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Stock Market Wealth, Private Saving, and the Current Account in the United States: Should We Worry?

by

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Abstract: The paper investigates by means of cointegration analysis whether the recently observed low levels of private saving and the current account balance in the United States are worrisome in the sense that they cannot be sufficiently explained by determinants which performed well in the past. Stock market wealth of private households is taken into account and turns out to be the main dampening factor of private saving during the nineties. Unlike the current account deficit, which reflects low saving, higher growth with respect to the rest of the world and the high dollar, private saving is much lower than predicted by the model in 1999.

Keywords: Private Saving, Current Account Balance, Stock Market Wealth, Cointegration

JEL classification: E21, E27, F32, H31

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Contents

I. The Risks for the US Economic Outlook On the Verge of the Third Millennium

The very long upswing in the United States during the nineties — it will soon be the longest on record — has worried some observers who believe the economy has entered a phase of speculative exuberance (The Economist 1999). Three symptoms are thought to be most troublesome: the high stock market valuations, the low saving of private households and the high current account deficit.

Private household debt has risen substantially during the nineties. With private saving shrinking, the high volume of investment was financed by massive capital imports. As a consequence, the dollar revalued and the current account deficit increased. Most economists do not view the latter as a problem for macroeconomic policy, but they doubt the sustainability of a deficit as huge as the one reached in 1999 (Bhagwati, Siebert et al. 1999). The levels of the three variables mentioned above would be corrected if foreign investors withdrew parts of the funds from the US economy either because of the risk of the United States' high debt exposure or because of the brighter business perspectives in other parts of the world.

If foreign capital stopped flowing into the United States, the dollar would weaken, the stock market would loose parts of its recent gains and private saving would increase again. The extent and the speed of such a correction is crucial for the macroeconomic outlook of the country. An abrupt pick-up in private saving would certainly trigger a recession. The danger of a recession is judged high by those who are convinced there is a bubble in the stock market (HSBC 1999). Others do not forecast a "hard landing" but perceive a stock market crash, a dollar devaluation as well as igniting inflation resulting from the large output gap as major risks for the near future (IMF 1999a). Still others, however, assert that

neither private saving nor the current account are currently a matter of trouble (Steinberg 1999).

This paper aims at finding out which one of these contradicting assertions comes closest to reality. Three questions are addressed. First, how large is the influence of stock market wealth on private saving? Second, can the current levels of private saving and the current account be explained by an econometric model which performs well within the sample period (1974 to 1998)? And third, how sustainable is the latest development and is there a danger of recession if one or more explanatory variables change sharply? The first question has received increasing interest in the recent empirical literature; in most cases it is addressed by a consumption function depending on current income and stock market wealth (Boone et al. 1998, Ludvigson and Steindel 1999). Following Schimmelpfennig (1997 and 1998) a saving rather than a consumption function is chosen to sift out the consequences of households' behavior on the external sector as is asked for in the second and the third questions.

The remainder of the paper is organized as follows: section two recapitulates the main determinants of private saving as proposed by an augmented version of the life-cycle hypothesis with stock market wealth of private households representing the wealth variable. Moreover, the main factors affecting the current account are discussed. Section three presents the estimation results obtained from error-correction equations for private saving and for the current account balance. The relative importance of the exogenous variables during the nineties is determined and the most recent developments are explained. Finally, some conclusions regarding the economic outlook for the United States in the near future are drawn from the estimation results.

II. Determinants of Private Saving and the Current Account Balance

1. Private Saving

According to the life-cycle hypothesis (Ando and Modigliani 1963), the individual consumer or household retains part of his labor or profit income earned during his active period to finance consumption during the retirement period. In the absence of bequest, life cycle income equals life cycle consumption. With a convex utility function the individual maximizes his life cycle utility by smoothing his consumption stream as much as possible over time. Period-to-period consumption depends on the rate of time preference and on life-time dis-

posable income.[1] Income changes affect current private consumption, but the size of this influence depends on the nature of income. If an income increase is perceived as permanent, consumption and saving rise at the same rate; if part of the increase is temporary, the individual tries to distribute the one-off excess income over all periods of his remaining life-time. Then his saving volume expands with a higher rate than his disposable income in the period of the income shock.

When assessing his future income perspectives an individual builds expectations on his endowment with human and physical capital, his labor supply and his financial wealth. In the recent debate the relentless consumption spending spree which among other forces drove the long business-cycle upswing in the nineties has been attributed to the stock market rally. If at least part of the increase in net financial wealth is permanent, it is rational to reduce saving to the extent to which the wealth financing a utility-maximizing consumption during the retirement phase has already been built up by the revaluation. This is especially true for increases in the shareholder's value due to undistributed profits which finance the expansion of successful businesses and generate sources of future profits. Changes in stock market wealth should therefore affect net saving in the opposite direction. The strength of this influence indicates the potential degree of exuberance associated with stock market induced consumption expenditures. A significant effect of changes in stock market wealth on consumption has been confirmed by the recent empirical literature (e.g. Boone et al. (1998) and Ludvigson and Steindel (1999)). A certain propensity to consume out of wealth had been reported long time before the era of financial deregulation (see e.g.

