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1. INTRODUCTION

THE BASIC PREMISE of this paper is that household sector net capital gains are an important omitted variable in most consumption and saving studies. Its major contribution is the empirical finding of the significant effects of capital gains on personal saving that have eluded previous investigators. These striking results can be attributed to three innovations incorporated in this study: (1) the use of a new detailed net capital gains data base carefully constructed by Robert Eisner; (2) the separation of total net capital gains into components by groups of assets; and (3) the division of each of those components into expected and unexpected elements.

Four components of total net capital gains are found to play an extremely important role in accounting for the recent fluctuations in personal saving: (1) expected net capital gains on owner-occupied housing, land, nonprofit fixed capital, and noncorporate equity; (2) expected net capital gains on consumer durable goods; (3) expected net capital gains on the net financial assets of the household sector; and (4) unexpected net capital gains on net financial assets. While it appears that the omission of net capital gains effects before the mid-1960s is not critical, the capital

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gains proxies developed in this study play an extremely important role in explaining the recent volatility of personal saving.

2. BACKGROUND

Interest in saving behavior has been heightened by the volatile fluctuations in personal saving in recent years. Most of the work in this area consists of attempts to explain what has been considered a surprisingly high saving rate through the first half of the 1970s with some behavioral interpretation of the inflation-saving linkage (e.g., money illusion [12]; interest rate [7]; uncertainty [21, 22, 23, 39]; data measurement distortion [33]). Based on studies such as these, it seemed clear by the mid-1970s that the historically high inflation rates were in some manner the primary determinant of the historically high personal saving rates, even if the exact underlying mechanism remained in doubt. However, the personal saving rate dropped sharply in 1976 and continued to decline even as the inflation rate rose from its 1976 level. The fact that both the abnormally low personal saving rates at the end of the decade and the earlier high saving rates have been accompanied by historically high rates of inflation has cast doubt on explanations of recent personal saving behavior that rely on any simple relationship between inflation and personal saving. Furthermore, a sharp dip in saving in 1972 in the midst of the earlier period of high saving rates presents an additional puzzle.

While there appears to be a role for capital gains in a number of theories of consumption and saving (e.g., see Keynes [19, p. 93]; Friedman [17, p. 194; 18, p. 116]), empirical studies have generally tended to exclude them,[1] although at times one finds some concern expressed over the omission.[2] The few empirical studies that have explicitly considered capital gains effects fall into two categories: (1) those that attempt to proxy capital gains effects indirectly (e.g., by using changes in an index of share prices [8], or, more commonly, by including corporate retained earnings in their income measure [7, 10, 11, 34]); and (2) those that include direct measures of capital gains (e.g., [2, 6, 15, 16]). It would appear that the use of direct measures of capital gains might dominate indirect measures and make the estimated coefficients much easier to interpret since it is not clear exactly how large a capital gain will result from an additional dollar of retained earnings. However, the few empirical studies that have incorporated direct capital gains measures have found little or no support for significant effects on saving or consumption. These disappointing empirical results may be related to the use of flawed measures of net capital

[1]However, empirical investigations based on the life cycle hypothesis (Modigliani and Brumberg [28], Ando and Modigliani [1]) that relate consumption and saving to the stock of household nonhuman wealth implicitly include past net capital gains since the current stock of wealth is composed of past accrued capital gains as well as past saving and beginning lifetime wealth.

[2]Houthakker and Taylor [20, p. 287] express the typical attitude of most empirical investigators toward capital gains: "Capital gains and losses do not appear in the national accounts at all; in principle they may influence consumption and saving, but in practice their influence is hard to detect, and we shall leave them out of the present analysis."

gains, improperly specified equations, and the fact that little attention has been focused on a careful integration of net capital gains into a behavioral analysis (see McElroy and Poindexter [25] for a detailed critique of Bhatia [6]).

3. THE MODEL

The proposed model is similar to that of Arena [2]. The basic hypothesis is that the planned change in wealth arises from the attempt by individuals to bring their actual real wealth into line with their desired real wealth through a partial adjustment mechanism. The planned change in nonhuman wealth will be

$$(DW)_t^* = \lambda_1(W_t^d - W_{t-1}), \tag{1}$$

where the * indicates the planned value of a variable, the D operator represents the change in a variable, W_t^d is desired household nonhuman wealth at the end of period t, W_{t-1} is actual household nonhuman wealth at the end of period $t-1$ (beginning of period t), and the adjustment coefficient, λ_l, is assumed to be less than one.

Planned wealth accumulation is assumed to arise from the desire of individuals to smooth their pattern of consumption over their lifetime. They recognize that their human capital cannot be carried over into their retirement years. Consequently, some of it must be transformed into nonhuman wealth to allow consumption to be smoothed over the retirement span as well as over the earning span. In addition, a precautionary motive arising from the existence of unforeseen fluctuations in income, and perhaps needs, would lead to the holding of a nonzero stock of nonhuman wealth by individuals regardless of any anticipated excess of consumption over income in the future.

The level of desired wealth is assumed to depend on total resources (proxied by expected disposable labor income (YDL_t^e), expected transfer payments (YTR_t^e), beginning-of-period nonhuman wealth (W_{t-1}), and expected net capital gains (G_t^e)), the interest rate (i), the percentage gap between potential and actual real GNP (GAP), and a variable reflecting the age distribution of the population (A):

$$W_t^d = w_0 + w_1 YDL_t^e + w_2 YTR_t^e + w_3 W_{t-1} + w_4 G_t^e + w_5 i_t + w_6 GAP_t + w_7 A_t. \tag{2}$$

This incorporates a specification of total resources that acknowledges the distinction between the human and nonhuman components of total resources in the tradition of the life cycle hypothesis (see Modigliani and Brumberg [28], Ando and Modigliani [1]) and as emphasized but not implemented by Friedman [18]. The flow specification of human resources and the use of W_{t-1} rather than a property income variable is typical of studies based on the life cycle hypothesis. Furthermore, the use of W_{t-1} avoids several problems associated with the flow specification concerning the interpretation of its coefficient (Modigliani [27] and Modigliani and Steindl [29] argue that the coefficient of disposable property income in consumption equations is related to the relative strength of the income and substitution effects of a change in the rate of return rather than as a marginal propensity to consume) and distortion in its measurement, especially during periods of inflation. For example, personal interest income includes any inflation premium incorporated into nominal interest payments during periods of anticipated inflation. Another measurement problem arises in imputing the value of the flow of services from consumer durable goods, an imputation that belongs in nonlabor income (see Burch and Werneke [9] and Poole [33] for a discussion of the problems this creates in estimating consumption and saving functions). The inclusion of *GAP* represents a crude attempt to distinguish between the effects of an increase in expected income that is associated with the business cycle and an increase that is not related to the cycle.

