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Working Paper — Digitized Version

Interest rate policies and domestic savings mobilization: A survey of the empirical evidence of Asian countries

Kiel Working Paper, No. 267

Provided in Cooperation with:

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Suggested Citation: Corsepius, Uwe; Fischer, Bernhard (1986) : Interest rate policies and domestic savings mobilization: A survey of the empirical evidence of Asian countries, Kiel Working Paper, No. 267, Kiel Institute of World Economics (IfW), Kiel

This Version is available at:

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Kiel Working Papers

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Savings Mobilization

A Survey of the Empirical Evidence of
Asian Countries

by

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ISSN 0342 - 0787

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August 1986

A 93763/86 Weltwirtschaft
Kiel

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ISSN 0341 - 0787

Interest Rate Policies and Domestic Savings Mobilization A Survey of the Empirical Evidence of Asian Countries*

1. Introduction

The liberalization of interest rates has become more and more an integrated part of the policy advice given to developing countries in order to stimulate domestic savings and to improve the allocative efficiency of investments¹. One of the most critical assumptions behind this policy approach refers to a high and positive interest rate elasticity of savings. Empirically, this assumption seems not to be supported unanimously. Giovannini (1983), for instance, concludes from his survey of a sample of econometric studies that the notion of a positive impact of higher interest rates on national savings is not warranted empirically. This would lead to the conclusion that the expected success from interest liberalization policies would be questionable. However, such a judgement is not justified because the mentioned survey has various shortcomings. First, the range of empirical studies covered in the overview is rather limited. Second, the discussion of the interest rate elasticity of savings is not differentiated enough with respect to different savings aggregates. Third, some of the specification and methodological problems existing in estimating interest elasticities of savings are not tackled sufficiently.

* This study is part of a research project on savings mobilization in developing countries and was carried out with financial support from the Fritz Thyssen Stiftung. Thanks are due to Ulrich Hiemenz for valuable comments on an earlier draft of this paper.

¹ For an overview of more recent theoretical and empirical studies on financial repression in developing countries see Fischer (1982), Fry (1982) and Gupta (1984c).

The objective of this article is to present a more comprehensive survey of empirical studies on the interest elasticity of savings in order to determine whether high positive interest elasticities are a reasonable assumption for developing countries. Since most of the empirical work has been done for Asian economies we will focus our survey on this developing region. Section 2 presents the theoretical discussion on the interest elasticity of savings in developing countries. The results of empirical investigations are reviewed in Section 3. Data limitations, specification problems and methodological caveats in measuring the impact of interest rates on savings are discussed in Section 4. Finally, Section 5 provides the conclusions.

2. Theoretical Arguments on the Interest Elasticity of Savings

In the theoretical debate on the interest elasticity of savings in developing countries basically two different issues can be distinguished: First, the impact of interest rate changes on the level of savings and, second, its influence on the composition of savings, i.e. the holding of savings in financial and real assets.

Most of the contributions to the theoretical debate focus on the interest elasticity of private household savings. It is generally stated that the net-effect of a change in interest rates on the level of household savings is an empirical question since theoretically two ambiguous forces are at work. On the one hand, a rise in interest rates makes future consumption less expensive (substitution effect) while on the other hand, less money has to be saved at present to consume the same amount in the future (income effect). However, the relevance of the income effect has been questioned for developing countries because of the relatively small importance of interest earnings for a large part of the

population (Wai, 1972). Theoretical support for a positive interest elasticity of savings is also provided by Tsiang (1973) who includes appreciation or depreciation effects of durable assets such as land and houses in his analysis. According to this approach the interest rate induced wealth effect is likely to offset any negative income effect. Arguments for a positive interest elasticity of savings are in addition given by Olson and Bailey (1981). Having developed a theoretical approach to intertemporal choice, they conclude that there is a compelling case for the existence of a positive time preference, i.e. current consumption is valued higher than future consumption. In this line of reasoning a positive time preference requires savings to be interest elastic. Any interest rate which is higher than the rate of time preference will lead to net savings. Since the net marginal product of capital should be positive it can be assumed that generally the rate of interest is higher than the rate of time preference.

