2/GDP both in the short- and the long-run. Shocks to income have a significant impact on the variance of M2/GDP in the short-run but the effect falls dramatically in the long-run. Finally innovations in income have an important impact on the variance of real interest rates in both the short-run and the long-run, while innovations in M2/GDP seem to affect the variance of real interest rates only in the long-run.

Thus, based on the results in Tables 2 and 3, there are some important relationships that must be taken into account when assessing the effects of financial reform in Morocco. The causality between the efficiency of financial intermediaries and financial deepening may be viewed as complementarity between these two indicators of financial reform. In some cases it may be easier for regulators to affect financial intermediaries' efficiency (for example, by changing the required reserve ratio) than to directly influence financial depth (which is a major goal of financial reform). In such cases, knowing that financial intermediaries' efficiency causes financial deepening to increase is a useful piece of information for policymakers.

The finding that increases in real interest rates cause the private saving ratio to fall may, as mentioned earlier, reflect a strong income effect. Alternatively, it may reflect a relatively weak substitution effect. In the pre-reform period in Morocco, households used various instruments for their savings including purchasing gold and expensive jewellery, and using the informal (curb) market. To the extent that households shift funds from these instruments to bank deposits, financial depth and financial intermediaries' efficiency may improve but the private saving ratio may not change. In fact this ratio may even fall because bank deposits are safer and the real return is now

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higher compared to using the informal market. In addition, as mentioned earlier, there was a significant expansion of consumer lending in Morocco beginning in the 1990s, which could have contributed to this result.

Table 3: Variance decomposition

Variance Decomposition of PRIVSAV:

Period	S.E.	PRIVSAV	LOG(Y)	RES/TD	M2/GDP	REALR
1	0.015059	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.018198	89.02099	6.608219	1.140123	2.451100	0.779567
3	0.020152	77.92357	7.438658	1.083351	7.269652	6.284771
4	0.021963	67.20337	6.618761	2.135278	6.199153	17.84344
5	0.022703	62.89806	8.365420	2.451455	6.458304	19.82676
6	0.024071	56.06197	9.893561	3.946075	8.617110	21.48128
7	0.024855	52.58434	11.57400	3.775867	9.413786	22.65201
8	0.025832	48.70040	12.73323	4.148566	10.72599	23.69181
9	0.026506	46.31342	14.35684	4.011716	10.95113	24.36690
10	0.027342	43.61112	15.26926	4.166987	11.36120	25.59144

Variance Decomposition of LOG(Y):

Period	S.E.	PRIVSAV	LOG(Y)	RES/TD	M2/GDP	REALR
1	0.051018	0.020803	99.97920	0.000000	0.000000	0.000000
2	0.067106	0.388122	87.37628	6.164296	5.881463	0.189842
3	0.080658	0.870798	85.14066	6.564152	4.886367	2.538027
4	0.091404	0.862250	84.78721	7.442045	4.693631	2.214868
5	0.099537	1.160711	85.56158	6.937976	4.121370	2.218362
6	0.108043	1.284326	84.61437	7.794711	4.221449	2.085146
7	0.115807	1.327008	84.97850	7.567024	3.880579	2.246889
8	0.123033	1.372116	84.61966	7.988716	3.899574	2.119931
9	0.129669	1.417159	84.84474	7.838499	3.715264	2.184340
10	0.136263	1.439097	84.57893	8.122685	3.731665	2.127624

Variance Decomposition of RES/TD:

Period	S.E.	PRIVSAV	LOG(Y)	RES/TD	M2/GDP	REALR
1	0.035077	14.08584	1.430781	84.48338	0.000000	0.000000
2	0.049423	10.18907	0.851964	82.97326	1.772031	4.213682
3	0.063646	11.05728	0.548930	81.67749	1.146430	5.569868
4	0.073058	12.89995	0.614586	79.60366	0.874303	6.007503
5	0.083082	15.36895	0.679634	76.90791	0.726867	6.316632
6	0.091969	17.03057	0.708247	75.09369	0.665813	6.501678
7	0.100185	18.35464	0.754430	73.69691	0.708130	6.485890
8	0.107768	19.21031	0.821574	72.87005	0.706191	6.391880
9	0.114862	19.78023	0.859433	72.27930	0.707066	6.373964
10	0.121544	20.15451	0.889329	71.93043	0.687176	6.338547

Variance Decomposition of M2/GDP:

Period	S.E.	PRIVSAV	LOG(Y)	RES/TD	M2/GDP	REALR
1	0.023474	15.68985	30.45018	1.315138	52.54482	0.000000
2	0.029444	32.55204	19.99662	8.181607	37.97733	1.292399
3	0.038461	37.44097	13.99614	5.865384	40.08118	2.616321
4	0.044164	39.81672	11.48499	8.768615	37.83501	2.094668
5	0.050584	41.16477	9.208401	6.977576	41.00812	1.641127
6	0.055314	42.66981	7.963002	8.840849	39.10923	1.417118
7	0.060116	42.93489	7.232729	8.013291	40.50992	1.309168
8	0.064133	43.74906	6.579957	8.919192	39.57282	1.178970
9	0.068220	44.09440	6.112096	8.354186	40.35297	1.086350
10	0.071830	44.63360	5.719852	8.907352	39.75522	0.983980

Variance Decomposition of REALR:

Period	S.E.	PRIVSAV	LOG(Y)	RES/TD	M2/GDP	REALR
1	3.643935	2.925248	9.676884	5.993551	0.978364	80.42595
2	4.074578	2.467670	9.551902	5.046101	5.466612	77.46772
3	4.593284	2.072937	15.37212	6.121186	10.04721	66.38654
4	5.060796	2.188199	17.79328	5.279629	10.75380	63.98510
5	5.445492	1.913607	18.11997	4.560460	12.08013	63.32584
6	5.777298	1.739090	19.67913	4.056269	13.13724	61.38828
7	6.106199	1.581372	20.85819	3.631097	13.60911	60.32023
8	6.409844	1.445081	21.49195	3.319035	13.84933	59.89461
9	6.703301	1.333112	22.03735	3.035075	14.19176	59.40270
10	6.981485	1.248996	22.61554	2.802421	14.42794	58.90510

Cholesky Ordering: PRIVSAV LOG(Y) RESTD M2GDP REALR

Source: see text.

5 Concluding comments

The discussion of financial reforms in Morocco and the empirical results derived in this study indicate that, overall, there are important effects in the short- and the long-run. In the short-run, financial depth (volume of intermediation) has a positive influence on private saving, while interest rates show a negative impact. On the other hand, the effectiveness of financial intermediation does not seem to have a direct effect on saving but has a significant influence on the volume of intermediation. Thus, intermediation effectiveness seems to have an indirect influence on private saving. In the long-run, savings have a stable relationship (co-movement) with financial reform but the influence of interest rates remains negative, indicating that the income effect outweighs the substitution effect in the long-run as well.

These findings are consistent with the behaviour of the means shown in Table 1a. The positive influence on saving from increased financial depth may be offset by the negative impact of higher interest rates. In the post-reform period (1987-99) we observe

that all indicators of financial reform have improved, with interest rates and financial depth registering significant increases. Yet, the saving rate has remained unchanged. Perhaps the main outcome of the financial liberalization that resulted from the reforms was to move savings from the informal market and thus enhance the efficiency of financial intermediation.

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