Actual wealth accumulation, $(DW)_t$, is the sum of planned wealth accumulation, $(DW)_t^*$, and unplanned wealth accumulation, $(DW)_t^u$:

$$(DW)_t \equiv (DW)_t^* + (DW)_t^u. \tag{3}$$

Unplanned wealth accumulation is assumed to be related to unexpected disposable income, Y_t^u, and unexpected net capital gains, G_t^u:

$$(DW)_t^u = b_1 Y_t^u + b_2 G_t^u. \tag{4}$$

Substituting (1) and (4) into (3), the actual change in wealth can be exnressed as

$$(DW)_t = \lambda_1 W_t^d - \lambda_1 W_{t-1} + b_1 Y_t^u + b_2 G_t^u\ . \tag{5}$$

Both b_1 and b_2 are assumed to be slightly less than unity. Of course both b_1 and b_2 must be essentially unity unless there is time during the period to adjust plans to any unexpected event. The longer the length of the time period taken as the unit of analysis, the more time there is to adjust behavior within the current period. Values less than unity are consistent with both the life cycle hypothesis (the unexpected increase will lead to increased consumption spread over the remainder of the lifetime) and the permanent income hypothesis (the unexpected increase may lead to an increment in permanent income and hence consumption).

The earlier behavioral analysis is based on individuals attempting to satisfy their desire for nonhuman wealth. Saving is one way to satisfy that desire, but not the only way. Net capital gains, realized or accrued, contribute to the accumulation of nonhuman wealth just as does personal saving.[3] Hence, the value of the change in

[3]By selling an asset that has appreciated in value, an individual is in the same position as someone who has saved an equal amount out of current income. On the other hand, if the capital gain has not been realized and is still embedded in the asset, it is indistinguishable from an equal amount of personal saving that has been invested in a similar asset.

total household nonhuman wealth is the sum of the net purchases of assets by households (the flow of personal saving) *and* the net change in the real value of household assets previously held (household net capital gains):[4]

$$(DW)_t \equiv S_t + G_t. \tag{6}$$

The saving equation can be derived by combining (5) and (6) and using the fact that the actual level of accrued net capital gains is the sum of expected and unexpected net capital gains

$$G_t \equiv G_t^e + G_t^u. \tag{7}$$

Actual saving can then be written as

$$S_t \equiv (DW)_t - G_t = \lambda_1 W_t^d - \lambda_1 W_{t-1} + b_1 Y_t^u + (b_2 - 1)G_t^u - G_t^e. \tag{8}$$

The response of saving to net capital gains includes a displacement, or deflection, effect.[5] This may be made more obvious by considering the planned saving equation

$$S_t^* = (DW)_t^* - G_t^e. \tag{9}$$

Once the value of planned nonhuman wealth accumulation has been determined for the period, planned saving, S_t^*, should be simply the total planned accumulation of wealth less the expected net capital gains accruing in the period. The degree to which the displacement effect of expected net capital gains on saving will be less than one-for-one will depend on the size of the effect of expected net capital gains on total planned wealth accumulation ($\lambda_1 w_4$).

The personal saving variable in (8) corresponds to the "use" concept of consumption that is consistent with the life cycle and permanent income hypotheses. However, the National Income and Product Accounts (NIPA) personal saving measure (*SNIA*) in widespread use in macroeconomic policy decisions and forecasts is based on an expenditures rather than "use" concept of consumption. The dif-

[4]Due to the presence of an accrued income tax liability associated with accrued capital gains, the appropriate relationship between the change in wealth, saving, and capital gains may actually be

$$(DW)_t \equiv S_t + cG_t, \tag{6a}$$

rather than (6), where $c = (1-t_g)$ and t_g is the effective income tax rate on accrued capital gains. This adjusts for the accrued tax liability on accrued capital gains that must be paid if and when accrued capital gains are finally realized. Bailey [3] found that the effective tax rate on accrued capital gains was very small, suggesting that a value in the range of 0.9 to 0.95 might be appropriate for c.

[5]Nichols [30] investigates some implications of this deflection issue whereby real capital gains crowd out asset accumulation in satisfying wealth accumulation motives.

ference between the two saving measures is the net investment in consumer durable goods (*SDUR*):

$$SNIA_t \equiv S_t - SDUR_t. \tag{10}$$

This study will focus on $SNIA_t$ rather than S_t in the empirical section since it is consumption expenditures and not the flow of consumption services that is a component of aggregate demand. Thus *SNIA* properly reflects the allocation of personal disposable income between expenditures and nonexpenditures, a central concern of stabilization policy.

To convert (10) into a behavioral equation about *SNIA* requires (8) and a behavioral equation for the net investment in consumer durables. An *SDUR* relationship can be obtained in much the same manner as (8). The planned change in the stock of consumer durable goods would be

$$(DWD)_t^* = \lambda_2(WD_t^d - (1 - \delta)WD_{t-1}), \tag{11}$$

where *WD* is nonhuman wealth in the form of durables and δ is their rate of depreciation. The unplanned change would be

$$(DWD)_t^u = a_1Y_t^u + a_2GND_t^u + a_3GDUR_t^u, \tag{12}$$

where *GDUR* and *GND* represent net capital gains on consumer durables and the remaining household sector net capital gains ($G - GDUR$), respectively. One would expect a_1 and a_2 to be very close to zero and a_3 to be very near unity. Recognizing that

$$(DWD)_t \equiv (DWD)_t^* + (DWD)_t^u \tag{13}$$

and

$$(DWD)_t \equiv SDUR_t + GDUR_t, \tag{14}$$

SDUR can be written as

$$SDUR_t = \lambda_2(WD_t^d - (1 - \delta)WD_{t-1}) + a_1Y_t^u + a_2GND_t^u + (a_3 - 1)GDUR_t^u - GDUR_t^e. \tag{15}$$

To complete the specification an equation for the desired stock of durables is required. It is assumed that WD^d depends on the determinants of W^d and the ratio of the price of consumer durable goods to consumer nondurable goods (*PDND*):[6]

[6]The z's reflect a combination (except for z_8) of two effects of the explanatory variables: the effect on the level of W^d and also any effect the variable might have on the desired share of consumer durable

$$WD_t^d = z_0 + z_1 YDL_t^e + z_2 YTR_t^e + z_3 W_{t-1} + z_4 G_t^e + z_5 i_t + z_6 GAP_t + z_7 A_t + z_8 PDND_t. \tag{16}$$

Now substituting (2), (8), (15), and (16) into (10) the *SNIA* equation can be derived as

$$SNIA_t = B_0 + B_1 YDL_t^e + B_2 YTR_t^e + B_3 W_{t-1} + B_4 WD_{t-1} + B_5 i + B_6 GAP_t + B_7 A_t + B_8 Y_t^u + B_9 PDND_t + B_{10} GND_t^e + B_{11} GDUR_t^e + B_{12} GND_t^u + B_{13} GDUR_t^u, \tag{17}$$

where

$B_1 = \lambda_1 w_1 - \lambda_2 z_1$

$B_2 = \lambda_1 w_2 - \lambda_2 z_2$

$B_3 = \lambda_1 w_3 - \lambda_1 - \lambda_2 z_3$

$B_4 = \lambda_2(1-\delta) > 0$

$B_5 = \lambda_1 w_5 - \lambda_2 z_5$

$B_6 = \lambda_1 w_6 - \lambda_2 z_6$

$B_7 = \lambda_1 w_7 - \lambda_2 z_7$

$B_8 = b_1 - a_1 > 0$

$B_9 = -\lambda_2 z_8 > 0$

$B_{10} = \lambda_1 w_4 - 1 - \lambda_2 z_4$

$B_{11} = \lambda_1 w_4 - \lambda_2 z_4$

$B_{12} = b_2 - 1 - a_2$

$B_{13} = b_2 - a_3$

Although in most cases the signs of the coefficients are ambiguous, one might reasonably expect to find $B_3 < 0$ and $1 > B_8 > B_1 > B_2 > 0$. An increase in YTR^e, like YDL^e, will raise the perceived value of total resources, and thus W^d. Unlike YDL^e, however, an increase in YTR^e will discourage the accumulation of wealth for retirement to the extent that it leads to the expectation of a higher retirement income (e.g., social security benefits).

