Bank Deposits and Inflation Expectations

by

Ms. Michelle Doyle
Economist
Research Department
Central Bank of Barbados

Presented at the Annual Review Seminar, Research Department,
Central Bank of Barbados
July 28-31, 1998

Abstract

Generally, the body of literature on savings behaviour concentrates on national savings or financial savings. This paper investigates the behavioural influences on domestic deposits in the banking sector of Barbados, using different inflation expectations schemes. As a small economy, with some restrictions to capital mobility coupled with an under-developed capital market, economic activity tends to be heavily financed by the banking sector. This critical role of the banking sector presents relevant liquidity considerations with respect to capital available to fuel economic growth. By virtue, if significant shifts in deposits are to be anticipated and deposit movement made more transparent, a better appreciation of what influences domestic bank deposits must be developed.

INTRODUCTION

Savings is the core resource for investment and economic activity. In the Caribbean, individuals tend to hold their savings in the form of claims on financial institutions and are hesitant to directly invest in government paper or corporations, [Hope(1993)]. This has partly contributed to capital markets that are relatively thin and underdeveloped. While bank deposits have remained sizable, boosting the lending potential of commercial banks. The dominance of bank deposits as a source of capital has been further promoted by a contraction in foreign capital inflows as a means of capital accumulation [Watson (1991)], relative to growth in economic activity. The corollary to these conditions, is that bank deposits are one primary source of financing for broad based economic activity. This intricate link imposes the need to investigate what influences bank deposits. Arising liquidity considerations relate to the consistency of the availability of capital in fuelling economic growth and anticipating large unexpected shifts in deposits.

Many studies focus on the influences of the size and composition of savings, [McKinnon(1973) and Khan(1993)]. With the exception of [Romer (1985)] and a few others, little has been performed primarily on savings in the banking system. This study adopts a simple approach by concentrating solely on what influences the supply of deposit savings by the private sector in a pure banking system. Issues such as deposit insurance, regulation on bank's portfolio and other features of the banking system are ignored.

Discussion in the literature on the effect of inflation expectations on the savings behaviour of household is minimal. By adopting this focus, the study is distinguished from simular work by [Boamah and Holder (1991) and Craigwell and Rock(1990)]. The remainder of this study is laid out as follows; Section I addresses some relevant empirical issues. Section II, details the structure and stylized facts about the banking system and the Barbadian economy. Section III presents the methodology and results, to conclude with Section VI.

RELEVANT EMPIRICAL ISSUES

There is little empirical research that deals primarily with the relationship between bank deposits and its determinants. However, there is some consensus about influences on savings behaviour. It is accepted that activity variables such as income growth and per capita income would have strong influences on savings accumulation and by extension bank deposits [Watson (1991)]. Lipsey (1989) outlines Keynes assumption on the shortsightedness of households; beyond the breakeven level of income (at which all income is consumed), even transitory increases in aggregate income will generate a rise in savings. Fry (1980) posits that savings is not only influenced by income but also by income growth. Tobin (1967) suggests that perceived future income growth may encourage greater consumption today while adjusting the rate of savings downwards. Ogaki, Ostry and Reinhart (1994) suggest that the relation between savings and per capita income is bell-shaped. At subsistence levels of income, the potential to save is minimal, however, a rise in per capita may lead to greater savings. For rich countries where investment opportunities are relatively higher, savings are likely to decline as per capita rises.

Under the more conventional life-cycle theory, savings behaviour is dependent on the stage of one's lifetime income stream. Agents work and save during the first period of their lives and then retire and dis-save in the second period. Ultimately the overall rate of saving in the economy depends, inter alia, on the proportion of workers to retirees. For this reason, the age structure of the population is expected to be another determinant of savings, Masson et al (1995)[1]. Leff (1980) found a significant inverse relationship between dependency rates and savings rates in LDC's. Craigwell and Rock 1990, found a positive and significant impact of dependency rates on the savings rate of Trinidad and Tobago.

One relevant motive for capital accumulation is for precautionary purposes under price or real income uncertainty, Ghosh and Ostry (1992). Skinner (1988) found precautionary savings

[1]Meredith (1995) found the life-cycle model to hold in Japan. Simulations in this study indicate that the savings rate is likely to consistently decline in the future, as the portion of elderly population rises.

to account for 56% of total life cycle savings. Romer (1985) assumes that bank deposits enter the utility function of households, to find that the impact of interest rate on inflation is indeterminate; with the plausible outcome being that inflation lowers real interest rates. Since banks must hold reserves, increased inflation raises the inflation tax on banks (reduces the real rate of return on banks' reserves of currency) and may result in banks lowering the real deposit rate. The public's response to a lower real rate os return may be to draw down on deposits, since under the substitution effect future consumption is viewed as more expensive than current consumption. Alternatively, in assuming an intertemporal income effect, deposits may be increased to purchase a given amount of future consumption, Wood (1991).

