Public Debt and Asset Preferences

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I. Introduction

The public debt, its size, funding and maturity have long been of concern to economists, policy makers and laymen alike. Even during those years of yore when demand management with its emphasis of flow variables commanded our respect, the discussion about the management of the national debt did not entirely fall into oblivion. In recent years, the size of the national debt and, to a lesser extent, its maturity composition have reemerged as controversial policy issues. Many governments in the West attempt to contain, with varying degrees of success, public indebtedness and all regard the conquest of this difficult task as a panacea to achieve lower interest rates. The maturity composition of the public debt may pose another conundrum for monetary policy. Unless budget deficits can be financed by issuing long-term government securities, it is feared that sizable amounts of short-term or "floating" debt might interfere with the appropriate conduct of monetary policy. One of the most pronounced warnings in this regard was expressed by *Henry Simons* (1944) who made the then and now radically sounding proposal that the authorities should only issue two types of debt, money and long-term bonds, lest the unique features of money be destroyed. They should, in other words, abstain from blurring the sharp distinction between money and relatively illiquid long-term securities. This would occur when a motley array of short and medium-term securities were created.

In view of the considerable difficulties many countries have in containing budget deficits, in financing them and in refinancing maturing debt with anything else than very short-term securities, surprisingly scant attention has been paid in more recent years to issues relating to the public debt and debt management. This study attempts to shed some light on the question of the relative size of the public debt and its main determinants and it investigates some of the implications of a changing maturity structure of the public debt for monetary policy and financial flows. In the next section (II) we discuss definitional issues and aspects of the importance of the public debt in

the economy. Then (III) we analyse the maturity structure of the public debt. This is followed (IV) by an analysis of the relationship between short-term and long-term debt and other financial assets. Subsequently (V) we estimate the impact of a shortening of the debt maturity on the demand for liquid assets and interpret the results as maturity crowding in. Finally (VI) the findings are summarized and the conclusions of the study are presented.

II. The Size of the Public Debt – Some Aspects of its Importance

1. Definitional Issues

For the purpose of this study we define the term public debt as the volume of certain government and semi-government securities on issue redeemable in Australian dollars. These include Treasury bonds and bills, special bonds, Australian savings bonds and their respectively associated inscribed stocks, furthermore Treasury notes as well as miscellaneous securities such as drought bonds, but income equalization deposits are excluded. This definition differs from the Treasury's concept of "Government Securities on Issue"[1] in that it excludes securities repayable in overseas currencies, that is, Australia's foreign debt.

The inclusion of Treasury bills in the national debt raises some thorny issues. Public Treasury bills create, and internal bills transfer, funds between Government agencies. Internal Treasury bills are issued as security for the investment of the Commonwealth Trust Fund and mature on 30 June of the year of issue. Public Treasury bills, their name notwithstanding, are not issued to the public but exclusively to the Reserve Bank for periods of not more than three months. Both securities carry an interest rate of one percent and the latter may be regarded as providing an overdraft facility for the Treasury with the Reserve Bank. Ordinarily they are issued to bridge the gap between the timing of tax receipts and Government expenditures and thus are short-lived in nature. They are repaid when tax-revenues have been collected or proceeds from the sale of notes and bonds are received. Whether or not bills for such purposes are outstanding at a particular date depends on the timing of receipts and expenditures. However, as roll-over possibilities for bills exist, they have at times been used for deficit-financing

[1] A booklet "Government Securities on Issue" is published annually as part of the budget papers. It lists all public securities which have been issued by the Commonwealth and State Governments and remained on issue at a certain date. Debt statistics of local and semi-government authorities and data on debt of instrumentalities that is guaranteed by Government are contained in the Reserve Bank Bulletin.

purposes. To the extent that they are used in this way without adding to inflation, bills should be regarded as part of the public debt. The sale of Treasury bills by the Government to the Reserve Bank, provided the receipts are spent and not used to replenish Treasury deposits there, raises base money immediately and eventually the money supply. Bill financing of Government expenditures is then tantamount to the printing of money. It may be legitimately included in the public debt as a non-interest-bearing component, provided the money creation does not cause prices to rise. Inflationary finance which is associated with the creation of public debt, on the other hand, is essentially equal to taxation. In this case bills cannot be regarded as adding to the public debt although nominally they increase it. As debt outstanding is a stock variable, its value thus being calculated at a point in time, it would be impossible to distinguish between bills that are issued as a temporary financing device and those that are created to either satisfy the demand for money or tax through inflation. For this reason bills have been included in the public debt.

