THE IMPACT OF DEMOGRAPHY, GROWTH AND PUBLIC POLICY ON HOUSEHOLD SAVING: A CASE STUDY OF PAKISTAN

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The present study investigates the behaviour of household saving by employing the Johansen-Juselius cointegration technique and error correction model to determine the long run and short run dynamics of the system respectively using "time-series" data for Pakistan over the period 1972-2003. The study found the existence of one cointegrating vector, indicating a valid long run economic relationship among the determinants of household saving.

The study established that there exists a valid long run inverse relationship between household saving and demographic variables. The results also reveal that income and growth variables have a significant positive effect on household saving. Similarly, the positive impact of real interest rates on saving indicates that the substitution effect dominates the income effect in Pakistan. The study also found that the rate of inflation affects household saving rate negatively. Furthermore, public saving 'crowds-out' private saving less proportionately in Pakistan, than in other comparable cases.

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I. INTRODUCTION

Development economics has for several decades recognized the importance of the mobilization of domestic savings for economic growth in developing countries. The positive relationship between saving/investment and economic growth has long been an established fact in economics.[1]

Pakistan's saving performance is not very impressive relative to other developing countries in the region that have experienced sustained high growth comparable to Pakistan. Despite the lacklustre performance of domestic saving in previous decades, household saving during the past four decades has been more than 80 per cent of domestic saving and significantly contributed to total saving. In spite of its sheer contribution to total saving, very few empirical studies have been conducted to analyse households saving behaviour in Pakistan. Most of the relevant available studies have used cross-sectional data.[2] Most of the empirical studies are based on total national/domestic saving. However, some studies have examined private sector saving, but only a few have explicitly focused on household saving. Moreover, most of the studies have used cross-country data for estimation. Cross-country regression analysis is based on assumptions of homogeneity about the nature and quality of data; these are very restrictive assumptions so the validity of the results becomes doubtful. There is a need to use individual country time-series data for undertaking econometric analysis of saving/investment behaviour to provide a sound foundation for a policy debate. However, there is compelling evidence that many macroeconomic time-series datasets are non-stationary and as a result, ordinary least square estimates using these data may produce spurious results. Although by now there exist well developed techniques for handling non-stationary time-series data, no attempt has yet been made in Pakistan to study household saving and its determinants using these methods within an integrated theoretical framework. The present study evaluates the determinants of household saving in the process of economic development in the light of Pakistan's experience during the period 1972-2003.

The plan of the paper is as follows: section II provides an overview of saving trends in Pakistan, section III discusses theoretical aspects of household saving determinants, data sources and econometric methodology is discussed in section IV, and the empirical findings are presented and analysed in section V. section VI presents a concluding summary.

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[1]   See Schmidt and others (1996), Bisat and others (1997), and Sinha (1999) etc.

[2]   See Akhter (1986,1987), Burney and Khan (1992) and Siddique (1993).

II. SAVING TRENDS IN PAKISTAN

In this section, we examine saving trends and some fiscal indicators of Pakistan in different eras. Self-reliance has always been an avowed objective of Pakistan's economy. A higher degree of self-reliance is a desirable long-term goal of any economy, but unfortunately, Pakistan is included in those countries, which rely on external sources due to deficiencies in domestic resource mobilization. The process of development in the past has been accompanied with large internal and external imbalances. The perspective plan (1965-85) envisaged that by 1985 more than 95 per cent of investment would be financed through domestic sources while investment would be as large as 22.9 per cent of GNP. It was expected that the marginal savings rate could rise to 28 per cent during the period 1975-80. In fact the marginal saving rate fell during that period. It was expected that dependence of external resources would be reduced from 21.4 per cent and 13.6 per cent of investment during the sixth and seventh plan respectively. In fact the opposite has happened and the share of external resources in total investment increased to 25 per cent. This resulted in a deteriorated balance of payments of situation in Pakistan.