While only a couple of studies deal with the interest elasticity of business savings empirically, even fewer include theoretical arguments how interest rates influence a firm's decision to retain a fraction of its earnings. In spite of the apparent lack of a complete theory of corporate finance¹ it can be contended that interest rates influence the "saving behaviour" of firms along two distinct lines. First, higher interest rates mean higher costs of external finance and will therefore induce the firm to save more to finance a larger share of its planned investments with own resources. The second line of reasoning assumes that for most firms in developing countries the availability of credits is more relevant than their costs. In countries with interest rate ceilings on credits banks tend to ration non-prime borrowers out in order to reduce the default risk. Those borrowers are then forced to finance a relatively larger part of their in-

¹ See for example Black (1976) and Myers (1984).

vestments internally, since credits from the informal market are only imperfect substitutes for loans from commercial banks because the former are usually very short term. If higher interest rates induce private households to increase their financial savings, the easier availability of formal sector loans reduces for many enterprises the need to "save". In addition the higher volume of formal credits may also lead to a decline in the weighted average cost of loanable funds (Khatkate, 1972). Whether an interest reform has a positive or negative cost effect on business "savings" will inter alia depend on the interest elasticity of financial savings. The combined impact of changes in the cost and availability of external funds on business "savings" can only be judged empirically.

One theoretical grounds, there are no reasons to expect that public savings are interest rate elastic. The interest rate is neither a major determinant for government revenues nor for public expenditures.

Less controversially discussed than the influence of interest rate changes on the level of savings is their impact on the composition of savings. Even if the level of total savings remains unaffected by an increase of the interest rate a portfolio reallocation effect is generally assumed to be very likely. According to the theory of portfolio choice, an increase in the yield of financial assets induces private household to increase their financial savings and decrease the share of savings which is held in real assets. Therefore the volume of loanable funds should increase when interest rates are rising even if the level of total savings remains constant.

3. Regression Results of Saving Function Estimates

Table 1 summarizes the regression results of savings functions for 13 Asian countries with respect to the sign of the estimated coefficient of the interest variable by different aggregates and types of saving. The studies included in the overview cover the 1950-1983 period or parts of it. More detailed information on the specification of the savings functions as well as on the estimation method applied are given in the Appendix Tables A1, A2 and A3.

Most of the empirical estimates on the interest elasticity of savings in Asian countries have been done using national or domestic savings (Table 1 and A1). In 15 of the 28 studies reviewed the sign of the estimated coefficient for the interest variable was positive. However, the positive result of a pooled cross country study (Fry, 1981) has to be interpreted with great care. First, Giovannini (1983) could not reproduce Fry's study for a different time period. Second, Ravallion and Sen (1986) showed that the pooling of individual country data, as done by Fry and Giovannini, is econometrically very questionable and yields unreliable results. The relatively large number of insignificant results is not surprising since the response of the government and of firms to changes in interest rates may be very different from the reaction of private households. Statistically significant negative coefficients for the interest variable have been estimated for the Republic of China (Liang, 1983) and for Thailand (Bürkner, 1981; Go, 1984). At least the result for Thailand remains questionable, since Fry (1981), using a more sophisticated methodological approach, found a statistically significant positive sign for the interest elasticity. Furthermore, the negative interest rate elasticities for Thailand and the Republic of China could be the consequence of a strong positive impact of inflation on national saving. Neither Bürkner (1981) and Go (1984) nor Liang (1983) included a variable in their estimated equations which takes into account the direct effects of inflation on saving. A

Table 1 - The Interest Elasticity of Savings in Asian Countries: An Overview of the Empirical Evidence