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[1] Constant consumption in each period occurs in the special case where life-time disposable income is perfectly known in advance and the individual time preference rate equals the real interest rate. If the latter is lower (higher) than the further, the smooth consumption path will be declining (increasing) over time.

Modigliani (1971) or Bathia (1972)), but the 1987 crash destroyed the relationships established until then (Boone et al. 1998: 5 f.). Actually households did not save more after the crash as one would have expected, probably because the crash did not last.

Apart from financial wealth, the household also assesses future taxation because tax payments as a main wedge between personal and disposable personal income are a determinant of the latter. At given paths of government receipts and outlays, rational households identify budget surpluses as future tax cuts and diminish their saving today to enjoy the fruits of future tax reliefs during all periods. I do not postulate the strong version of this Ricardian equivalence outlined by Barro (1974) where the drop in households' reserves just equals the difference between the fiscal surpluses and future net spending. Yet if a negative long-term relationship between private and public saving can be found empirically, the idea of Ricardian equivalence represents a convincing theoretical explanation for the diverging evolution of these two components of national saving during the nineties. This decade has seen a continuous improvement in the structural fiscal balance from -3.5 percent of GDP at the beginning to about +1 percent in 1998. The growing ratio of tax payments to income probably gave private households the impression that the "state was saving for them" (Velde 1999: 2). The decline in private saving seems to be rationalized by the prospect of continued budget surpluses during the next ten years (CBO 1999).[2]

Besides on income and on wealth, saving depends on two important relative price variables. The first is the real interest rate. An interest rate hike makes fu-

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[2] Even if the reliability of this prospect is a matter of conflict among economists (for doubts see e.g. Gokhale 1998), the relative independence of the Congressional Budget Office makes it rational for households to rely on its surplus forecasts. Building rational expectations is costly and therefore economic agents exploit the predictions of professional forecasting institutions (Scheide 1984: 27).

ture consumption cheaper and triggers a substitution of today's by tomorrow's consumption (substitution effect). But as life-cycle disposable income goes up this income gain is used to increase spending in all periods of life (income effect). While future consumption increases, the effect on current consumption and thus on saving is theoretically uncertain. However, as the negative income effect of a rise in interest rates on saving only holds for net creditors whereas the effect is positive for net debtors, the coexistence of net creditors and net debtors in the economy markedly diminishes the size of the income effect. As a consequence one would expect the latter to be dominated by the substitution effect (Sachs and Larrain 1993: 107 f.) and thus saving to depend positively on the real interest rate. The second important relative price is the real effective exchange rate. An appreciation of the US dollar that is perceived as permanent by domestic economic agents improves the terms of trade by lowering the price of all imported goods and thus the cost of the overall basket of goods and services today and tomorrow. As consumption increases in all periods, the income effect of a higher real external value of the dollar on saving is negative. Households have no incentive to substitute between current and future consumption, so saving lessens. In the presence of an only temporary appreciation, however, the effect is ambiguous, since a negative substitution effect on saving is opposed to a positive income effect.[3] As convergence to purchasing power parity seems to hold (Meier 1997: 297 ff.), one should not expect the real effective exchange rate to have an excessive influence on private saving. But a significant empirical impact should not surprise for two reasons: first, mean reversion of a currency takes time and consumers have a positive time preference rate; second, it suffices

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[3] The income effect — although smaller than in the case of a permanent appreciation — pulls in the opposite direction because real income is higher only in the present compared with the scenario without exchange rate changes. To enjoy this extra gain in all periods, the household has to increase the volume of saving (the saving rate remains stable if the real interest rate equals the rate of time preference).

to introduce only a slight degree of short-sightedness to have them spend out of current rather than permanent income.[4] Both reasons point towards a relatively high importance of the substitution effect of a temporary dollar appreciation.

As stated above, private saving depends on the position of the household within the life-cycle. Households save in the active phase while retired households dissave. The economy as a whole is composed of overlapping generations; the percentage of people in the age of working (and earning labor and profit income) relative to the total population, the dependence ratio, varies over time due to demographic fluctuations. If each individual behaves according to the life-cycle hypothesis, aggregate private saving should move in the same direction as the dependence ratio. Yet, this positive relationship can be weakened or even outweighed by several distinct effects. First, younger generations may have become less thrifty due e.g. to an exogenous surge in the time preference rate (Schimmelpfennig 1997: 10-11). Second, social and institutional changes not (or not entirely) accounted for by the other variables may per se reduce the level of saving even in a period of a rising dependence ratio. In her analysis of the savings behavior of U.S. households Kauffmann (1990: 103 and 107) points out the crucial roles of female labor force participation and changes in financial markets. With more than one of its members in the labor market, households reduce their savings for unexpected events because the risk of a total income loss becomes smaller. This encourages them to borrow more, a demand met by the rapid expansion of credit cards and the abolition of maximum levels on mortgage