The arbitary element in this procedure is attenuated by the Government's policy strategy of controlling monetary aggregates as this strictly limits the scope for resorting to inflationary means of deficit-financing. However, one might ask whether the creation of base money in this case which is neither inflationary nor interest-bearing, contributes in any meaningful way to the public debt although formally it constitutes a liability of the Government. It can be shown, however, that under quite acceptable assumptions there is no difference in principle between the financing of a deficit through printing of money or the sale of bonds. First, in the absence of distributional effects, the taxes levied to service interest-bearing debt are exactly offset by the interest payments to the public so that for the economy as a whole one presumed difference between the two financing methods disappears. Secondly, under both financing methods real resources are transferred to the Government when the deficit arises. Thirdly, whether or not money or debt-financing imposes a burden on future generations depends on the social productivity of Government projects which gave rise to the debt. If the return from such a project "pays for itself" any burden can only stem from distributional effects when taxes are levied to pay for the interest and the repayment of the principal. Provided, of course, the debt is ever redeemed. It is highly unlikely that non-interest-bearing debt will be repaid.

The foregoing arguments appear to support the views, first, that under certain conditions there is essentially no difference between noninterest (base money) and interest-bearing (notes and bonds) public debt, secondly, that the stock of bills (which results in the creation of money) and interest-

bearing debt are a permanent feature of our financial system. They should therefore be counted as debt.

A definition of the public debt broader than the one used here would have to embrace the present values of all future Government liabilities, regardless of whether they are evidenced by financial securities or not. For example, the promise to pay old age pensions falls into the category of a debt-component not documented by any financial claim. Although such a claim is neither tangible nor fungible, it represents a clearly defined current or future commitment of the Government and as such it forms part of people's wealth and determines, inter alia, their consumption and accumulation decisions. The unavailability of data covering this aspect of the public debt seriously impedes statistical, econometric or any other type of empirical work in this area. For instance, it is highly doubtful whether the demand of the private sector for the stock of government securities could be satisfactorily explained without including these claims against the government in the estimation approach. The reason being that government bonds and social security entitlements are likely to be substitutes in individuals' portfolios.

2. *Relative Size of the Public Debt*

The accompanying Table 1 contains annual data regarding the amount of Commonwealth Government as well as local and semi-government securities on issue for the years 1965 to 1983 Total (1) includes and total (1′) excludes Treasury bills on issue. In order to furnish the reader with a rough idea as to whether the public debt has expanded slowly or excessively, a ratio total public debt to GDP at current prices has been calculated. Although no criterion exists which favours a specific value of the ratio, it appears that public debt has become less of a burden for the economy as debt has grown at a lower rate than nominal GDP. Growth in nominal GDP does fulfil the useful purpose of a reference benchmark as the creation of financial assets is linked through the flow of funds to saving which equals investment which in turn determines the growth rate of the economy. Therefore, for the economy as a whole the growth rate of financial assets, roughly speaking, equals the growth rate of GDP at current prices. The ratio of total public debt to GDP has fallen appreciably from 0.60 in 1965 to 0.36 in 1983. Taking a longer-term perspective the fall in this ratio is even more spectacular. Its values for 1910, 1920, 1930, 1935, 1940, 1945, 1950 are 28.7%, 72.7%, 82.3%, 110.1%, 93.7%, 150.1% and 96.7% respectively. It appears that the two World Wars and the Great Depression were primarily responsible for