The four capital gains coefficients are the particular parameters of interest here. Earlier it was noted that b_2 and a_3 should be slightly less than unity and a_2 essentially zero. Thus B_{12} and B_{13} should be very near zero with $B_{12} < 0$. B_{11} would be expected to be positive but less than unity. B_{10} would be expected to be between zero and minus unity. This takes into account the relationship between B_{10} and B_{11} implied by the model, that $B_{11} - B_{10} = 1$.[7]

Some care should be taken when interpretating the net capital gains coefficients in (17). For example, the negative value of B_{10} implies that with an increase in

goods in total nonhuman wealth. For example, as *GAP* increases one might expect the desired share of consumer durables in total wealth to decline due to their illiquidity (see Mishkin [26] for a discussion of illiquidity effects) in addition to any effects on the total desired wealth. In the absence of any compositional effects of an explanatory variable, the magnitudes of its coefficients in (16) and (2) should be proportional to the desired share of consumer durable goods in total nonhuman wealth.

[7]The condition that $B_{11} - B_{10} = 1$ should be qualified. To the extent that $GDUR^e$ and GND^e have different effects on WD^d, $z_4 G^e$ should be rewritten as $z_4' GDUR^e + z_4'' GND^e$. Since expected capital gains are a part of the return to holding assets, an increase in $GDUR^e$ (or GND^e) might have an effect on the desired share of durable goods in an individual's wealth portfolio. Consequently, one might expect to find that $z_4' > z_4''$. This would imply that $B_{11} - B_{10} = 1 - \lambda_2(z_4' - z_4'')$. Thus, $B_{11} - B_{10}$ might actually be expected to be slightly less than unity.

GND^e less of the wealth accumulation for the period must be satisfied by purchasing additional assets, not that there will be a smaller accumulation of nonhuman wealth in the period. This becomes clear once one realizes that the budget constraint governing consumption and wealth accumulation is expanded by the additional net capital gains. In fact, even with the expanded budget constraint the coefficients on the net capital gains variables in the consumption expenditures equation corresponding to (17) will be identical in absolute value but of opposite signs to those in (17). This can be seen from the budget constraint

$$\begin{aligned} Y_t + G_t \equiv C_t + (DW)_t &\equiv C_t + S_t + G_t \\ &\equiv CEXP_t + SNIA_t + G_t, \end{aligned} \tag{18}$$

where Y_t is disposable income. Consequently consumption (C_t) and consumption expenditures ($CEXP_t$) can be written as

$$C_t \equiv Y_t - S_t \tag{19}$$

and

$$CEXP_t \equiv Y_t - SNIA_t. \tag{20}$$

When (19) and (20) are combined with the equations for S_t and $SNIA_t$ it becomes clear that the corresponding coefficients of the consumption and saving equations take on the usual relationships. Thus an additional dollar of GND^e would alter consumption expenditures by $-B_{10}$ (>0) and alter $SNIA$ by B_{10} (<0). The standard interpretation of the increase in consumption expenditures and decline in saving is that the household has decided to consume more and accumulate less, since net capital gains are typically ignored. Clearly this is not the case here. While the household did choose to increase its consumption expenditures, it also chose to increase its stock of wealth.[8] Since the increase in consumption expenditures is only a fraction ($-B_{10}$) of the increase in GND^e, the remaining share ($1 + B_{10} < 1$) goes to increase wealth with no reduction in saving. Alternatively, one can think of the entire net capital gain being added to the stock of wealth while deflecting saving in the amount of B_{10}. The negative coefficient on GND^e in the saving equation merely reflects the fact that less of the wealth accumulation for the period has to be satisfied by purchasing additional assets. Thus a very low (by historical standards) measured personal saving rate does not necessarily mean that households are not accumulating nonhuman wealth at normal or above normal rates.

[8]Actually, a portion of the increase in consumption expenditures, $\lambda_2 z_4$, represents the increase in net investment in consumer durable goods (*SDUR*) that represents wealth accumulation. The increase in wealth is $\lambda_1 w_1$ of which $\lambda_2 z_4$ is in the form of consumer durable goods and ($\lambda_1 w_1 - \lambda_2 z_4$) is in the form of other assets. Thus the acquisition of financial assets, *SNIA*, must be reduced by the excess of the increase in GND^e relative to the desired increase in nonhuman wealth in the form of assets other than durables ($= 1 - \lambda_1 w_1 + \lambda_2 z_4$).

The preceeding theoretical analysis has several implications. First, it is important to separate total net capital gains into expected and unexpected components because one should not expect to find a sizable effect of unexpected capital gains in a personal saving equation. Furthermore, net capital gains accruing to consumer durable goods should be separated from other capital gains since the predicted coefficient on $GDUR^e$ is positive, whereas the predicted coefficient on GND^e is negative. In particular, a testable implication of the model is that $(B_{11} - B_{10})$ is equal to unity. In addition, one should be careful when formulating the behavioral implications of the estimated impacts of the net capital gains variables on personal saving.

4. EMPIRICAL ANALYSIS

A. *The Data*

As previously noted, the NIPA personal saving measure (*SNIA*) will be used as the dependent variable. Following Arena [2], the share of the population aged 65 and over (*POP*65) will be used as the proxy for the age distribution variable. *GAP* will be calculated as the percentage gap between potential and actual GNP based on the potential GNP series contained in *The Economic Report of the President*. *PDND* is based on the NIPA price deflators for consumer durable and nondurable goods.

The appropriate interest rate is a real after-tax interest rate. This requires a good proxy for both the expected inflation rate and an appropriate marginal tax rate. The interest rate proxy used here is calculated as

$$RRAT = (1 - \tau)i - PEL, \tag{21}$$

where *PEL* is the one-year expected inflation rate based on the Livingston survey data provided by Donald Mullineaux, i is the corresponding one-year Treasury bill yield, and τ is the average marginal tax rate on interest income calculated from annual issues of *Statistics of Income* (*SOI*) using the method suggested by Wright [40].