Table 1 shows domestic savings and the decomposition of saving rate trends on an aggregated annual basis for the period 1960-2000. Pakistan's saving performance is not very inspiring; indeed, it is abysmally low and hovers around 11.44 per cent for the period 1960-61 to 2000-01.

Table 1. Trends in Saving and Investment in Pakistan

Period	As per cent of GDP					As per cent of GTI	
	Public Saving	*Private Saving*	*Household Saving*	*Corporate Saving*	*Domestic Saving*	*External Resources*	*Domestic Resources*
1960-61 to 1969-70	2.26	10.43	8.92	1.51	13.54	NR	NR
1970-71 to 1979-80	0.87	9.40	7.95	1.45	8.44	36.88	63.11
1980-81 to 1989-90	1.60	12.71	11.64	1.07	9.65	21.02	78.98
1990-91 to 1999-00	1.56	12.49	11.05	1.44	14.13	24.29	75.71
1960-61 to 2000-01	1.57	11.28	9.92	1.36	11.44	22.52	65.74

Source: State Bank of Pakistan (1980-2003)

Note: 1. *NR* stands for Not Reported

2. *GTI* stands for Gross Total Investment

Pakistan's saving performance is not very impressive relative to other countries in the region that have experienced sustained high growth. Therefore, Pakistan has relied heavily on foreign capital to fill the gap between domestic saving and domestic investment. A disturbing feature of savings performance is that the savings rate has fallen over time from 13.54 per cent during the 1960s to 8.44 per cent and 9.65 per cent during the 1970s and the 1980s respectively though it increased during 1990s.

The macroeconomic dynamic represents a unique paradox, which arises from its high dependence on external resources to finance gross investment. Domestic savings financed 75 per cent of total gross investment, the remaining 25 per cent of total investment was financed through external sources. Public saving was on average 1.57 per cent of Gross Domestic Product (GDP) for the period 1960-2000. The persistently large fiscal deficit is one of the main reasons of macroeconomic imbalances in Pakistan. On the other hand the Government has failed to implement serious tax reform, the tax to GDP ratio has remained stagnant around 13 per cent for the last 30 years. Both factors are jointly responsible for the dismal state of public saving in Pakistan.

Private saving consists of household saving and corporate saving. Household saving performance is better than corporate or public saving, thus, household savings contribute more than 80 per cent of the total share in domestic saving rates. But it also has remained stagnant around 11 per cent for the last 30 years. The performance of corporate saving has remained very poor; over the period 1960-2000 average corporate saving was 1.36 per cent of GDP.

III. THEORETICAL ASPECTS OF HOUSEHOLD SAVING DETERMINANTS

We identified many determinants of household saving in Pakistan and classified them into the following three groups: demographic variables, income and growth variables and policy variables.

Demographic factors

Demographic variables are considered important for empirical studies of household savings. The population structure has been identified as a factor affecting saving behaviour in less developed countries.[3] Changes in the dependency ratio

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[3] Young-age dependency is usually defined as the ratio of the population less than 15 years to working age population (15-64) and old-age dependency is defined as the ratio of population age 65 and above to working age population.

affect saving behaviour, not only in the form of changed demand for health expenditure, human capital formation, and retirement consumption levels, but this ratio can also affect Government expenditure.

Leff (1969) found a significant inverse relationship between dependency rates and saving rates in less developed countries. Subsequently studies by Kelly (1973, 1976, 1988), Gupta (1975), Lahiri (1989) and Fry (1991) have also found a negative relationship between dependency rates and saving rates.

Growth and income factors

Many empirical studies have noted a very high degree of correlation between growth rates and saving rates; however, direction of causation is not clear. Mason (1981) wrote, that "With positive growth in aggregate real income, the lifetime resources of young savers exceed those of old dissavers and there can be positive aggregate saving".

Economic development theories generally assume that the causality runs from saving to the formation of human and physical capital to growth. On the other hand, many consumption theories have assumed that the causality runs from growth to saving (Modigliani (1970, 1993)).