Table 1

Public Debt and its Relative Importance

	Public Debt						
	Common-wealth Government Securities	Local and Semi-Government Securities	Totals (1)	(1')*	GDP at Current Prices (2)	(1) (2)	Public Debt Money (M3) (not correct for seasons)
	$m	$m	$m	$m	$m		
1965	8,695	3,417	12.112	11,304	20,323	0.60	1.17
1966	9,134	3,672	12,806	12,044	21,568	0.59	1.17
1967	9,677	3,976	13,653	12,883	23,744	0.58	1.16
1968	10,358	4,310	14,668	13,842	26,004	0.56	1.15
1969	10,815	4,679	15,494	14,621	28,941	0.54	1.11
1970	11,625	5,018	16,643	15,612	31,996	0.52	1.12
1971	11,946	5,425	17,371	16,331	35,940	0.48	1.10
1972	12,592	5,910	18,502	17,462	40,060	0.46	1.06
1973	13,479	6,485	19,964	18,938	47,214	0.42	0.91
1974	14,274	6,921	21,195	20,264	51,366	0.41	0.86
1975	16,587	7,636	24,223	23,213	61,773	0.39	0.85
1976	19,013	8,618	27,631	25,614	72,826	0.38	0.85
1977	21,420	10,154	31,574	28,783	83,165	0.38	0.87
1978	23,287	11,738	35,025	31,669	90,340	0.39	0.89
1979	25,752	13,733	39,485	35,815	102,163	0.39	0.90
1980	27,250	16,249	43,499	39,189	114,755	0.38	0.88
1981	27,820	19,071	46,891	43,835	130,813	0.36	0.85
1982	28,072	22,254	50,326	47,561	147,942	0.34	0.82
1983	32,053	25,437**	57,490**	56,278**	160,806	0.36**	0.83**

* Excludes Treasury Bills. — ** Estimates.
Source: RBA Bulletin December 1983.

the extraordinary high values which occurred during the first half of this century.[2]

The extent of the decline of the stock of public debt relative to GDP is not fully revealed by available data. Official statistics seriously overstate the amount of debt outstanding as they are based on face and not on present value of securities on issue.[3] These observations are obvious and have been

[2] Source of securities of all government authorities and gross domestic product at current prices for these earlier years is *Butlin* (1977).

[3] Special bonds provide the exception from this rule; they are included at their redemption value. Furthermore, for Australian Savings Bonds the face and market values are identical as ordinarily no secondary market exists for such securities.

made by others before. Both *Buchanan* (1958, pp. 196 f.) as well as *Boehm* and *Wade* (1971, p. 319) criticise the face-value method. The estimation technique employed by the authorities assigns the same weight to securities with the same face values regardless of their market prices. The upward trend in interest rates over the period of observation is responsible for this fall of the market values of the outstanding stock of debt.

Although economic theory[4] remains mute about the "correct" size of the public debt in relationship to GDP or other relevant economic variables, it appears to follow from the homogeneity assumption of asset demand[5] that portfolio investors expand (or contract), ceteris paribus, their asset holdings according to a scale variable such as permanent income or wealth. Provided observed national income approximates this variable, we would have expected a rise in the debt-to-income ratio, as the face-value of debt represents an inflated variable.

III. Maturity Structure of Public Debt

In recent years the maturity structure of the public debt has shortened rapidly, and it is interesting to inquire into the causes which give rise to this development. Obviously, when we discover that the underlying forces are still at work, public debt will tend to become more and more liquid. Several points are important in this context.

The average maturity for the period 1965 – the earliest date for which observations are available – to 1973 amounts to 118.3 months and the quarterly maturity values fluctuate between 106 and 128 months over the same period. From 1974 onwards maturity declined from an average value of 126 to an average of 54 months in 1983.

The observed changes in the maturity structure of the public debt are the outcome of past and current demand and supply decisions of the monetary authorities and portfolio investors. The passage of time reduces the maturity of the outstanding debt, provided we are not dealing with perpetuities. The decisions to supply and take up new securities of a certain maturity depend primarily on expected yields. However, according to the pure expectations theory long rates are an average of current and expected short term rates.

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[4] Fiscal theory discusses whether Governments should borrow rather that tax and retire rather than convert debt. See *Buchanan* (1958) for an account of the various arguments. With the advent of portfolio theory and the drifting into disrepute of anti-cyclical deficit spending, the emphasis of the debate appears to have shifted away from the area of fiscal theory into the realm of monetary policy.