Country	Number of Empirical Studies/Sign of Interest Rate Elasticity by Type of Savings																		Authors
	National and domestic savings			Private savings			Household savings			Business savings			Financial savings			Savings in real assets			
	+	-	n.s.	+	-	n.s.	+	-	n.s.	+	-	n.s.	+	-	n.s.	+	-	n.s.	
Bangladesh			1										1						Rana (1984)
Burma	1								1				1 ^a				1 ^a		Fry (1981); Gupta (1984a); Williamson (1968)
China, Rep.	1	1						1							1		1		Fry (1981); Liang (1983); Gupta (1984a); Williamson (1968)
India	1		1	1			2		2	1			1				1 ^a		Fry (1981); Gupta (1970a/b); Gupta (1984a); Iqbal (1982); Johri (1969); Sundarajan, Thakur (1977); Williamson (1968)
Indonesia	1														1		1 ^a		Fry (1981); Gupta (1984a)
Korea, Rep.	1		3	1			1		2	1			3				1		Brown (1973); Dowling (1984); Frank, Kim, Westphal (1984); Gupta (1984a); Fry (1981); Sundarajan, Thakur (1977); Wijn- bergen (1983); Williamson (1968); Yusuf, Peters (1984)
Malaysia	1																1		Fry (1981); Vongvipanond (1978); Gupta (1984a)
Nepal	2												2 (1 ^a)		1		1		Fry (1981); Gupta (1984a); James (1984)
Pakistan	2						1					1	3				1 ^a		Abbott, De Rosa (1984); Fry (1981); Gupta (1984a); Qureshi (1981)
Philippines	1		1			1	1	1					1 ^a				1		Bürkner (1981); Fry (1981); Gupta (1984a); Williamson (1968)
Singapore	1														1		1		Fry (1981); Gupta (1984a)
Sri Lanka	1		1										1						Fry (1981); Lee (1984)
Thailand	1	2	1		2		1	2					3 (1 ^a)				1	1	Bürkner (1981); Fry (1981); Go (1984); Gupta (1984a); Kirakul, Sriphayak, Ploydanai (1984)
Pooled country sample	1		2		1								2				1		Abe, Fry et al. (1977); Giovannini (1983); Gupta (1984a); IMF (1983); Vongvipanond (1978)
All countries	15	3	10	2	3	1	6	4	5	2	0	1	18	0	4	0	3	5	

^aMarginally significant (coefficient greater than its own standard error).

regression analysis, where inflation affects saving only via the real interest rate, will, however, yield a downward biased coefficient for the interest rate elasticity (Ravallion, Sen, 1986).

Due to data limitations less empirical investigations have been done directly for private household savings. At the first glance the results for the interest elasticity of household savings are ambiguous (Table 1 and A2). Only in six of the 15 country studies reviewed a positive relationship was found, while significant negative values were estimated for the Philippines, the Republic of China and Thailand. The negative sign or statistically insignificant results for the estimated coefficient of the interest variable for the Philippines and India (Williamson, 1968) triggered further research. Gupta (1970a) reproduced Williamson's regression of the savings function for India over a longer period with more reliable data and found a positive interest elasticity. While estimates for Korea and Pakistan support this result, the negative impact of the real rate of interest on household savings in Thailand (Bürkner, 1981; Go, 1984) is probably again due to a misspecification. The hypothesis of the positive influence of inflation on savings is also supported by a recent study of Kirakul, Sriphayak and Ploydanai (1984), who regressed household savings in Thailand on a weighted nominal interest rate and found a positive relationship.

The empirical evidence on the interest elasticity of business savings is too scarce to be conclusive (Table 1 and A2). Two of the three available studies yielded positive elasticities (Frank, Kim, Westphal, 1975 for Korea and Johri, 1966 for India) while Qureshi (1983) could not find a statistically significant relationship in the case of Paki-

stan. However, Qureshi (1983) could show that the availability of external finance influences business savings significantly negative in Pakistan. Similarly, less conclusive are the results for the impact of the interest variable on private savings (business and household savings). While positive interest elasticities were found for India (Iqbal, 1982) and Korea (Brown, 1973) the sign of the estimated coefficient was negative for Thailand (Go, 1984) and a pooled sample of six Asian countries (Vongvipanond, 1978).

The expected positive impact of interest rates on financial savings is unambiguously supported by the empirical evidence while the few studies available for the interest elasticity of savings in real assets fail to yield statistically significant results in all cases (Table 1 and A3). The relatively large number of insignificant interest rate coefficients in equations, where savings in real assets are the dependent variable, may be partly attributed to data problems. Savings in real assets are mostly calculated as residual of total saving minus financial savings (mostly defined in a rather arbitrary way). Thus, savings which are held as consumer durables are not covered while credits to the informal market are included. Furthermore, saving or dissaving in real assets involves considerable transaction costs so that savers are unlikely to respond to small or as transitory perceived changes in real interest rates.