There is little consensus in the literature, on the relation between interest rates and savings. The McKinnon-Shaw hypothesis is well-know for its support of the positive responsiveness of savings to interest rate changes. Giovanni (1985) concludes that there is only a negligible response of aggregate savings to changes in the real interest rate for developing countries. Rossi (1988) also found this to be true in low-income countries that are characterised by pervasive liquidity constraints, whereby income growth induces increased consumption, instead of a response in interest rates[2].

Current inflation theories suggest that the magnitude of real stimulus resulting from inflation will be larger the less this inflation was previously anticipated. Expected inflation constitutes the difference between nominal and real interest rates. The Fisher Effect[3] postulates a point-to-point relationship between nominal interest rates and expected inflation - ceteris paribus ex ante real rates will be unaffected, Peng (1995)[4]. Typically, if people underestimate future inflation the nominal interest rate is likely to be relatively low, to result in an ex-post negative real interest rate. Tanzi (1976) noted that when interest income is taxed, nominal interest rates should rise by more that expected inflation.

Given that real interest rates are used to derive allocative savings and investment decisions, while a nominal rate reflects the opportunity cost of holding wealth in the form of money - expected inflation will enter into the determination of various macroeconomic aggregates, [McCallum (1987)]. It is reasonable that *"even in an economy where the real rate of interest is invariant to expected inflation, the nominal rate - and thus the quantity of real money balances held-will be influenced by these expectations"* (McCallum 1987).

It is acceptable that economic agents do not possess complete information about market prices and can not distinguish between change in relative prices and absolute prices. The misinterpretation of unanticipated inflation as a change in relative prices could lead to a reduction in aggregate consumption and hence savings, [Khan (1993)]. Wicksell (1965), advances the possibility that interest rate rules or policy may lead to indeterminancy of the price level under rational expectations. This is not adequately confirmed, given that generally there is little empirical evidence available for developing countries on anticipated inflation and its effect on savings, Khan (1993).

Other potential determinants of savings is the labour market constraint, since this may influence persons ability to save, (Wood 1995). Boamah and Holder (1991) state that as the purchasing power of exports grows, it will lead to increases in profit and rent (more so than wages), since savings from the former is greater, then savings should increase.
From the above discussion, it can be posited that bank deposits may be influenced by income growth, per capita income, the number of employed persons, population dependency, expected inflation, the real rate of return export growth and tax on interest earnings.

[2]For further evidence on the low sensitivity on savings to interest rates in developing countries see De Gregrio (1993) and Schmidt-Hebbel et al (1992). Also of interest are Deaton (1989) and Masson et al (1995).

[3] The *Classical Fisher Hypothesis* states that in an economy with out taxes, the demand for and supply of lending is determined by the equilibrium real rate of interest. Thereby, the nominal interest rate will contain an inflation premium sufficient to compensate lenders for the expected loss of purchasing power associated with inflation.

[4]If these movements are to take place quickly, actual inflation must be fully incorporated into inflation expectations, Peng (1995).

STYLIZED FACTS AND RECENT TRENDS

The most commonly held financial asset in Barbados are bank deposits. Individuals tend to be hesitant about directly investing in government paper or corporations and prefer to hold their savings in the form of claims on financial institutions [Hope(1993)]. This has partly contributed to the capital market of Barbados being relatively thin and underdeveloped. In turn, sizable deposit balances have boosted the lending potential of commercial banks. The dominance of bank deposits as a source of capital has been further promoted by a contraction in foreign capital inflows as a means of capital accumulation[5]. The corollary to these conditions, is that bank deposits are one primary source of financing for broad based economic activity.

Chart 1. The Ratio of Domestic Deposits to GDP

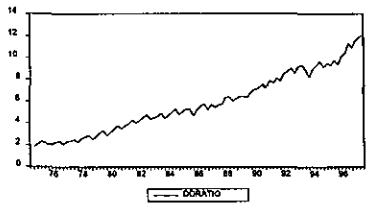
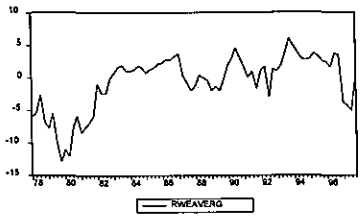


Chart 1. shows that over the last two decades there has been a steady upward trend in the ratio of bank deposits to GDP in Barbados. Nominal interest rates move relatively seldom, since the minimum return on deposits is determined by the Central Bank of Barbados and there is marginal competition between commercial banks. Chart 2 shows the real interest rate, which has been mostly negative. As in Watson (1995) these artificially low interest rates can be accepted as an indication of financial repression, (under the McKinnon Shaw terminology) which can lower rate of growth. Excess liquidity in the banking system (calculated as the ratio of domestic deposits to excess holdings of cash reserves and securities), has been steadily rising.