The beginning-of-period nonhuman wealth of the household sector (W) and household sector net capital gains are taken from Eisner [13]. These estimates are based on the flow-of-funds accounts of the Federal Reserve Board of Governors and are supplemented by Bureau of Economic Analysis estimates of the stocks and flows of reproducible capital.[9] Net capital gains are computed as the change in the

[9]The current dollar household sector net capital gains data carefully constructed by Eisner represents a very detailed calculation that considers eighteen separate components of household net worth. These are: reproducible assets: (1) owner-occupied housing, (2) nonprofit fixed capital, (3) consumer durables, (4) land. Financial assets: (5) demand deposits, currency and time deposits, (6) U.S. government securities, (7) state and local obligations, (8) corporate and foreign bonds, (9) commercial paper, (10) corporate equities, (11) mortgages, (12) life insurance and pension funds, (13) adjusted noncorporate equity, (14) miscellaneous assets. Liabilities: (15) mortgages, (16) other loans and credit, (17) trade credit, (18) miscellaneous liabilities.

value of wealth less both net investment and that portion of the change in the value of wealth required to maintain real wealth intact as suggested by McElroy [24] and Eisner [13, 14]:

$$G\$_t = W\$_t - \left(\frac{P_t}{P_{t-1}}\right) W\$_{t-1} - \left(\frac{P_t}{\bar{P}_t}\right) I\$_t, \tag{22}$$

where P_t is the price level at the end of period t, and $\overline{P}_t$ is the average price level during period t. The initial household nominal net worth, $W\$_{t-1}$, is revalued to end-of-year prices to make it comparable to the units in which end-of-year nominal net worth, $W\$_t$, is measured. Similarly, since the flow of the nominal net investment in assets ($I\$_t$) occurs over the whole period, it is assumed to be in the prices of the average of the price index for the period. By calculating net capital gains in this manner, they reflect only the current accrual of purchasing power (with respect to the general price index, P_t) that does not arise from the net additions to the stock of assets. This adjustment to eliminate the incorporation of money illusion into the analysis is sometimes overlooked (e.g., Bhatia [6]). To obtain constant dollar net capital gains, one must still divide the current dollar net capital gains of equation (22) by an appropriate price index.

To obtain disposable labor income, the problem of allocating total personal tax liabilities arises. It is quite likely that this has contributed to the scarcity of empirical studies that separate labor and property income in these analyses. Personal labor income is the sum of the NIPA measures of wages and salaries, other labor income, and an imputed share of proprietors' income. Actual federal income tax liabilities based on the *SOI* data and NIPA state and local taxes are allocated between labor and property income. Disposable labor income (*YDL*) is then calculated as personal labor income less labor's share of federal, state, and local tax liabilities, and personal social security contributions. The sources and methods for these calculations are described in detail in Peek [31]. The other element of nonproperty income, transfer payments, is taken from the National Income and Product Accounts.

All of the income and wealth variables are converted into per capita 1972 dollars for use in the regression equations. Annual observations are used. The NIPA implicit consumption expenditures deflator is used to obtain the constant dollar values. The beginning-of-period nonhuman wealth variable is deflated by a beginning-of-year value of the deflator, while the income flow variables are deflated by the average value of the deflator for the year.

B. *Expected and Unexpected Components*

The estimation of the saving equation requires proxies for the expected and unexpected elements of several of the variables. Each data series is divided into expected and unexpected components by fitting a regression of the variable in question on a set of exogeneous variables. The predicted value of the regression is then taken as the expected component and the residual is taken as the unexpected component. The set of explanatory variables is composed of variables whose values are known at the beginning of the period (i.e., are in the information set available at the beginning of time period t when expectations about period t are made), for example, lagged values of variables. Annual observations are used for the sample period 1951–77.

This procedure presents a problem. While the set of explanatory variables is limited to variables known at the beginning of period t, later information actually contributes to the fitted values of the regression since the estimated coefficients are calculated using the data set for the entire 1951–77 period. Thus, later information is used in predicting earlier values of the dependent variables to the extent that it helps in the estimation of the structure of the systematic relationship between the dependent variable and the set of explanatory variables. This problem could be avoided by reestimating the equation for each period using a sample period ending with the period for which the expectation is desired. Such a procedure is not feasible here due to the very limited number of observations available. Consequently, the present procedure is probably a very reasonable alternative under the circumstances and has, in fact, previously been used extensively (e.g., Barro [4, 5]).

The total net capital gains of the household sector are separated into four major groups of assets. The first component consists of owner-occupied housing, land, nonprofit fixed capital, and noncorporate equity (*GHL*). Net capital gains on consumer durable goods (*GDUR*) and on corporate equities (*GSTK*) form the second and third components. The fourth component (*GNFA*) consists of net capital gains on all other financial assets less liabilities.[10]

The decomposition of total net capital gains into the four groups provides an opportunity to improve upon previous expected capital gains measures that considered only total capital gains (e.g., Arena [2], Bhatia [6]). Just as different types of income (e.g., wages and social security benefits) would not be expected to have identical effects on consumption or saving, it seems plausible to assume that net capital gains arising from different sources similarly might not have identical effects on consumption or saving. A further consideration is that the information relevant to the formation of expectations about one component of net capital gains may differ from that relevant for another component. For example, recent undistributed corporate profits might be relevant for capital gains on corporate equity but would not be relevant to the determination of expected net capital gains on owner-occupied housing. Alternatively, while one might suppose that both *GSTK* and *GNFA* might depend on the inflation rate, inflation may have quite different effects on the two

[10]The basis for the particular grouping of net capital gains into the four components was their correlation with one another and a priori reasons for assuming that individuals might react differently to net capital gains on alternative assets. Initially three groups were isolated for special consideration: (1) owner-occupied housing and land, (2) consumer durable goods, and (3) corporate equities. Nonprofit fixed capital and noncorporate equity were then combined with housing and land because they were very highly correlated with one another. Also, financial assets and liabilities were initially considered separately. However, they appeared to be related to other variables (including saving) in a very similar (although opposite in sign) manner and were very highly correlated with one another. Consequently, it was felt that little could be gained by considering them separately and such a specification would add to any multicollinearity problems already existing in the saving equations.

components. The actual regressions used to separate disposable labor income, transfer payments, and the four groups of net capital gains into expected and unexpected components are presented in Appendix A.

C. *Estimation and Tests*

Initially all eight net capital gains proxies were included in the estimated saving equation. Unfortunately, there are a number of strong simple correlations between pairs of the capital gains proxies making it very difficult to pinpoint their individual effects on *SNIA*. For instance, all of the unexpected capital gains proxies except *GNFAU* had estimated coefficients much smaller than their estimated standard errors. However, the estimated coefficients of *GHLE* and *GDURE* exceeded twice their standard errors. To reduce the number of explanatory variables to a more manageable size, *GHLU, GDURU,* and *GSTKU* (with t-statistics of 0.45, 0.09, and 0.18, respectively) were eliminated from the equation. At this point, the t-statistic for the estimated coefficient of *GSTKE* was still only 1.15 and the estimated coefficients on *GHLE* and *GNFAE* were -0.130 and -0.125, respectively. To further reduce the number of explanatory variables, *GSTKE* was eliminated from the equation[11] and *GHLE* and *GNFAE* were combined into a new variable, *GHLFAE* (the t-statistic for the test of the null hypothesis that the two coefficients are equal is only 0.0565).