It could be argued that even if variations in interest rates have a statistically significant and positive influence on savings the resulting quantitative impact would be too small to make the interest rate a useful policy variable for domestic resource mobilization. Most numerical values of interest elasticities of saving were estimated for Korea. Frank, Kim and Westphal (1975) found household savings on average to be five times more interest rate elastic (1.84) than business savings (0.34). Yusuf and Peters (1984) calculated an interest elasticity of 1.16 for national savings.

Brown (1973) reports even higher values for the private savings ratio, which responds in his study to a change in the real interest rate with an elasticity of four to seven per cent, measured at mean values. Contrary to the reported results household savings in Ortmeyer's study (1985) were less interest elastic (0.33). However, according to the same study, a one percentage point increase in the nominal return to financial assets, leads to a rise in the financial savings of households of four per cent. Using time deposits as a proxy for financial savings, Wijnbergen (1983) estimated a positive interest rate elasticity of 1.63 with respect to the nominal interest rate.

4. Empirical Problems in Measuring Interest Elasticities

Due to data limitations, specification problems and methodological caveats, the empirical evidence on interest elasticities of savings in Asian countries has to be interpreted with care. The unreliability and poor quality of data on savings in developing countries is a well known fact. This is especially true for private household savings which are usually calculated as a residual from the national accounts. Although data derived directly from household surveys would provide more accurate figures, this kind of information is rare for developing countries.

The choice of an appropriate proxy for the representative interest rate is no easy task in estimating interest elasticities of savings. Most of the studies reviewed consider the real return of 12 month time deposits as a representative interest rate variable. However, only an analysis of the term structure of interest rates can show whether this is an accurate proxy for the average rate. If the financial sector is fairly well developed and time deposits with longer maturities are widely held, a weighted average return on financial assets would be more appropriate. Or, for example, if with volatile inflation rates and inflexible nomi-

nal interest rate ceilings households shift their wealth to more liquid assets, interest rates for time deposits with shorter maturities would be more representative. Finally, only one of the studies reviewed adjusts the interest variable for the tax to be paid on interest earnings although such considerations may be relevant for wealthier savers and for countries with relatively well developed capital markets.

Another empirical problem arises when real interest rates are used as an independent variable in savings function estimates¹. In this case actual and expected values have to be distinguished. While theoretically the expected rate of inflation would be the more appropriate deflator of nominal interest rates, empirically it might be difficult to apply the 'correct' expectation hypothesis although. Inflation rates in most Asian countries were lower than the average of developing countries in the period under review. Nevertheless, Asian countries also experienced periods with very volatile inflation rates, for example Malaysia and Singapore between 1973 and 1982 (Fry, 1983). Therefore, the expected inflation rate should be corrected by a measure accounting for the uncertainty about the future rate of inflation.

Furthermore, in nearly all studies the specification of the interest rate effect remains unsatisfactory. None tries to pick up Tsiang's (1973) "interest induced wealth effect" separately. Instead changes in wealth are generally treated as exogenous and not attributed to changes in interest rates which might have caused them. Moreover, the surveyed studies relate current saving only to current deposit rates. However, as Molho (1986) has shown with an intertemporal model savings are affected by interest changes only within a complex lag structure.

¹ For a detailed discussion on real interest rates see Khatkhate (1986).

The existence on informal credit markets further complicates the specification of the interest rate effect on savings. Informal credit markets may result from market imperfections, such as a low density of financial institutions, and/or interest rate ceilings, which are imposed by the government in order to make cheap funds available for investors¹. Facing an excess demand for credits smaller and riskier borrowers are usually crowded out by the rationing process. These have to satisfy their demand for external funds in the informal sector, where interest rates are higher than the ceiling rates due to high risk premiums, the high administrative costs of servicing many small borrowers and some degree of monopoly power. In a simplified model a deregulation of interest rates will raise formal but lower informal interest rates when funds flow from the informal into the formal market². How total household savings respond to the liberalization depends on the type of interest rate households base their consumption-saving decision on. The implications for the volume of household saving will be very different, whether the formal, the informal interest rate or an average of both is used. To sum up, higher interest rates in the formal financial market will not necessarily lead to higher household savings even when households savings are interest elastic since informal interest rates may counteract an interest rate reform in the formal sector.

¹ See Holst (1985) for an overview of the structure and performance of informal financial markets in LDCs.