The life cycle hypothesis implies that there is positive relation between income and saving, Modigliani in a recent study (1993) argued for there being a positive relation between income and saving for poor countries. He noted that, for poor developing countries the saving ratio tends to rise with income, while in developed countries there is no significant, systematic relationship between income and saving.

The life cycle model identifies growth in per capita income as one of the important determinants of saving rates, because people are forward looking and base their savings decisions on lifetime income. But in reality the current level of income also plays a significant role in explaining saving behaviour. Therefore, this study includes both these variables in household savings models.

Economics policy factors

The real interest rate is considered an important factor for inter-temporal decision-making. The sensitivity of savings to interest rate fluctuations has been the subject of much debate in less developed countries literature. At the theoretical level, the influence of real interest rates on saving depends on the relative strengths of offsetting substitution and income effects. A rise in the real rate of return may

increase saving by making future consumption cheaper relative to current consumption (substitution effect). At the same time, higher real interest rates may reduce the amount of saving necessary to purchase a given amount of future consumption (income effect). Thus, the impact of real interest rates on saving is a controversial issue in economic literature. Inflation is generally considered an important indicator of macroeconomic stability, so, higher inflation creates uncertainty and in anticipation of higher inflation rates in the future people substitute their future consumption for present consumption, consequently saving less. So, an increase in the inflation rate is expected to have a negative impact on saving.

Inflation can have a positive effect on saving rates as uncertainty about future asset values and future real incomes in an inflationary environment may encourage saving in order to maintain future consumption levels. Thus, the direction of the impact of inflation is indeterminate a priori.

The final variable of public saving in our study is used to gauge the impact of public saving on household saving, as public saving has significant relevance to household saving. The stance of the Government toward public saving may have a very large impact on household saving. According to the full Ricardian equivalence, public saving is a perfect substitute for private saving. The full Ricardian equivalence holds when there is a perfect capital market and no uncertainty. In the case of developing countries, these two assumptions do not hold and that may in fact make public saving not a perfect substitute for private saving.

IV. DATA AND METHODOLOGY

1. Data Sources and Model

The model consists of eight variables, growth rate per capita income (GR), per capita income (PC), young dependency ratio (YD), old dependency ratio (OD), real interest rate (IR), inflation rate (IF) and public saving (PS). All the data were obtained from *World Development Series, Economic Survey of Pakistan* and *the State Bank of Pakistan Annual Report.*

According to the variables identified earlier our empirical savings function takes the following form.

$$HS = \alpha_0 + \alpha_1 GR + \alpha_2 PC + \alpha_3 YD + \alpha_4 OD + \alpha_5 IR + \alpha_6 IF + \alpha_7 PS + U \qquad E(1)$$
$$\quad\;\; (+) \quad\;\; (+) \quad\;\; (-) \quad\;\; (-) \quad (+/-) \quad (+/-) \quad\;\; (-)$$

Symbols below the variables in E(1) indicates the expected coefficient signs

2. Econometric Procedure

In this paper, the impact of the determinants on household savings rates are examined in the following ways:

1. To examine whether a time series has a unit root, this paper has used augmented Dickey-Fuller (ADF) unit root test.

2. To find the long run relationship among the variables, this paper has applied the Johansen's multiple cointegration test.

3. Once the variables are found to be co-integrated, meaning that long-run equilibrium holds between them, they may still be in disequilibrium in the short run. Therefore, we estimated an error correction model (ECM) to determine the short run dynamic of the system.