The first column in Table 1 presents the resulting equation using ordinary least squares (OLS) and incorporating the Cochrane-Orcutt iterative technique (ρ is the estimated serial correlation coefficient). A special dummy variable has been included in the regression to account for the effects of the 1968–70 income tax surcharge and the 1975 income tax rebate. *DSC*75 is equal to the per capita constant dollar magnitudes of the surcharge in the 1968–70 period and of the rebate (a negative value) in 1975. It has a value of zero in all other years. Furthermore, a variable equal to the difference between the NIPA cash payments and *SOI* accrual measures of federal personal income tax liabilities is included to adjust for the measurement distortion incorporated in the *SNIA* measure. A coefficient in the vicinity of minus unity on *TXADJ* would be expected in the saving equation.[12]

[11]The inability to obtain statistically significant effects of *GSTKE* on *SNIA* may be related to the concentration of corporate stock ownership among the wealthy. According to the model, the algebraically larger estimated effect on *SNIA* of *GSTKE* relative to *GHLFAE* implies that *GSTKE* has a larger effect on desired wealth than does *GHLFAE*. In fact, the absence of any effect of *GSTKE* on *SNIA* implies that the planned change in nonhuman wealth increases dollar for dollar with *GSTKE*.

[12]The relationship of *TXADJ* to the saving equation can be derived as follows. Assuming that the correct specification of the saving function is based on the *SOI* accrual measure of income tax liabilities,

$$S_{SOI} = a_0 + a_1 YD_{SOI} + a_2 X,$$

where *YD* is disposable income, *X* is a vector of the other nonincome explanatory variables, and the subscripts *SOI* and *NIA* will refer to whether the variable is constructed using the *SOI* accrual tax measure (TX_{SOI}) or the NIPA cash payment tax measure (TX_{NIA}), the S_{NIA} equation can be written as

$$S_{NIA} = a_0 + a_1 YD_{SOI} - TXADJ + a_2 X,$$

where

TABLE 1

DEPENDENT VARIABLE: *SNIA*; ANNUAL OBSERVATIONS
(ABSOLUTE VALUES OF *t*-RATIOS IN PARENTHESES)

	(i) OLS 1952–77	(ii) TSLS 1952–77	(iii) TSLS 1952–75	(iv) TSLS 1952–77	(v) TSLS 1952–77
Constant	414.4	397.9	176.1	924.8	958.4
	(1.35)	(1.10)	(0.21)	(1.06)	(1.93)
W	−0.0044	−0.0028	−0.0084	−0.0046	0.0059
	(0.70)	(0.38)	(0.47)	(0.17)	(0.54)
WD	−0.229	−0.189	−0.154	−0.338	−0.265
	(3.56)	(2.15)	(0.93)	(1.35)	(2.20)
TXADJ	−0.981	−0.944	−0.976	−2.00	−1.836
	(4.39)	(2.50)	(3.09)	(3.30)	(3.24)
YDLE	0.459	0.440	0.424	0.622	0.440
	(8.98)	(6.59)	(4.39)	(2.19)	(4.79)
YTRE	0.347	0.275	0.316	0.153	0.243
	(3.13)	(1.87)	(2.25)	(0.41)	(0.92)
YDLU	0.570	0.537	0.520	0.624	0.625
	(6.07)	(4.70)	(3.83)	(2.04)	(3.31)
YTRU	1.692	1.456	1.59	1.95	1.027
	(5.78)	(3.64)	(3.90)	(1.79)	(1.45)
*POP*65	−129.2	−125.0	−108.2	−182.2	−175.5
	(6.25)	(4.32)	(1.45)	(3.05)	(3.88)
GAP	4.36	3.67	2.64	12.81	8.30
	(2.31)	(1.65)	(0.59)	(2.24)	(2.67)
PDND	222.0	191.6	296.6	40.8	49.6
	(1.32)	(0.98)	(0.93)	(0.08)	(0.19)
RRAT	−1.73	−2.42	−2.46	−11.12	4.63
	(0.41)	(0.41)	(0.41)	(0.85)	(0.45)
*DSC*75	−0.294	−0.566	−0.321	0.494	−0.768
	(0.86)	(1.26)	(0.55)	(0.38)	(1.43)
GDURE	0.646	0.712	0.565		
	(5.22)	(4.80)	(1.59)		
GHLFAE	−0.109	−0.109	−0.111		
	(5.93)	(4.93)	(4.19)		
GNFAU	−0.215	−0.184	−0.196		
	(3.70)	(2.13)	(2.12)		
GNW				−0.018	
				(−0.99)	
PCPIG					9.89
					(3.47)
ρ	−0.61	−0.49	−0.48		−0.50
	(3.87)	(2.81)	(2.65)		(2.89)
SEE	5.676	6.225	6.791	18.733	12.067
D-W	2.47	2.31	2.40	1.91	2.19

NOTES: The variables are defined as follows: *W* = beginning-of-period nonhuman wealth; *WD* = beginning-of-period stock of consumer durable goods, *TXADJ* = the difference between the cash and accrual measures of income tax liabilities; *YDLE* = expected disposable labor income, *YTRE* = expected transfer payments; *YDLU* = unexpected disposable lab [illegible] *POP*65 = the share of the population aged 65 or older; *GAP* = [illegible] *PDND* = the ratio of the implicit price deflators for durable and nondurable consumption expenditures; *RRAT* = the one year real after-tax interest rate, *DSC*75 = dummy variable for the income tax surcharge in 1968–70 and rebate in 1975; *GDURE* = the expected net capital gains on consumer durable [illegible] land, and net financial assets; *GNFAU* = [illegible] al gains, and *PCPIG* = the actual CPI inflation rate.

$$TXADJ = S_{SOI} - S_{NIA} = YD_{SOI} - YD_{NIA} = TX_{NIA} - TX_{SOI}.$$

Accounting for data measurement problems is essential if one wishes to isolate and explain the behavioral component of *SNIA*. Peek [32] finds extremely strong support for the hypothesis that personal tax liabilities should be measured on an accrual rather than a cash payments basis for the investigation of personal saving behavior.

The pattern of estimated coefficients on the income variables is quite reasonable.[13] However, the estimated coefficient on *YTRU* is unreasonably large. There is a timing effect present that may be contributing to the overstatement of the size of the effect of *YTRU* on *SNIA*. For example, on several occasions (such as 1965, 1970, 1971) social security benefit levels were increased in the middle of the year and made retroactive to the first of the year. Because of the residual accounting nature of the NIPA saving measure, any retroactive and unexpected increase in disposable income automatically is forced into measured saving.

The estimated coefficient on *TXADJ* is consistent with results reported by Peek [32] lending strong support to the hypothesis that personal income tax liabilities should be measured on an accrual rather than on a cash basis. Both *W* and *PDND* have estimated coefficients of the predicted signs although they do not differ significantly from zero. However, the estimated coefficient on the stock of consumer durable goods (*WD*) is not positive as predicted. This may be related to the very strong correlation of *WD* with several of the other explanatory variables that exhibit strong trend elements.