[5]As a small territory now venturing into the realm of liberalisation, Barbados continues to maintain restrictions on the cross border movement of capital [Doyle(1997)].

Chart 2. The Real Weighted Average Deposit Rate(%)



Preliminary indications show that domestic deposits tend to respond to anticipated changes in prices. At the beginning of 1997 the indirect tax system in Barbados was restructured and a Value Added Tax system implemented. This created some degree of price uncertainty and heightened expected inflation. This caused agents to increase precautionary savings which resulted in a surge in bank deposits in the latter half of 1996 and into 1997. This occurrence was further exasperated by the postponement of Government's budgetary statement for the year. This outcome is counter to the conventional expectation of holding less wealth in the form of real money balances, to forestall the erosion of value caused by inflation. However, this may solely a result of the inadequacy of the financial system in providing alternative financial assets.

MODEL SPECIFICATION AND DATA

The empirical long-run model to be tested can be specified as;

$$lndd_t = \alpha_0 + \alpha_1 lny_t + \alpha_2 r_t + \alpha_3 lnemp_t + \alpha_4 lndep_t + \alpha_5 lnexp_t + \alpha_6 lnpercap_t + \alpha_7 lntax_t + \alpha_8 inf^e_t$$

where α_i represents the long run coefficients, (y_t) is the growth rate of income, (r_t) the real weighted average rate of return, $(lnemp_t)$ the number of persons employed, $(lndep_t)$ the dependency ratio of the population, $(lnexp_t)$ the growth rate of goods exports, $(lnpercap_t)$ the per capita income rate, $(lntax_t)$ the tax rate on interest income and (inf^e_t) the expected inflation rate.

From a macro perspective, private sector deposit holdings are subject to fluctuations in government deposits, as government's policy and expenditure changes affect the private sector. For this reason, deposits are disaggregated into public sector deposits and private sector deposits to prevent the former from masking the influences on private savings, Boamah and Holder (1991). Quarterly data on total domestic deposits, the consumer price index (re-based to 1994) and the number of persons employed were taken from the Economic Financial Statistics of the Central Bank of Barbados. Since a quarterly income growth rate is not officially produced for Barbados, this series was adopted from work by Lewis **(1997). As in Watson and Ramlogan (1991), the rate of return on bank deposits used is the quarterly weighted average deposit rate.

Following Khan (1993), to determine the sensitivity of the results to alternative expectations schemes, three measures of unobservable inflation expectations are derived; perfect foresight, static expectation and adaptive expectations. Adaptive expectations makes the period's change in the expectation variable proportional to the most recent expectational error. As in Watson and Ramlogan (1991) the following adaptive expectation model is adopted:

$$\pi_t = \lambda p_t + (1-\lambda)\pi_{t-1} \qquad 0<\lambda<1 \text{.....(1)}$$

where π_t represents the expected annual rate of inflation at time, p is the actual rate of inflation based on the retail price index and λ the coefficient of expectation. A set of series where generated using a grid of values for $(0<\lambda<1)$. As in Watson and Ramlogan (1991), the value of (λ) which generated the highest R^2, (ie. λ=0.74) was retained. The other two expectation schemes are special cases of the adaptive expectations model. For example, if λ =1, equation 1 reduces to the case of perfect foresight.

RESULTS

Ordinary Least Squares estimation is used to generate the coefficients for the cointegration regression. The variables which are significant carry the a priori expected signs. The negative but significant interest rate coefficient indicates the rejection of the McKinnon-Shaw hypothesis. This indicates that interest rate sensitivity may not be the most direct means to savings mobilisation.

$$\begin{array}{l} \text{lndd} = 17.7 - 0.01\ r - 0.90\text{lndep} + 0.22\text{lnpercap} \\ \qquad (6.02)\ (-2..17) \qquad (1.96) \qquad (3.83) \end{array}$$

$\bar{R}^2 = 0.97$ **DW = 1.89**

As in Fry (1988), it was found that the real deposit rate had virtually the same impact on bank deposits, whether or not actual or expected inflation estimates are used. Some studies, such as Hayashi et al (1988), have cast doubt on the life-cycle model, by finding only limited support for the model's dissaving behaviour of elderly. However, in the current study this variable exhibits the strongest inverse influence on deposits (in the long run). All the inflation expectation series employed were insignificant in explaining the variation in bank deposits.