The cointegration and error correction modeling techniques are now well-know and widely used in applied econometrics. The cointegration technique pioneered by Granger (1986), Engle and Granger (1987) allows long-run components of variables to obey long-run equilibrium relationships with the short-run components having a flexible dynamic specification. In the light of Shintani's (1994) finding that the Johansen method is more powerful than the Engle-Granger method, the multivariate cointegration framework that we propose to use here is established as the standard for vector autoregression systems. Unlike the Engle and Granger cointegration method the Johansen procedure can find multiple cointegration vectors. Considering a VAR model of order p with Gaussian errors, the dynamics of Xt are presumed to be governed by a pth-order Gaussian vector autoregression:

Let Xt be an I(1) vector representing the n-series of interest. A VAR of length p for Xt, would then be of the form.

$$Xt = \sum_{j=1}^{p} \Pi_j X_{t-j} + \mu + \varepsilon \qquad \textbf{\textit{E(2)}} \qquad t = 1, 2, 3,.....T$$

Where the Π_j are matrices of constant coefficients, Xt is a (n x 1) vector of I(1), μ is an intercept, ε is a Gaussian error term and T the total number of observations. It is convenient to rewrite E(2) in first difference notation reformulate in error correction form as

$$\Delta X = \sum_{j=1}^{p} \Gamma_j \Delta X_{t-1} + \Pi X_{t-p} + \mu + \varepsilon \qquad \textbf{\textit{E(3)}}$$

Where Δ is the first difference operator and the E(3) contains information on both the short and long run adjustments to changes in Xt, via the estimates of Γ_j and Π, respectively.

If Rank (Π) = r (r < n) then cointegration is indicated (with r cointegrating vectors present) and further, in this case Π may be factored as $\Pi = \alpha\beta$, with the matrix β comprising the r cointegrating vectors and α can be interpreted as the matrix of corresponding ECM weights. The matrix Π contains the information on the long run relationship between variables. If the rank of Π = 0, the variables are not cointegrated. On the other hand if rank (usually denote by 'r') is equal to 1 there exists one cointegrating vector and finally if 1 < r < n there are multiple cointegrating vectors. Johansen and Juselius (1990) have derived two tests for cointegration, namely trace test and the maximum Eigen value test. The first task in Johansen procedure is to choose an autoregressive order (p). There are tests for the choice of this appropriate lag length.[4] The ECM weights αi determine the short run term error correction responses of the variables to deviations from long run equilibrium values.

V. EMPIRICAL RESULTS AND ANALYSIS

The Johansen cointegration method and error correction model technique has been used in order to examine the long run and the short run dynamics of the system respectively.[5]

Prior to testing the long run cointegration relation ship, it is necessary to establish the order of integration presented. To this end, an augmented Dickey-Fuller (ADF) was carried out on the time-series levels and difference forms. The results are given in table 2 and show; all the variables have a unit root in their levels and are stationary in their first difference. Thus all eight variables (HS, GR, PC, YD, OD, IR, IF and PS) are integrated of order one I(1).[6]

$$\Delta X = \gamma_o + \gamma_1 X_{t-1} + \Sigma_{i=1}^{p}\beta\Delta X_{t-i} + \gamma_3 T + \mu_t$$

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[4] Akaike information criteria in Schwarz (1978).

[5] The Johansen-Juselius (1990) can find multiple cointegrating vectors; the Engle-Granger approach has several limitations in the case of more than one cointegration vector.

[6] The term I(1) is used in time series analysis. The first step in cointegration analysis is that all the variables must be stationary in same order and I(1) means that all variables are stationary in their first difference or stationary in same order.

Table 2. Test of the unit root hypothesis

	Level		First Difference	
Variables	*t-statistics*	*k*	*t-statistics*	*k*
HS	-2.72	2	-3.84**	2
GR	-2.91	4	-5.53*	3
PC	-0.29	4	-5.18*	4
YD	-0.56	1	-4.13**	1
OD	-3.06	1	-3.96**	4
IR	-1.84	1	-4.26**	1
IF	-1.62	4	-3.97**	4
PS	-1.32	1	3.89**	2

*The optimal lags (k) for conducting the **ADF** test were determined by **AIC (Akaike information criteria)**.*

*** and * indicate significance at the 5 per cent and 1 per cent levels, respectively.*

Note: *The t-statistic reported in is the t-ratio on γ_1 in the following regression.*