² It is possible to assume that the credit market in LDCs is segmented even before interest rate ceilings are introduced. Interest rate controls will then establish a second informal market which interacts with the "old" informal market (Roemer, 1986). However, the basic point that changes in the informal interest rates may counteract an interest rate reform in the formal market remains valid.

In addition to the mentioned data limitations and specification problems there are severe methodological caveats in most of the estimation procedures used in the empirical studies reviewed. Most of them have been done in a similar ad hoc fashion using single-equation and ordinary-least-square models. However, these approaches neither can capture the simultaneous nature of the saving-investment decision which is typical for many firm-households in poorer developing countries nor the phenomenon that the desired level of wealth and its allocation among competing assets is determined simultaneously. An outstanding methodological effort to refer to this problem has been done by Ortmeyer (1985) applying a portfolio model for the saving behaviour of Korean households. Although this approach would be desirable from a methodological point of view the lack of flow-of-funds statistics and wealth stock data still limits the applicability of portfolio models to few developing countries.

5. Conclusions

In reviewing empirical studies on the interest elasticity of savings in Asian countries strong support could be found that financial savings react positively on a rise in real rates of interest. A positive interest elasticity of financial savings is, however, not sufficient to conclude that funds for investments purposes can be increased by higher interest rates. As long as the informal credit market is not considered, a parallel decline of informal credits, which results from a portfolio reallocation of households in favour of the formal market, cannot be ruled out¹. To clarify this problem an empirical test of a portfolio model is needed which integrates both credit markets (Corsepius, 1986).

¹ However, even if the volume of available credits may not increase an interest rate reform can lead to greater allocative efficiency (Fischer, 1982).

Although the results for national, domestic and private household savings are less clear-cut, it could be shown that studies which yielded negative interest elasticities suffer from severe specification problems. Given the differences in household and business saving behaviour as well as the existence of informal credit markets, the empirical testing of the response of national or domestic savings to changes of a single interest rate can not yield reliable results. Instead models which integrate the saving behaviour of different economic sectors should be developed and tested empirically in order to shed additional light on the debate of the interest elasticity of savings in developing countries.

Table A1 - Empirical Estimates of the Interest Rate Elasticity of National and Domestic Savings in Asian Developing Countries

Author	Country	Period	Method	Dependent Variable	Specification of Estimated Equations*				Regression Results
					Independent Variables				Sign of Interest Rate Variable
					Income	Interest Rate	Foreign Savings	Other Variables	
NATIONAL SAVINGS									
Abbott, de Rosa (1984)	Pakistan	1961-82	TSLS	S_n/Y	\hat{Y}	$R-P^e$		TOT, DR	+
Abe, Fry et al. (1977)	6 Countries ^a	1951-73	PRA:GIS	S_n/Y	$\ln Y_p$	R	S_f/Y	P, CD	n.s.
Dowling (1984)	Korea	1960-82	OLS	S_n	\hat{Y}^r, Y^r	$R-P^e$, R-D	S_f	$(S_n)_{-1}$	n.s.
Fry (1981)	12 Countries	1961-77	TSLS	S_n	\hat{Y}^r, Y^r	$R-P^e$	S_f/Y^r	$(S_n)_{-1}$	+ ^b n.s. ^c
		1961-77	TSLS	S_n/Y	$\hat{Y}^r, \log(Y^r/N)$	$R-P^e$	S_f/Y	$(S_n/Y)_{-1}$	+ ^d n.s. ^e
Fry (1981) ^f	Thailand	1960-81	TSLS	S_n/Y	\hat{Y}^r	$R-P^e$	S_f/Y	$(S_n/Y)_{-1}$, DR, log TOT	+
Go (1984)	Thailand	n.a.	OJS	S_n/Y	Y^r	R-P	S_f/Y	BD	-
James (1984)	Nepal	1960-81	OLS, TSLS	S_n/Y	\hat{Y}^r	R-D	S_f/Y	DR, TOT, 1/RD (S_n/Y)	+
Lee (1984)	Sri Lanka	1960-82	OLS, TSLS	S_n/Y	$\ln(Y^r/N)_{-1}, \hat{Y}^r$	R-D	S_f/Y	TOT, IM/Y, FS	n.s.
Liang (1983)	Rep. of China	1953-80	OLS	S_n/Y	$\ln(Y^r/N)_{-1}, \hat{Y}^r$	R-P			-
Rana (1984)	Bangladesh	1975-83	OLS, TSLS	S_n/Y	Y^r	R-ANFP	S_f/Y	$\Delta(M4-M1)/Y, \Delta(M3-M1)/Y, \Delta(M4/Y)$	n.s.