[5] See *Brainard* and *Tobin* (1968).

The maturity of the bond should therefore be immaterial to the investor. This might be true during periods of moderate interest rate fluctuations, but this theory appears to break down or to be only applicable for shorter maturities during periods of rapid and significant interest rate changes. Tentative empirical evidence appears to support the view that increased interest rate volatility appears to heavily tax the forecasting ability of investors. The evidence suggests that during the 1960s and the beginning of the 1970s short and long-term interest rates on public debt did not exhibit a discernible trend, whereas from about 1973 onwards rates fluctuated strongly around a steep upward trend. The time profile of the maturity of the public debt follows a roughly similar pattern. It is probably no coincidence that the downward trend in maturity occurs at a time when interest showed an upward trend, although after the steep rise in rates in the second half of 1973 and the first half of 1974 the maturity of the public debt lenghtened at first. This happened because investors generally believed that interest rates had culminated. In order to take advantage of what were then considered to be very high interest rates by historical standards, investors bought long-term securities, especially those with a maturity of 10 and 20 years and ran down their holdings of notes and short-term bonds. As a consequence of the lenghtening of portfolios, the average maturity increased to 137 months in the second quarter of 1974 which incidentally, is the highest value on our record. The decline in interest rates which indeed followed, seemingly justified investors' decisions but the subsequent rises, again creating considerable capital losses for holders of Government securities, appear to have discredited the notion that historically high interest rates mark their turning points. Instead these are now often merely viewed as stepping stones to new peaks. Investors did not immediately revise their interest rate expectations upwards after the 1973/74 surge, but apparently did so only gradually as the Government's occasionally successful issue of long-term bonds afterwards shows. Given these circumstances it appears that investors only became slowly cognizant of the increased riskiness of investments in Government securities. Risk in this case reflects market risk which is due to interest rate volatility. To the extent that market yields contain an inflationary expectations premium, market risk also captures purchasing power risk. Risk may be measured by the variance of the rate of return on bond portfolios. For a given rise in interest rates, the capital loss on such securities varies directly with term to maturity. Therefore the risk premium in interest rises with term to maturity. Investors vacated the longer end of the bond market because to the majority of risk-averse investors, the risk-premium contained in long interest rates was not large enough to compensate them adequately for the higher risk they would incur.

IV. Maturity and Substitutability of Assets

Monetary policy actions typically change, on the margin, the economy's desired composition of its portfolios of assets where liabilities are included in this term as negative assets. The public debt constitutes part of these portfolios. The efficacy of monetary policy depends importantly on the degree of substitutability amongst assets. One characteristic of assets, determining their degree of substitutability, concerns term to maturity. Monetary policy and debt management may shorten or lengthen the maturity structure of the outstanding debt. Such maturity changes have similar effects on the portfolio compositions of investors, and, eventually, on the consumption and spending decisions of the economy.

1. Substitutability of Assets – Three Views

Linkages between the maturity structure of the public debt and asset demands are known to exist. One view regarding this relationship was suggested by *Keynes* (1936), *Patinkin* (1965) and *Leijonhuvfud* (1968) who assumed perfect substitutability between long-term government bonds and capital and lumped short-term debt together with money. When economic agents are indifferent between holding cash, various bank deposits and short-term government debt, an increase in the latter component of liquid assets must be offset, for a given desired volume of liquid assets, by a commensurate decrease in the two former components, in order not to disturb equilibrium in this market. A reduction in the average maturity of the public debt which pries away bonds from the long-term debt-capital category thus creates an imbalance in the money market which has its mirror-image in an excess demand for bonds. Consequently the long-term bond rate can be expected to fall, stimulating investment.