In the next step, the data series are a further check for the presence of cointegration using Johansen maximum likelihood cointegration test for HS, GR, PC, YD, OD, IR, IF and PS has been estimated and reported in table 3. In this respect, the maximum likelihood procedure developed in Johansen (1988) and Johansen and Juselius (1990) is adopted. The maximum Eigen value statistic and the cumulative form of that statistic, known as the trace statistic are reported in table 3. The trace and maximum Eigen value tests rejected the null hypothesis that there are zero cointegration vectors. Both tests suggest that there is one cointegration vector. Starting with a null hypothesis of no cointegration (r = 0) among the variables, the trace statistic of 171.25.05 exceeds the 99 per cent critical value of the λtrace statistic (critical value is 168.36). Thus, it is possible to reject the null hypothesis (r = 0) of no cointegration vector, in the favour of the general alternative r ≥ 1. As is evident in table 3, the null hypothesis of r ≤ 1, r ≤ 2 and so on cannot be rejected at 5 per cent of the level of significance. Consequently, we conclude that there is one cointegration relationship involving given variables of HS, GR, PC, YD, OD, IR, IF and PS.

On the other hand, the λmax statistics reject the null hypothesis of no cointegration vector (r = 0) against the alternative (r = 1) as the calculated value λmax (0, 1) = 52.10 exceeds the 99 per cent critical value (57.69). Similarly, the null hypothesis of r ≤ 1, r ≤ 2 and so on cannot be rejected at 5 per cent of level of significance. Thus, on the basis of the λmax statistics there is also one cointegration vector. The presence of one cointegration vector shows that there exists a long run relationship among the variables.

Table 3. Johansen's test for multiple cointegration vectors

Cointegration test among [HS GR PC YD OD IR IF PS]				
H0:	H1:	Tests statistics	95% Critical values	99% Critical values
λtrace		λtrace		
r = 0	r $\geq$ 1	171.25	156.00	168.36
r $\leq$ 1	r $\geq$ 2	119.15	124.24	133.57
r $\leq$ 2	r $\geq$ 3	78.78	94.15	103.18
r $\leq$ 3	r $\geq$ 4	45.38	68.52	76.07
r $\leq$ 4	r $\geq$ 5	23.47	47.21	54.46
r $\leq$ 5	r $\geq$ 6	8.73	29.68	35.65
r $\leq$ 6	r $\geq$ 7	4.62	15.41	20.04
r $\leq$ 7	r $\geq$ 8	0.32	3.76	6.65
λmax values		λmax values		
r = 0	r = 1	52.10	51.42	57.69
r $\leq$ 1	r = 2	40.37	45.28	51.57
r $\leq$ 2	r = 3	33.40	39.37	45.10
r $\leq$ 3	r = 4	21.91	33.46	38.77
r $\leq$ 4	r = 5	14.74	27.07	32.24
r $\leq$ 5	r = 6	4.11	20.97	25.52
r $\leq$ 6	r = 7	4.30	14.07	18.63
r $\leq$ 7	r = 8	0.32	3.76	6.65

Note: Critical values obtained from Osterwald-Lenum (1992).

We estimated an error correction model (ECM) to determine the short run dynamics of system. To estimate the short run error correction model, we used the general to specific approach (Hendry, 1995).

Using the notion of general-to-specific modeling, firstly 2 lag of both explanatory and dependent variables and 1 lag of residual from cointegrating regression was included. Subsequently, the insignificant variables were dropped in order to get a parsimonious model.

The coefficient of the error correction term has the correct sign (negative) and is statistically significant at 1 per cent.[7] Meaning, not only that the ECM is valid but also that there is a significant conservative force tendency to bring the model back into equilibrium whenever it strays too far. The results of the diagnostic test indicate that the household saving equation passes the test of

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[7]   The error correction term was calculated from the maximum likelihood estimates of cointegrating vector.