The *t*-statistics of the three remaining net capital gains proxies are quite impressive given the volatility of the net capital gains variables and the general lack of significance found for capital gains measures in previous studies. The estimated coefficient on *GHLFAE* indicates that an additional dollar of expected net capital gains on owner-occupied housing, land, and net financial assets leads to a reduction in *SNIA*, and an increase in consumption expenditures, of eleven cents. To compute the resulting increment to nonhuman wealth, however, we must take into account the portion of the increase in consumption expenditures that consists of net investment in consumer durable goods ($= \lambda_2 z_4$ from (15) and (16)). Thus, the increment to nonhuman wealth is eighty-nine cents plus the increase in *SDUR*.

The interpretation of the estimated coefficient on *GDURE* is a little more complicated. An additional dollar of expected net capital gains on consumer durable goods leads to an increase in *SNIA*, and a reduction in consumption expenditures, of sixty-five cents. The rather large reduction in consumption expenditures is due to the reduction in net investment in consumer durable goods (*SDUR*), not to an overwhelming desire to increase wealth. The estimated coefficient represents a compositional effect. The increase in *GDURE* causes an increase in desired wealth in the form of both durables and other assets. The estimated coefficient merely indicates that individuals want sixty-five cents of the increase in nonhuman wealth to be in the form of assets other than consumer durable goods.

The relatively strong negative effect of *GNFAU* indicates that individuals will try to partially replace net capital losses on these financial assets immediately. They may need these assets for transactions purposes or even for precautionary purposes since liquid assets tend to better serve this motive. Since there tend to be well-

[13]Unexpected property income is not included in the analysis due to the severe problems associated with the measurement of property income previously mentioned. The measurement problems are intensified during periods of inflation such as are of central concern here. There is good reason to believe that measurement errors would tend to dominate a constructed measure of unexpected property income.

functioning markets in these financial assets and liabilities, unexpected net capital gains and losses can be perceived rather quickly, thereby allowing individuals to react rapidly to them, perhaps at the expense of consumer durable goods.

The *t*-statistic for the hypothesis that the estimated coefficient of *GDURE* minus the estimated coefficient of *GHLFAE* is equal to unity is 2.10. Thus the hypothesis cannot be rejected at the 5 percent level of significance (critical value: 2.26).

Parameter estimates based on OLS estimation of equations such as the one of interest here may be biased due to the well-known simultaneity problems. Consequently, regression (i) was reestimated using two stage least squares (TSLS) with the Cochrane-Orcutt transformation. The results are presented in the second column of Table 1. The following instruments were used in the TSLS procedure: the exogenous explanatory variables (*W, WD, YDLE, YTRE, POP*65, *DSC*75, *GDURE, GHLE,* and *GNFAE*), exports, federal government purchases of goods and services, the expected inflation rate, an index of marginal personal income tax rates, two lagged values of M2, and one lagged value of: the yield on one-year Treasury bills, *PDND, TXADJ,* and *GAP*.[14] The results are very similar to the OLS estimates. In particular, the estimated coefficient on *GHLFAE* is unchanged while the estimated coefficient on *GDURE* is raised somewhat and that on *GNFAU* is reduced (in absolute value) slightly. The *t*-statistic for the null hypothesis that the estimated coefficient on *GDURE* minus the estimated coefficient on *GHLFAE* is equal to unity is only 1.28. Thus, the hypothesis cannot be rejected at the 10 percent level of significance (critical value: 1.83).[15]

While the capital gains variables appear to have statistically significant effects on *SNIA*, one might suspect that they are simply serving as proxies for the inflation rate. With this in mind, the rate of inflation of the Consumer Price Index was added to regression (ii). Its estimated coefficient was -0.68 with a *t*-statistic of -0.17. The estimated coefficients of the capital gains variables were only slightly altered (all three increasing in absolute value) but their estimated standard errors also increased. The *t*-statistics of *GDURE, GHLFAE,* and *GNFAU* are now reduced to 3.89, -2.89, and -1.19, respectively. When the inflation rate was split into expected (*PEL*) and unexpected (*PU*) components based upon the Livingston survey data, *PEL* had an estimated coefficient of -2.75 with a *t*-statistic of -0.15 and PU had an estimated coefficient of 0.058 with a *t*-statistic of 0.01. The estimated

[14]Given the very limited number of degrees of freedom, the selection of the instrument set represents an attempt to maximize the correlation between the endogenous explanatory variables and the instrument set with as few instruments as possible. Thus, in addition to some lagged values of endogenous explanatory variables, a representative monetary aggregate and tax parameter were chosen along with two exogenous expenditure components to represent exogenous shocks to the *LM* and *IS* curves.

[15]Since there is some skepticism regarding the reliability of survey data, the saving equations in the first two columns of Table 1 were reestimated using explanatory variables constructed by replacing *PEL* with an alternative "rational expectations" version of the expected rate of inflation. It was constructed as the predicted values from a regression of the actual CPI inflation rate on its own lagged values along with other relevant predetermined variables in the model. There was very little change in the magnitudes of the estimated coefficients of *GDURE* ($=0.75$) and *GHLFAE* ($=-0.11$). Their *t*-statistics were between 3.16 and 4.98. The OLS estimate of the coefficient of *GNFAU* was also in line with the previous results ($= -0.18$ with a *t*-statistic of 2.59). However, the TSLS estimate was only -0.112 with a *t*-statistic of 1.09. The sign of the estimated coefficients of *RRAT* changed from negative to positive, but still remained less than their estimated standard errors.

coefficients of the capital gains variables were again only slightly altered. This evidence indicates that the net capital gains variables are representing more than some simple effect of inflation (actual, expected, or unexpected) on saving.

A further test of the model would be to check its out-of-sample fit beyond 1977. Unfortunately, the Eisner net capital gains data extend only through 1977. An alternative course of action is to reestimate the basic equation over the period 1952–75 and then use this equation to fit the puzzling sharp decline in *SNIA* in 1976 and 1977. The results of reestimating the basic equation for the period 1952–75 are presented in column (iii) in Table 1. The pattern of estimated coefficients in this equation is very similar to that obtained using the entire sample period except that the estimated coefficient on *GDURE* has declined substantially. Even so, the null hypothesis that the coefficient on *GDURE* minus the coefficient on *GHLFAE* is unity still cannot be rejected due to the rise in the estimated standard errors of the coefficients (t-statistic is 0.95, the critical value for the 5 percent level of significance is 2.36). This equation overpredicts *SNIA* by 6.7 per capita 1972 dollars in 1976 and by 14.2 per capita 1972 dollars in 1977. The fit in 1976 and 1977 is pretty good considering the sharp decline in personal saving. *SNIA* declined by 69.8 per capita 1972 dollars from 1975 to 1976, with a further decline of 26.7 from 1976 to 1977. Thus the equation is able to predict approximately 90 percent of the 1975–76 decline and over 70 percent of the further decline in 1976–77.