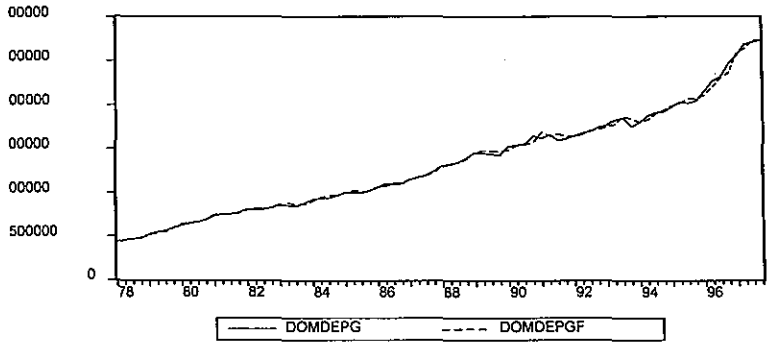
Results on the temporal properties of the variables are listed in the Appendix. The Augmented Dickey Fuller and Phillips Perron tests show that all variables with the exception of inflation are I(1). Stationarity in the residuals of the cointegrating regression at the 5% level confirmed that the variables are cointegrated. The ECM, which nests the long run and short run dynamics of the variables is estimated using a lag structure of four since the data is quarterly.

$$\begin{array}{l} \text{Dlndd} = 0.02 - 0.01\text{Dr} - 0.03\text{Dr}(-4) + 0.24\text{Dlnpercap}(-4) - 0.87\text{ECM}(-1) \\ \qquad (7.77)\ (-2..31) \qquad (-2..96) \qquad (4.73) \qquad (3.53) \end{array}$$

$\bar{R}^2 = 0.72$ **DW = 1.98**

The results of this study are simular to that of Ramsaran (1988) by showing that the activity variable per capita income has a strong influence on the accumulation of bank deposits. Consistent with other savings studies on Barbados the interest rate variables for the current period and one year earlier were found to negatively effect savings. The standard diagnostic tests performed generated favourable results to indicate that the model is adequately specified. The residuals appear normal and homoscedastic. From the Cusum plots the parameters also appear stable, (see Appendix). The ECM of (-0.87) indicates a relatively fast speed of adjustment for the long-run equilibrium relationship.

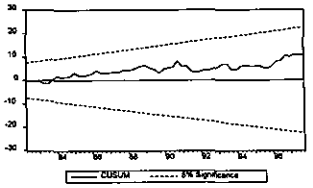
The forecasted bank deposit series using the regression relationship fits the actual data relatively well. The Theil inequality coefficient, as well as the bias and variance of this forecast, indicate its robustness.



CONCLUSION

The responsiveness of bank deposit accumulation to interest rate changes indicates that Barbados would not benefit from a more active interest rate policy. The negative influence of the dependency ration in the long-run highlights that through time deposit accumulation could be depressed by the growth in population dependents (i.e. those under 15 years and over 65 years of age.

Appendix 1.



TEST FOR UNIT ROOTS: 1975 - 1997

SERIES	AUGMENTED DICKEY FULLER		PHILLIPS PERRON	
	WITHOUT TREND	WITH TREND	WITHOUT TREND	WITH TREND
DOM DEP	3.0589	1.039135	3.5039	1.05522
D(DD)*	-4.1097	-4.8976	-7.8621	-8.6589
Employ	-1.4480	-2.4757	-1.3555	-2.7092
D(Employ)	-7.0292	-6.9881	-	-11.7169
Adainf	-5.9190	-5.9525	-4.4808	-4.6095
D(Adaiy)	-5.2373	-5.1583	-12.9095	-13.0616
POP	-1.8885	-0.9843	-1.7158	-1.2219
D(POP)	-6.9532	-7.3817	-10.8506	-11.1290
rr	-6.0181	-6.3236	-4.4912	-4.9401
D(rr)	-5.7664	-5.5515	-13.4653	-13.5735
Tax	-0.5562	-2.0041	-0.5678	-2.0546
D(tax)	-5.4423	-5.4780	-95095	-9.5163
ggDP	-2.4921	-2.4741	-2.5031	-2.4909
D(ggDP)	-4.2727	-4.2421	-8.1541	-8.1058
PerCap	-0.6679	-1.4200	-0.5490	-1.6318
D(Percap)	-7.7716	-7.7459	-11.4814	-11.4230
NewInf	-5.5272	-5.2762	-12.9255	-13.0304
D)NewInf	-7.1781	-7.2507	-29.2718	-28.9532
Expinf	-3.1250	-4.1607	-3.9520	-4.1846
D(	-7.3763	-7.2096	-4.8436	-4.8425
MacKinnon 5% Critical	-2.8939	-2.8932	-2.8936	-3.4597
Value 10%	-2.5838	-2.5834	-2.5836	-3.1557

*Display a trend in series

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