Table 4. Error correction model results

Dependent variable = ΔHS		Long run estimates
Regressors	Estimated coefficients	
Constant	0.42*	
ΔHS (-1)	0.42***	
Δ (GR)	0.15***	0.37**
Δ (PC)	0.29*	0.39*
ΔYD	-1.32**	-1.61*
ΔOD (-1)	-0.27**	-0.32**
ΔIR (-1)	0.47**	0.17*
Δ (IF)	-0.41**	-0.72*
ΔIF (-1)	-0.61**	
ΔPS (-1)	-0.22	-0.54**
RES (-1)	-0.05*	
Diagnostic tests		
Serial correlation	0.62	
Heteroscedasticity	1.47	
Functional form	0.32	
Normality	0.26	

Note: ***, ** And * indicate significance at the 10 per cent, 5 per cent and 1 per cent levels, respectively
RES (-1), the error correction term. All variables are measured in natural logarithms.

serial correlation, functional form, normality and "heteroscadisticity". The small sizes of coefficient of error correction figures indicate that the speed of adjustment is rather slow for the equation to return to their equilibrium level once it has been shocked.

Since all the variables are measured in logarithms, the regression coefficients can be directly interpreted as elasticities. Table 4 shows short run and long run estimates of a parsimonious model of household savings for Pakistan.

The coefficients for short run and long run growth rate per capita and per capita income have a positive significant effect on household saving.

The results reveal that both per capita income and growth rate have significant positive impacts on household saving. The long run elasticity from the coefficients GR and PC suggests that a 1 per cent increase of the (GR and PC) yield .37 per cent and .39 per cent increase in HS respectively.

The results also indicate that demographic variables (young and old dependency) have exerted significant negative impacts on the household saving rate. The coefficients for the short run and long run of the young and old dependency ratios have significant negative effects on household saving and the long run elasticities are 1.61 and .32 respectively. The young dependency coefficient is larger than the old dependency coefficient. These two dependency rates are likely to have different effects on the household savings rate.[8] The cohort effect of young dependency versus old dependency on saving by stage of development is an interesting phenomenon and needs further investigation (Kim and Zang, 1997).

The findings regarding the impact of demographic variables (young and old dependency) on household saving rate are in the line with recent empirical time-series studies (Horioka, 1997; Thornton, 2001; Prema-Chndra and Pnag-Long, 2003).

The impact of the real interest rate *(IR)* has a significant positive effect on household saving. As argued earlier, when the substitution effect dominates the income effect, the real interest rate has a positive effect on the saving rate. Thus, our finding is in complete disagreement with Fry (1982, 1988), Fry and Mason (1980) and Basalla (1989) who all favour a positive relationship between IR and HS in developing countries. The long run elasticity of IR indicates that a 1 per cent increase in IR will increase HS by 17 per cent.

Similarly, short run and long run coefficients of the inflation rate also have a significant negative effect on HS. The long run elasticity from the coefficient IF indicates that a 1 per cent increase in IF yields a .72 per cent decrease in HS.

This study finds a significant inverse relationship between public saving and household saving. The long run coefficient of public saving (PS) indicates that a 1 per cent increase in public saving leads to an average decrease of 0.54 percentage points in household saving. The study strengthens recent evidence regarding the inability of the Ricardian equivalence to fully explain the counterbalancing of household saving with public saving (Edwards, 1996; Liu and Woo, 1994).

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[8]   The proportion of population age structure in Pakistan has changed between 1951 to 2000: the proportion under 15 years has risen from 40 per cent to 45 per cent in 2000, and the relative size of the age group between 15-64 has declined from 57 per cent to 52 per cent over the corresponding period. These changes imply not only an increase in overall dependency, from 75 per cent in 1951 to 88.3 per cent in 2000, but also a gradual shift in the structure of the dependency burden toward the young age group.

VI. CONCLUSIONS

Domestic resource mobilization is one of the key determinants of economic growth. Despite high economic growth Pakistan's saving performance is very low relative to other countries in the region that have experienced similar growth rates. In this paper, we have used the Johansen-Juselius cointegration technique and error correction model to determine the short run dynamics of the system to time-series data for Pakistan's economy, over the period 1972-2001. The paper finds the existence of one cointegrating vector, indicating a valid long run economic relationship among the variables.