This categorization of assets has been criticized by *Tobin* (e.g. 1963) who regards long-term bonds and capital as imperfect substitutes and he is inclined, if not to include short-term debt outright in the stock of money, so to regard it as a close money-substitute. When in this case the proportion of short-term, at the expense of long-term, debt is increased, a negative excess demand for liquid assets is likewise created. This disequilibrium situation may result in a reduction in the interest rate on bonds and may lead to a decrease in the required rate of return on capital.[6] Of course, a monetarist

[6] Whereas in the *Keynes / Patinkin / Leijonhuvfud* case a shortening of the maturity structure of the public debt of the type described above always lowers the long-term bond rate, – the liquidity trap case aside –, the same result does not necessarily

interpretation would stress the inflationary potential of the imbalance in the money market.[7] If monetary policy does not take appropriate liquidity-reducing measures its stance becomes expansionary, either deliberately or by default.

When, on the other hand, long and short-term debt are perfect substitutes, the maturity composition of the outstanding government securities does not influence portfolio selection. Neither a shortening nor a lengthening of the average maturity does then alter the liquidity or the yield of the public debt. Provided this view is correct, the impact of debt management on the maturity structure might therefore safely be ignored by monetary policy.

2. *Maturity and Liquidity*

Whether and to what extent money, short-term and long-term debt are imperfect substitutes, or even complements, can only be properly assessed within the framework of a disaggregated model of a financial sector à la *Brainard / Tobin*'s Pitfalls Model. So long as such a system of demand-supply equations for groups of relatively homogeneous assets has not been specified and estimated, one is willy-nilly forced to fall back on estimates of demand functions for liquid assets in order to gauge the impact of the maturity structure of public debt on the liquidity status of the economy. Traditional analysis has emphasized the impact of a shortening maturity structure on the demand for money, assuming that money and short-term securities are close, but imperfect substitutes.[8] A shortening of the maturity structure increases the supply of short-term securities relative to those of long securities; consequently the prices of the former fall and their yields

occur in the *Tobin*-model. There the final outcome depends on whether monetary policy or debt management operations create a wealth effect or not. See *Tobin* (1969).

[7] "Since short-term debt is a closer substitute for money than long-term, the amount of money that would be consistent with price stability if long-term debt were sold would imply rising prices if the same amount of short-term debt were sold." (*Milton Friedman,* 1959, p. 60).

[8] The degree of substitutability amongst assets depends on those factors which distinguish one security from another in the view of investors. Many different features set securities apart, such as their legal status, tax features, marketability or term to maturity. However, as portfolio theory is dominated by the two-parameter risk-return model, it comes hardly as a surprise that different risk features have been related to asset substitutability. According to *Tobin*'s suggestion (1963, p. 162) securities are in general good substitutes if they share the same risk attributes. As far as short-term and long-term government securities are concerned, they are affected, given the investment horizon, to a varying extent by interest rate and purchasing power risk, as will be shown below. Thus both types of securities are less than perfect substitutes for each other.

rise. The fall in bond prices, and the associated capital losses are limited as the maturity date is shifted closer to the present. With near-money titles offering a more attractive rate of return, economic agents are induced to reduce their money balances and hold short-term securities instead. The demand for money falls. This sequence of events reflects the conventional wisdom, most explicitly stated by *Cagan* (1966, p. 624), "... the stimulus of the federal debt to aggregate demand – taking the federal budget as given – equals its contribution to total liquidity. That contribution is defined here by how much the federal debt reduces the public's demand for money balances". Somewhat surprisingly this widely and firmly held view has, to my knowledge, never been tested despite the fact that the demand function for money is one of the most extensively estimated relationships in economics.

However, other factors may provide a countervailing influence. If wealth holders have a given preference to hold short-term government and short-term private sector securities in a given balance and desire to expand their portfolios so as to leave these asset proportions in tact, it is conceivable that the demand for short-term assets of the private sector rises when the maturity of the public debt shortens. Under these circumstances private and public securities are complements rather than substitutes as is generally held. Moreover, when the authorities vacate the long end of the yield curve either by shortening the terms of new issues or replacing long-term with short-term securities during the process of rolling over outstanding debt, the private sector obtains greater scope to tap the market for long-term funds. Firms and corporations may then issue more equity capital, long-term debentures or other such securities while at the same time allowing them to finance expansions of the capital stock. Certain nonbank financial institutions may also benefit from the shortening of the public debt. They may find it easier to sell to the public such long-term assets as life policies, superannuation schemes and pension plans which otherwise would compete with long-term bonds for investors' funds. On the asset side these institutions hold a considerable amount of Government securities in their portfolios which tend to become more liquid as their average maturity shortens.