Table A1 continued

Author	Country	Period	Method	Dependent Variable	Specification of Estimated Equations*				Regression Results
					Independent Variables				Sign of Interest Rate Variable
					Income	Interest Rate	Foreign Savings	Other Variables	
Sundarajan, Thakur (1977)	India	1960-76	OLS	S_n^r	GDP^r	$(R-P)/(1+P)$		$(S_n^r)_{-1}$	+
	Korea	1960-70	OLS	S_n^r	$GDP^r, (GDP^r)_{-1}, (GDP^r)_{-2}$	$(R-P)/(1+P)$			n.s.
Yusuf, Peters (1984)	Korea	1965-81	OLS, GLS	S_n^r	Y_p, \hat{Y}, Y	R-P		P	+
DOMESTIC SAVINGS									
Bürkner (1981)	Philippines	1950-77	OLS	S_d	Y	R-P, R			n.s.
	Thailand	1950-77	OLS	S_d	GDP	R-D			-
Giovannini (1983)	7 Countries ^g	1962-80	PRA:TSLS	S_d/Y	$\hat{Y}^r, \log(Y^r/N)$	$R-P^e$	S_f/Y	$(S_n/Y)_{-1}, CD$	n.s.
Vongvipanond (1978)	6 Countries ^h	1962-73	PRA:OLS	S_d/Y	$\hat{GDP}^r, \ln(Y^r/N)$	$R-P^e$	S_f/Y	T, EX/Y, CD	+
Yusuf, Peters (1984)	Korea	1965-81	OLS, GLS	S_d^r	GDP, \hat{GDP}	R-D		P	+

*See list of abbreviations.

^aRep. of China, Japan, Korea, Pakistan, Thailand, Turkey. - ^bBurma, Indonesia, Nepal, Pakistan, Philippines, Singapore, Rep. of China. - ^cIndia, Korea, Malaysia, Sri Lanka, Thailand. - ^dBurma, Indonesia, Malaysia, Nepal, Pakistan, Singapore, Sri Lanka. - ^eKorea, Philippines, Rep. of China, Thailand. - ^fQuoted in Go (1984)

^gBurma, India, Korea, Malaysia, Philippines, Singapore, Rep. of China. - ^hRep. of China, India, Korea, Philippines, Thailand, Malaysia.

Source: Own compilation.

Table A2 - Empirical Estimates of the Interest Rate Elasticity of Private, Household, Business and Real Savings in Asian Developing Countries

Author	Country	Period	Method	Dependent Variable	Specification of Estimated Equations*				Regression Results
					Independent Variables				Sign of Interest Rate Variable
					Income	Interest Rate	Foreign Savings	Other Variables	
PRIVATE SAVINGS									
Brown (1973)	Korea	1957-70	OLS	S_p/Y_p^d	Y^d	R-P, R		$(S_p/Y_p^d)_{-1}$	+
Bürkner (1981)	Philippines	1950-77	OLS	S_p	Y^d	R-D, D			n.s.
	Thailand	1950-77	OLS	S_p	Y^d	R-D			-
Go (1984)	Thailand	n.a.	OLS	S_p/Y	Y^r	R-P	S_p/Y	BD	-
Iqbal (1982)	India	1968-71	OLS,WLS	S_p (rural)	Y_p, Y_t	R^a		ILI, Age, Family Size	+
Vongvipanond (1978)	6 Countries ^b	1962-73	PRA:OLS	S_p/Y	$\hat{GDP}^r, Y^r/N$	$R-P^c$	S_f/Y	T/Y, EX/Y, CD	-
HOUSEHOLD SAVINGS									
Bürkner (1981)	Philippines	1950-77	OLS	S_h	Y^d	R			+
	Thailand	1950-77	OLS	S_h	Y^d	R-D			-
Dowling (1984)	Korea	1960-82	TSLS	S_h	\hat{Y}^r, Y^r	$R-P^e; R-D$	S_f	S_{h-1}	n.s.
Frank, Kim, Westphal (1975)	Korea	1955-70	COIT	S_h	Y^d	R		$P; P_{-1}$	+
Go (1984)	Thailand	n.a.	OLS	S_h/Y	Y^r	R-P	S_f/Y		-
Gupta (1970a)	India	1950/51-1966/67	OLS	S_h^r/N	$Y_p^d/N, Y_t^d/N$	R-P			+