According to our findings both per capita income and the growth rate of per capita income have a significant positive effect on the household saving rate. Efforts to enhance economic growth potential could be rated as one of the most important policy measures to promote household saving behaviour in the country.

The demographic variables have a significant negative effect on household saving rates in Pakistan. Population structure over previous decades in Pakistan has changed and the inclination is towards an increase in dependency on the young. Therefore, a policy implication that could be drawn from this study is the need to lower Pakistan's fertility level, which is the highest among the developing countries and might remain high due to a high level of dependency on the young.

Furthermore, our study also found that the inflation rate affects household saving rates negatively. Inflation in Pakistan is a major source of macroeconomic instability that should be controlled to set the economy on a trajectory of growth. The Government should encourage national saving schemes to augment household savings for the formation of capital, but maintain a healthy balance between suppressing inflation and facilitating investment growth in a non-inflationary environment.

The real interest rate has a significant positive impact on saving rates, which confirms financial repression in Pakistan. Therefore, one of the key messages to emerge from the present endeavour is that, an environment that promotes financial development in the country would have a significant impact on the promotion of saving potential. This will result in a sustainable domestic capital resource generation capacity for the country. The results also confirm the "crowding out" impact of public saving on private saving but less proportionately, than in other comparable cases.

REFERENCES

Akhtar, S. (1986). "Saving-Income Relation in Urban Pakistan: Evidence from Household Income and Expenditure Survey (HIES) 1979. Pakistan", *Journal of Applied Economics*, vol. 5, No. 1, pp. 23-30.

Akhtar, S. (1987). "Dependency, Urbanization, Education and Household Saving: Some Preliminary Evidence from Pakistan", *Saving and Development*, vol. 11, No. 4, pp. 74-81.

Basalla, B. (1989). "The Effect of Interest Rate on Saving in Developing Countries" World Bank Working Paper, No. 56. Washington, D.C.

Bisat A., Mohammad A., EL-Erain. (1997). "Growth, Saving and Investment in Arab Economies", IMF Working Paper, pp. 33. Washington, D.C.

Buney, N.A. and A.H. Khan, (1992). "Socio-Economic Characteristic and Household Saving: An Analysis of Household Saving Behavior in Pakistan", *The Pakistan Development Review*, vol. 31, No. 1, pp. 23-30.

Dickey, D.A. and W.A. Fuller, (1981). "Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root", *Econometrica*, vol. 49, pp. 1057-1072.

Edwards, S. (1996). "Why are Latin America's savings rates so low? An international comparative analysis ", *Journal of Developing Economics*, vol. 51, pp. 5-44.

Engle, R.F. III and Granger C.W.J. (1987). "Cointegration and Error Correction: Representation, Estimation and Testing", *Econometrica*, vol. 55, pp. 251-276.

Granger, C.W.J. (1986). "Developments in the study of cointegrated economics variables", *Oxford Bulletin of Economics and Statistics*, vol. 48, 213-28.

Fry, Maxwell J. (1988). "Money, Interest and Banking in Economic Development.Baltimore, Md*",* The Johns Hopkins University Press.

Fry, Maxwell J. (1980). "Saving, Investment, Growth and the Cost of Financial Repression", *World Development*, vol. 8, No. 4, pp. 317-327.

Fry, Maxwell J. and Andrew Mason (1982). "The Variable Rate of Growth Effect in the life –Cycle Saving Model: Children, Capital Inflows, Interest and Growth in a New Specification of the Life-Cycle Model Applied to Seven Asian Developing Countries", *Economic Inquiry*, vol. 20, pp. 426-442.

Government of Pakistan, Ministry of Finance, *Economic Survey* (annual issue 1983-2003).

Horioka, Charles Y. (1997). "A Cointegration Analysis of the Impact of the Age Structure of the Population on Household Saving Rate in Japan", *Review of Economic and Statistics*, vol. 79, No. 3, pp. 511-516.