The substitution of private for Government long-term securities may be called maturity crowding-in. The vacuum created in the market for long-term funds by the authorities' preference for the short end of the market is filled by private borrowers. According to this hypothesis it appears that the public now holds a greater amount of long-term private-sector securities than they otherwise would have held had the Government not shortened the maturity of its debt.

A further step in the line of argumentation rests on the observation that public debt as a percentage of GDP and total wealth has fallen gradually and almost persistently over the years. If wealth holders have a given preference to hold short-term and long-term assets in a given balance and desire to expand their portfolio so as to leave these asset proportions intact, it is conceivable that they demand more liquid assets despite the fact that the average maturity of the public debt has been reduced and has left them more liquid than before. This occurs when the economy expands its holdings of long-term assets at a faster rate than the rate at which it substitutes money for short-term public debt as it becomes more and more liquid.

V. Debt Maturity and Asset Demand

In order to assess the impact of the shortening maturity structure of the public debt on the demand for liquid assets we include the average maturity of the outstanding interest-bearing public debt as an additional variable in asset demand functions of the *Brainard / Tobin* (1968) type. According to this approach asset demand is linear-homogeneous in wealth, implying the regression of the ratio of asset to wealth on a number of relevant variables.

Amongst the variables most likely to influence the decision to hold a proportion of total wealth in the form of very liquid assets are a vector of interest rates, possibly the lagged dependent variable if adjustment lags exist and a variable measuring the transactions demand for money such as income.

As a novel feature the average maturity of the outstanding interest-bearing public debt of the Federal Government has been included as an additional variable in the asset demand function in order to ascertain the impact of the shortening of the public debt on the holding of liquid balances. The weaknesses of this liquidity-measure of the public debt are well-known and have been pointed out by *Luckett* (1964, p. 153) and *Van Horne* and *Bowers* (1965, p. 527). Alternative liquidity measures, such as the grouping of the debt in maturity categories or the calculation of liquidity co-efficients as suggested by Van Horne and Bowers (1965, pp. 527 - 28), have been taken into consideraton, but rejected. The low turnover in the bond market especially on the long end, does not appear to promise an improvement over the average-maturity method. To boot, the calculation of liquidity coefficients is associated with a fair amount of subjectivity.[9]

[9] The adopted measure is not free from subjectivity either. Average maturity calculations hypothesize a linear relationship between maturity and liquidity, that is, they assume an identical liquidity differential between a one and a two-year bond as well as between a nineteen and a twenty-year bond.

The asset demand function has been estimated in the following form

$$(1) \qquad (A/W)_t = a_0 + a_1 AM_t + a_2 r_t + a_3 r_t^0 + a_4 (Y/W)_t + a_5 (A_{-1}/W)_t + e_t$$

The asset variable A consists of borrowings from the public by all financial institutions (banks and non-banks). This broad monetary aggregate includes $M3$, the conventionally defined volume of money, as well as the liabilities to the public of all financial institutions registered under the Financial Corporations Act. These include bulding societies, credit unions, money market corporations and the like. This financial aggregate consists predominantly of short-term assets which the public holds with these institutions and it is therefore ideally suited to test the crowding in hypothesis.

For the source of the wealth variable see *Helliwell* and *Boxall* (1978), updated figures are from the Reserve Bank. Data for the average maturity, AM are calculated by the Reserve Bank of Australia. The two-year bond rate r has been included to measure the opportunity costs of holding liquid assets. The own rate of interest, r^0, is the weighted average of the bank's interest-bearing deposits. The coefficients a_2 and a_3 are expected to be negative and positive, respectively. We follow a suggestion by *Tobin* (1969) and attempt to capture the transactions and the asset demands for money by including the ratio of income to wealth in the above equation. We expect the parameter a_4 to be positive. The lagged dependent variable has been included in one estimation equation in order to allow for less than instantaneous market clearing.