Table A2 continued

Author	Country	Period	Method	Dependent Variable	Specification of Estimated Equations*				Regression Results
					Independent Variables				Sign of Interest Rate Variable
					Income	Interest Rate	Foreign Savings	Other Variables	
Gupta (1970b)	India	1950/51-1962/63	OLS	S_h^r /N (rural)	$Y_p^r/N, Y_c^r/N$	R-P		n.s.	
				S_h^r /N (urban)	$Y_p^r/N, Y_t^r/N$	(R-P) ^e	+		
Kirakul, Sriphyak, Ploydanai (1984)	Thailand	1967-82	OLS	S_h	Y_{pr}^d	R_t		+	
Qureshi (1981)	Pakistan	1950/51-1976/77	OLS	S_h^c	\hat{Y}^r, Y^r	R-P		+	
Williamson (1968)	6 Countries	1950-64	n.a.	S_h	Y^d	R-P		- ^d n.s. ^e	
BUSINESS SAVINGS									
Frank, Kim, Westphal (1975)	Korea, Rep.	1955-70	OLS	S_b	Y_{na}	R		+	
Johri (1969)	India	1951-65	OLS	S_b		R	GP_r, GI_{+1}	+	
Qureshi (1981)	Pakistan	1961-75	OLS	S_b		$R-P_h$	A, P_r	n.s.	
RFAI SAVINGS									
Gupta (1984a)	11 Countries	1966-77	OLS	S_r	Y_p, Y_t	$R-P^e, R$	P^e, P^u, FIR, IV	- ^f (-) ^g n.s. ^h	
Gupta (1984b)	25 Countries	n.a.	PRA:TSIS	S_r	Y_{pr}^d	R	P^e, P^u, S_{r-1}	n.s.	
Kirakul, Sriphayak, Ploydanai (1984)	Thailand	1967-80	OLS	$S_{r, h}$	Y_h^d	R_t	P^e	-	

*See list of abbreviations.

^a Endogenous specified. ^b Malaysia, Rep. of China, India, Korea, Philippines, Thailand. ^c Inclusive unincorporated businesses. ^d Japan, Rep. of China, Philippines. ^e Korea, Burma, India. ^f Rep. of China, Korea, Singapore, Thailand. ^g Marginally significant (coefficient is greater than its own standard error): Burma, India, Indonesia, Pakistan. ^h Malaysia, Nepal, Philippines.

Source: Own compilation.

Table A3 - Empirical Estimates of the Interest Rate Elasticity of Financial Savings in Asian Developing Countries

Author	Country	Period	Method	Dependent Variable	Specification of Estimated Equations*			Regression Results	
					Independent Variables			Sign of Interest Rate Variable	
					Income	Interest Rate	Other Variables		
Abbott, de Rosa (1984)	Pakistan	1961-82	OLS	$\ln(M2/M2_{-1})$	$\ln(Y^r/N) / \ln(Y^r/N)_{-1}$	$(R-P^e) - (R-P^e)_{-1}$	$\ln(AM2)_{-2}$	+	
Dowling (1984)	Korea	1960-82	TSLS	QM/CNP	\hat{Y}^r, Y^r	$R-P^e, R-D$	$(QM/CNP)_{-1}, 1/BD$	+	
Go (1984)	Thailand	n.a.	OLS	$AM2/Y$	\hat{Y}^r, Y^r	$R-P^e$	S_f/Y	+	
Gupta (1984a)	12 Countries	1960-77	OLS	FS	Y_p, Y_t	$R-P^e, R$	P^e, P^u, FIR, IV	+	b c d
Gupta (1984b)	25 Countries	n.a.	PRA:TSLS	FS	Y_{pr}^d	R	P, P^u, FS_{-1}	+	n.s.
James (1984)	Nepal	1960-81	OLS	$M2/N$	(\hat{COP}/N)	$\Delta(R-D)$	$(M2/N)$	+	
		1960-81	OLS	(QM/N)	(\hat{COP}/N)	$\Delta(R-D)$	$(QM/N)_{-1}$	+	
IMF (1983)	21 Countries ^e	1981-80	PRA:OLS	M2		$R-P$		+	f g h
Kirakul, Sripayak, Ploydanai (1984)	Thailand	1967-80	OLS	FS_h	Y_h^d	$R_t - P^e$		+	
Lee (1984)	Sri Lanka	1960-82	TSLS	$M2/Y$	$\ln(Y^r/N)$	$R-D$	$FS_{-1}, BD, S_n/Y$	+	
Ortmeyer (1985)	Korea	1962-76	TPIS	FS_h	Multi-equation-household-portfolio-model			+	
Qureshi (1981)	Pakistan	1950/51-1976/77	OLS	FS_h^a	Y^d	$R-P$		+	
Rana (1984)	Bangladesh	1975-83	TSLS	$M4/Y, (M3-M1)/Y$ $(M4-M1)/Y + /N$		$R-P_{NF}$		+	
Wijnbergen (1983)	Korea	1964-79	TSLS	$\ln(TD^r)$	Y^r	R, R_c	$\ln(TD^r)_{-1}, P$	+	