Hendry, D.F. (1995). "Dynamic Econometrics", *(London: Oxford University Press)*.

Johansen, S. and Juselius, K. (1990). "Maximum Likelihood Estimation and Inference on Cointegration with Applications the Demand for Money", *Oxford Bulletin of Economics and Statistics*, vol. 52, No. 2, pp. 169-210.

Johansen, S. (1988). "Statistical Analysis of Cointegrating Vectors", *Journal of Economic Dynamic and Control*, vol. 12, pp. 231-254.

Kelly, Allen C. (1976). "Saving, Demographic Changes and Economic Development", *Economic Development and Cultural Change*, vol. 24, pp. 683-693.

Kelly, Allen C. (1988). "Population Pressure, Saving, and Investment in Third World"*, Economic Development and Cultural Change*.

Kim, Young Chul and Zang, H. (1997). "Dependency Burden and Saving: A New Approach to the Old Query", *the Journal of Development Area*, vol. 32, pp. 29-32.

Khan, A.H. Hassan, L. and Malik, A. (1992). "Dependency Ratio, Foreign Capital Inflows and Rate of Saving in Pakistan", *The Pakistan Development Review*, vol. 31, No. 4, pp. 843-856.

Leff, N.H. (1969). "Dependency Rates and Saving Rates", *American Economic Review*, vol. 59, No. 5, pp. 889-896.

Liu, L.Y. & Woo W.T. (1994). "Saving Behavior Under Imperfect Capital Markets and the Current Account Consequences", *The Economic Journal*, vol. 104, pp. 512-527.

Mason Andrew (1981). "An Extension of the Life-Cycle Model and its Application to Population Growth and Aggregate Saving", Honolulu East-West Center.

Kelly, Allen C. (1973). "Population Growth, Dependency Rate and Pace of Development", *Population Studies*, vol. 27, pp. 407-420.

Modigliani, Franco (1970). "The Life Cycle Hypothesis of Saving and Intercountry Difference in the Saving Ratio" *in Induction, Growth Band Trade: Essay in Honour of Sir Harrod*, W.A. Eltis, M.F.G. Scott, and J.N. Wolfe ed., London: *Oxford University Press*, pp.197-225.

Modigliani, Franco (1993). "Recent Declines in Saving Rate: A Life Cycle Perspective' in *World Saving, Prosperity and Growth*, M. Baldassarri, L. Paganetto and E.S. Phelps, eds., London: Macmillan, pp. 249-286.

Osterwald-Lenum, M. (1992). "A Note with Quantiles of the Asymptotic Distribution of the Maximum Likelihood Cointegration Rank Test Statistics", *Oxford Bulletin of Economics and Statistics*, vol. 54, pp. 461-471.

Prema-Chandra, Athukorala and Pnag-Long Tsai (2003). "Determinants of Household Saving in Taiwan: Growth, Demography and Public Policy", *The Journal of Development Studies*, vol. 39, No. 5, pp. 65-88.

Schmidt-Hebbel, K. (1996). "Saving and Investment: Paradigms, puzzles, Policies", *The World Bank Research Observer 11,* Washington, D.C.

Shintani, Mototsugu (1994). "Cointegration and Tests of the Permanent Income Hypothesis: Japanese Evidence and International Comparison"*, Journal of the Japanese and International Economies*, vol. 8, pp. 144-172.

Schwarz, G. (1978). Estimating the dimension of a model. Annals of Statistics, vol. 6, pp. 461-464.

Sinha, D. (1999). "Saving and Economic Growth in Sri Lanka", Indian Journal of Applied Economics, vol. 8, pp.163-74.

State Bank of Pakistan, State Bank Annual Reports (1980-2003).

Thornton, John (2001). "Age Structure and Personal Saving in the United States, 1956-1995", *Southern Economic Journal*, vol. 68, No. 1, pp. 166-170.

World Bank (2005). *World Development Indicators 2005*, CD-ROM.