The estimation results are compiled in the accompanying table. Both the bond rate and the own rate have the expected sign and they are statistically significant at the five percent level with the exception of one coefficient. When income rises (falls) or wealth falls (rises) the economy holds a larger (smaller) proportion of its wealth in liquid form, and this relationship is highly statistically significant. The inclusion of the lagged dependent variable appears to introduce autocorrelation into the estimation equation. The negative and statistically significant (at the 5 percent level) coefficients of the average maturity of the public debt appears to run counter to the hypothesis that public and private short-term debt are close substitutes; in fact, the negative sign of the coefficients appears to suggest that they are complements. These results also lend credence to the hypothesis of maturity crowding in, according to which the private sector substitutes private for Government long-term securities in its portfolios. In order to eliminate the possibility that the negative relationship between the average maturity and the demand for liquid assets could be due to a spurious movement

between the maturity-shortening of the public debt and an increase in the liquidity preference of the public, we included a time trend in the estimation equations. This modification did not affect size or significance of the coefficient of the average maturity although it altered the importance of the ratio income to wealth. Since the broad monetary aggregate BP is only available since 1976 (4) and a shift in liquidity preference may only gradually develop over a number of years, we estimated the demand for narrowly defined money, $M1$ (currency plus demand deposits with banks) for the period 1970(1) to 1982(4). Again we obtained a negative and significant coefficient of the variable average maturity regardless of whether a time trend was included or not.

Determinants of the Ratio Liquid Assets to Wealth

Constant	Average Maturity AM	Interest Rates		$\frac{GDP}{W}$	$\frac{BP_{-1}}{W}$	R^{-2}	DW
		Bond Rate	Own Rate				
		Dependent Variable BP/W					
0.689 (5.9)	−0.098 (−5.04)	−0.071 (−3.41)	0.02 (1.80)	0.235 (2.98)	0.618 (9.61)	0.992	2.50
0.749 (3.83)	−0.002 (−3.86)	−0.105 (2.25)	0.086 (3.03)	.854 (7.10)		0.952	1.93

Estimation Period 1976 (4) to 1982 (4)
(All variables, except average maturity, are in logarithmic terms)
t-statistics in parentheses DW: Durbin-Watson Statistic

VI. Summary of Findings and Conclusions

Our discussion of some aspects of the relative importance of the Australian public debt and of the observed shortening of its maturity allows the following tentative conclusions.

(1) The view that the Australian public debt has increasingly become a burden for financial markets is most likely to be incorrect, at least it entails a gross exaggeration. Two observations support this notion. First, the method of adding up the face value of outstanding securities overstates significantly the size of the debt. The market value of the debt will generally lie below the face value when interest rates rise. Secondly, the

outstanding debt as a proportion of GDP has fallen almost continuously and appreciably over the period of observation.

(2) Although economic theory remains mute about the "correct" size of the public debt in relationship to GDP or other relevant economic variables, it appears to follow from the homogeneity assumption of asset demand that portfolio investors expand (or contract), ceteris paribus, their asset holdings according to a scale variable such as permanent income. Provided, observed GDP approximates this scale variable, we would have expected a rise in the debt-to-income ratio as measured debt (face value) is an inflated variable while we observe a continual fall in this ratio.

(3) Traditional analysis conjectured that short-term debt of the public and the private sectors are substitutes, and it neglected to analyse the impact of a shortening of the public debt on the total portfolio of private investors. The inclusion of a variable measuring the maturity structure in the demand function for liquid assets of the private sector appears to suggest that a shortening of the term of the outstanding debt raises the demand for such liquid assets.

(4) Two implications emerge from this finding for monetary policy. The shortening of the public debt appears to have left long-term funds for investment purposes of the private sector. No doubt, the government could only have commanded a larger share of the pool of long-term loanable funds at the price of significantly higher interest rates. The results also indicate that the shortening of the public debt does not appear to create an overabundance of liquidity which could make the policy stance associated with an announced target rate of the money supply more expansionary than is intended.

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