D. Decomposition of the Saving Equation

To obtain a better sense of the contribution of the net capital gains variables, Figure 1 plots the actual and fitted (*SNIAF*) values of *SNIA* as well as the separate contributions of three sets of explanatory variables. Each explanatory variable was multiplied by its estimated coefficient from regression (ii) in Table 1. The contributions of the constant term, *W, WD, YDLE, YTRE, YDLU, YTRU, POP*65, *GAP, PDND, RRAT,* and *DSC*75 were combined. Their effect is labeled *CORE* and is presented immediately below the actual and predicted values of *SNIA*. The contribution of *TXADJ* is presented below *CORE*. Finally, the bottom frame presents the sum of the effects of *GHLFAE, GDURE,* and *GNFAU* (labeled *GAINS*). All of the data are in per capita 1972 dollars.

As Figure 1 demonstrates, the regression does a very good job tracking the movements in personal saving, especially during the period following 1967 that contains the most volatile fluctuations in *SNIA*. The *CORE* contribution follows the general pattern of *SNIA* except for major problems in 1972 and 1977. In these two episodes *CORE* moves sharply in the opposite direction from *SNIA*. *CORE* also overstates the fluctuations in *SNIA* in 1973–75. *TXADJ* helps account for the fluctuations in *SNIA* that are missed by the *CORE* contribution in the late 1950s and is especially important for its large contribution to the explanation of the sharp dip in *SNIA* in 1972. It also contributes to the explanation of the further decline in *SNIA* from 1976 to 1977, although it moves in a direction opposite that of *SNIA* in 1975 and 1976.

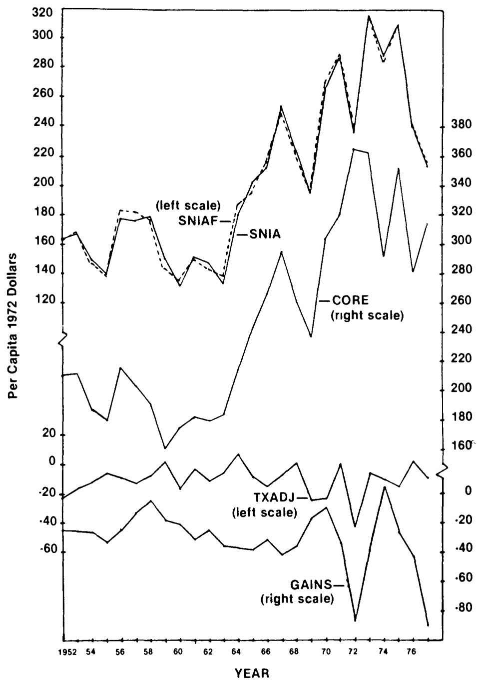

FIG. 1. Decomposition of Saving Equation

The fluctuations in the *GAINS* contributions are primarily after 1968, although the rise in the 1956–58 period does help offset some of the *CORE* effects. The *GAINS* effect also mitigates the large decline in *SNIA* in 1974 predicted by the *CORE* contribution and helps explain the sharp decline in *SNIA* after 1975. However, by far the most important contributions of *GAINS* are in 1972 and 1977, the two episodes that present the most severe problems for the *CORE* explanation of *SNIA*. Not only must the decline in *SNIA* be accounted for, but in addition, the predicted increases in *SNIA* by *CORE* must be offset. In 1972 this is done by both *TXADJ* and *GAINS*. In 1977 the burden is handled primarily by the net capital gains variables.

E. Comparison With Alternative Specifications

The results presented here, in contrast to previous empirical studies, have consistently indicated that net capital gains do play an important role in explaining personal saving behavior. The decomposition of the contributions of the explanatory variables presented in Figure 1 gives some indication of the episodes where the contribution of net capital gains is most crucial. An alternative method of highlighting the importance of the net capital gains proxies developed in this paper for the explanation of personal saving is to compare these results with alternative specifications of the saving equation that omit the net capital gains variables that are the basis of this study.

The last two columns in Table 1 present two alternative saving equations. The regression in column (iv) replaces the previous net capital gains proxies with the actual total net capital gains on household sector nonhuman net wealth (*GNW*). This regression corresponds to the specification formulated by Arena [2]. He hypothesized that expected net capital gains were a linear function of actual net capital gains. With such a simple expectations hypothesis, actual net capital gains would enter the regression as a proxy for expected net capital gains. The estimated coefficient of *GNW* is only -0.018 with a t-statistic of -0.99. The lack of statistical significance of such a capital gains proxy is typical of previous studies. It appears that the net capital gains proxies presented in this study are a drastic improvement.[16] In addition to having a standard error three times as large as the preferred specification, the use of *GNW* as the capital gains proxy causes several of the other explanatory variables to take on unreasonable estimated coefficients and presents especially severe difficulties in tracking *SNIA* from 1968–77.

The final column in Table 1 presents the results of eliminating all net capital gains proxies from the saving equation. They are replaced with the rate of inflation (*PCPIG*).[17] In terms of the standard error of the regression, this specification outperforms the equation with *GNW*. However, the standard error of 12.067 is nearly double the value of 6.225 of the preferred specification. Furthermore, the equation has great difficulty in tracking the 1976 and 1977 movements in *SNIA*.

5. CONCLUDING REMARKS

The inclusion of net capital gains effects in the analysis of saving behavior increases substantially the ability to track the sharp fluctuations in personal saving in recent periods. The separation of expected and unexpected elements of net capital gains as well as the division of total net capital gains into components by type of asset is an important contributor to the striking findings of this study. At least part of the explanation for the previous lack of evidence of statistically significant net capital gains effects on consumption and saving is related to the use of very simple specifications of the net capital gains proxies. The approach taken here looks very promising as a guide for further research on net capital gains effects.

Consideration of the size of the stocks of the assets involved can provide some idea of the magnitude of the effect of capital gains on personal saving. For example,

[16] There are actually two important aspects of the capital gains proxies presented in this study: (1) the separation of total net capital gains into subgroups by type of asset, and (2) the further division into expected and unexpected components. The first step alone results in a sharp reduction in the standard error of the saving equation compared to the equation containing *GNW*. When *GHL, GDUR, GSTK,* and *GNFA* replace *GNW* the standard error of the equation is reduced from 18.733 to 9.134. However, this is still well above the standard error of 6.225 obtained in the preferred specification (Table 1, (ii)). The t-statistics of *GHL, GDUR, GSTK,* and *GNFA* are -1.93, 3.15, 1.32, and -2.29, respectively.

[17] Similar results were obtained when the expected and unexpected components of the CPI inflation rate were entered separately except that the standard error of the equation was a much larger 16.83.

at the beginning of 1978 the stock of assets in the first component of total wealth (owner-occupied housing, land, nonprofit fixed capital, and noncorporate equity) was 9,669 in per capita 1972 dollars. In the preceding five year span, 1973–77, the net capital gains on this component of total household sector net nonhuman wealth averaged over 4 percent of the beginning-of-period stock of these assets. If individuals expected a 4 percent net capital gain for 1978, *GHLE* would take on a value of 387 per capita 1972 dollars. This represents nearly $127 billion in current dollar terms, or over 175 percent of the volume of *SNIA* in 1978. Even though personal saving is reduced on average by only 10.9 percent of the expected net capital gains on this component of assets, the effect is still a substantial $13.8 billion. This represents 19 percent of the actual level of *NIPA* personal saving in 1978.