* See list of abbreviations.

^aInclusive unincorporated businesses. - ^bIndia, Korea, Pakistan. - ^cMarginally significant (coefficient is greater than its own standard error): Burma, Nepal, Philippines, Thailand. - ^dRep. of China, Indonesia, Malaysia, Singapore, Sri Lanka. - ^eIn groups according to level of real interest rates. - ^fCountries with positive real interest rates. - ^gCountries with moderately negative real interest rates. - ^hCountries with severely negative real interest rates.

Source: Own compilation.

List of Abbreviations

Savings Variables

S_n	= National Savings
S_d	= Domestic Savings
S_{pr}	= Private Savings
S_h	= Household Savings
S_b	= Business Savings
S_f	= Foreign Savings
S_r	= Savings in Real Assets

Income Variables

Y	= National Income
Y_t	= Transitory Income
Y_p	= Permanent Income
Y^d	= Disposable Income
Y_{pr}^d	= Private Disposable Income
Y_{na}	= Non-Agricultural Income
GDP	= Gross Domestic Product

Financial Variables

FS_{pr}	= Private Financial Savings
FS_h	= Personal Financial Savings
$M1$	= Currency and Demand Deposits
QM	= Time and Savings Deposits
$M2$	= $M1 + QM$
$M3$	= $M1 +$ Deposits at Scheduled Banks
$M4$	= $M3 +$ Other Deposits ^a
FIR	= Financial Intermediation Ratio ^b
IV	= Variation of the Inflationrate
B	= Bank Density ^c
TD	= Time Deposits

Interest Rate/Price Variables

P^u	= Unexpected Inflation
R	= Nominal Interest Rate
P	= Inflation Rate (CPI)
P_{NF}	= P (Non-Food)
D	= GNP or GDP Deflator
P_b	= Inflation Rate (WPI)
R_c	= Nominal Curb Market Rate
R_t	= Weighted Nominal Interest Rate After Tax

^aInclude deposits at non-scheduled banks, cooperatives and post office savings bank. - ^bRatio of total financial assets to GDP. - ^cNumber of bank branches per 10 000 inhabitants.

Other Variables

CPI	= Consumer Price Index
WPI	= Wholesale Price Index
TOT	= Terms of Trade
DR	= Dependency Ratio
T	= Total Tax Revenue
EX	= Exports
IM	= Imports
N	= Population
ILI	= Irrigated Land Indicator
CD	= Country Dummy
^	= Growth Rate
Δ	= Change
GP _r	= Gross Profits
P _r	= Post Tax Net Profits
A	= Net Assets
GI	= Gross Investment

Methods

OLS	= Ordinary Least-Squares
WLS	= Weighted Least-Squares
GLS	= General Least-Squares
TSLS	= Two-Stage Least-Squares
TRLS	= Three-Stage Least-Squares
COIT	= Cochrane-Orcutt Iterative Technique
PRA	= Pooled Regression Analysis

Superscripts

r	= Real
e	= Expected

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