In summary, the results of this study lend strong support to the hypothesis that net capital gains do play an important role in the explanation of recent personal saving behavior. It appears that the omission of net capital gains effects before the mid-1960s, however, is not critical. While the estimated coefficients tend not to be very large, given the magnitudes of the outstanding stocks of household sector assets and liabilities, even a slight change in their real values can have quite substantial effects on the volume of personal saving. Thus, for the investigation of recent saving behavior, ignoring the role of household sector net capital gains in the consumption/saving decision is a substantial omission.

APPENDIX A

The Calculation of Proxies for the Expected and Unexpected Variables

The set of explanatory variables in the disposable labor income (*YDL*) regression is composed of two lagged values of *YDL* (*YDL*1, *YDL*2), lagged values of the percentage GNP gap (*GAP*1), federal government expenditures on goods and services (*GEXP*1), and the M2 definition of the money stock (*MTW*01), an index of the current marginal personal income tax rate (*TXRT*), the expected rate of inflation (*PEL*), and a dummy variable for the Korean War period (*DKW*). The transfer payments (*YTR*) regression includes one lagged value of *YTR* (*YTR*1), two lagged values of M2 (*MTW*01, *MTW*02), *GEXP*1, and *GAP*1.

The results for the period 1951–77 for the two equations are (with standard errors of estimated coefficients in parentheses)

$$\begin{aligned} YDL = {} & \underset{(261.73)}{595.85} + \underset{(0.174)}{0.580} \cdot YDL1 - \underset{(0.154)}{0.378} \cdot YDL2 \\ & + \underset{(0.152)}{0.652} \cdot GEXP1 - \underset{(2.54)}{9.19} \cdot TXRT + \underset{(0.115)}{0.639} \cdot MTWO1 \\ & - \underset{(12.06)}{42.01} \cdot PEL + \underset{(2.82)}{9.26} \cdot GAP1 + \underset{(32.11)}{169.57} \cdot DKW \end{aligned}$$

$$\text{SEE} = 28.44; \quad \text{D-W} = 1.97; \quad \text{Mean of } YDL = 2399.3$$

$$YTR = \underset{(84.85)}{-250.76} + \underset{(0.122)}{0.674} \cdot YTR1 - \underset{(0.068)}{0.136} \cdot MTWO1$$

$$+ \underset{(0.053)}{0.246} \cdot MTWO2 + \underset{(0.030)}{0.167} \cdot GEXP1 + \underset{(2.18)}{3.43} \cdot GAP1.$$

$$\text{SEE} = 12.59; \quad \text{D-W} = 1.96; \quad \text{Mean of } YTR = 328.3$$

For the net capital gains regressions, the capital gains terms are divided by the corresponding value of the assets. For example, stock market capital gains are divided by the value of corporate equities at the beginning of the period. In this way, the capital gains are converted into a form corresponding to a rate of return. It is quite reasonable to assume that the magnitude of the capital gains is related to the size of the stock of assets in this way. For example, the net capital loss on money is related to the product of the inflation rate and the stock of money. Hence, the appropriate specification would be with the ratio of the capital gains on money to the stock of money as the dependent variable if the inflation rate is used as an explanatory variable.

Third degree polynomial distributed lags were used on the lagged capital gains variables with up to six lagged values considered. The *GHL* equation contains the lagged value of the consumer expenditures price deflator (*PPCE*1), a current and lagged value of an index of marginal personal income tax rates (*TXRT*, *TXRT*1), one lagged value of the yield on 9–12 month government securities (*RN9M*1), and five lagged values of the dependent variable. The *GDUR* equation includes *PPCE*1, *TXRT*, *RN9M*1, *GAP*1, and five lagged values of the dependent variable.

The *GSTK* equation contains *TXRT*, *GAP*1, the marginal corporate tax rate (*TXCR*), the expected inflation rate based on the Livingston survey series (*PEL*), the ratio of lagged undistributed corporate profits to the stock of beginning-of-period corporate equities (*UNDPR*1), the ratio of lagged dividends to the stock of beginning-of-period corporate equities (*DIV*1), two lagged values of *RN9M* (*RN9M*1, *RN9M*2), and four lagged values of the dependent variable. The *GNFA* equation contains *PEL*, *GAP*1, *TXRT*1, and five lagged values of the dependent variable. The results for the net capital gains regressions are

$$GHL = \underset{(0.1209)}{-0.1099} + \underset{(0.0531)}{0.1935} \cdot PPCE1 + \underset{(0.2057)}{0.3613} \cdot TXRT$$

$$- \underset{(0.1403)}{0.2888} \cdot TXRT1 - \underset{(0.00402)}{0.00995} \cdot RN9M1$$

$$+ \sum_{i=1}^{5} a_i \cdot GHL_{t-i};$$

$$\text{SEE} = 0.0158; \quad \text{D-W} = 2.09; \quad \Sigma a_i = \underset{(0.87)}{-1.66}; \quad \text{Mean of } GHL = 0.0178$$

$$GDUR = \underset{(0.0497)}{-0.2188} - \underset{(0.0173)}{0.0421} \cdot PPCE1 + \underset{(0.0740)}{0.3051} \cdot TXRT + \underset{(0.0007)}{0.0025} \cdot GAP1 + \underset{(0.0016)}{0.0038} \cdot RN9M1 + \sum_{i=1}^{5} a_i \cdot GDUR_{t-i};$$

$$\text{SEE} = 0.0074; \quad \text{D-W} = 1.91; \quad \Sigma a_i = \underset{(0.48)}{-2.03}; \quad \text{Mean of } GDUR = -0.0269$$

$$GSTK = \underset{(1.116)}{-2.258} - \underset{(1.704)}{4.712} \cdot TXRT + \underset{(2.937)}{8.264} \cdot TXCR - \underset{(0.0358)}{0.1106} \cdot PEL + \underset{(3.813)}{5.338} \cdot UNDPR1 + \underset{(3.893)}{11.075} \cdot DIV1 + \underset{(0.013)}{0.015} \cdot GAP1 - \underset{(0.0475)}{0.0525} \cdot RN9M1 + \underset{(0.0426)}{0.0867} \cdot RN9M2 + \sum_{i=1}^{4} a_i \cdot GSTK_{t-i}$$

$$\text{SEE} = 0.1263; \quad \text{D-W} = 2.05; \quad \Sigma a_i = \underset{(1.000)}{-0.578}; \quad \text{Mean of } GSTK = 0.0421$$

$$GNFA = \underset{(0.1042)}{0.1691} - \underset{(0.0066)}{0.0255} \cdot PEL + \underset{(0.0015)}{0.0044} \cdot GAP1 - \underset{(0.1985)}{0.3362} \cdot TXRT1 + \sum_{i=1}^{5} a_i \cdot GNFA_{t-i}.$$

$$\text{SEE} = 0.0188; \quad \text{D-W} = 1.50; \quad \Sigma a_i = \underset{(0.42)}{-0.40}; \quad \text{Mean of } GNFA = -0.0330$$

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