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[4] The importance of changes in current income on the time path of consumption is well founded empirically. For a survey and an application to Germany see Döpke and Kamps (1999).

rates.[5] The purchase of a home or the substitution of a bigger home for a smaller one can explain why additional expenditures following the entrance of more than one person per household into working life may surpass the additional income(s). Third, besides the growing share of equities in households' portfolios the rising rate of homeownership (from 63.8 pc in 1986 to 66 pc in 1998) illustrates that individual lifetime wealth accumulation is compatible with a shrinking difference between disposable income and consumption expenditures, i.e. with a decline in private saving as it is defined by the Bureau of Economic Analysis (Allen 1999: 1).[6] The estimated coefficient of the dependence

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5 These two factors, multiple household incomes and the evolution of financial markets, are probably intertwined, with the former being of more importance during the seventies and the eighties, the latter in the more recent past. Neither a simple replacement of the dependence ratio by the ratio of female labor force participation in [6] nor a specification embodying both variables changes the results described in the next section.

6 In a world of predominantly rising home prices, this decline may occur in two ways: either home purchasers anticipate future wealth gains and adjust their level of current and future consumption thus diminishing the amount of saving, or effective valuation gains obtained by sellers of existing homes — which by definition are excluded from the current income account — are spent.

ratio will show if these profound social changes will reverse the initially positive saving impact of a rising share of persons in the age of working.

To sum up, real saving (in absolute terms) of the private sector (*PS*), defined as savings of private households and undistributed corporate profits,[7] is determined as follows (the signs below the symbols indicate the direction of influence predicted by theory):

[1] $$PS = h\ (dep, yd, r, e, gs, smw)\ ,$$
$$\qquad\quad +\quad +\ +\ -\ -\quad -$$

with *dep* being the dependence ratio, *yd* real disposable personal income, *r* the real interest rate, *e* the real external value of the domestic currency, *gs* the structural[8] balance of general government relative to potential nominal GDP as a measure of government saving and *smw* the stock market wealth of private households.

2. The Current Account Balance: Its Dependence on Private Saving and Other Determinants

The narrow interrelation between net private saving (*PS*) and the current account balance (*CA*) is given by the well-known identity

[2] $$CA \;=\; X - M + IP + Tr \;=\; PS - I + (T - G),$$

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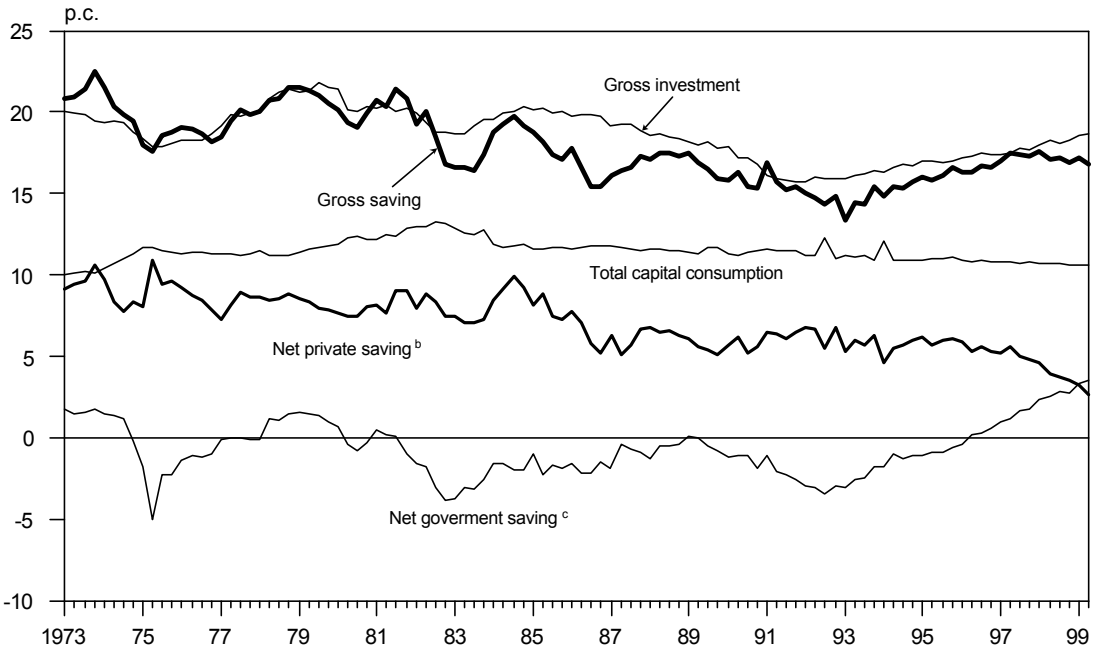
7 I do not want to focus on the profit distribution decisions of corporations. Rather, if one assumes that corporations are owned by the household sector, households adjust private saving such as to optimize total private saving.

8 The structural balance is preferred to the actual fiscal surplus in equations [1] and [4] in order to avoid multicollinearity with domestic income (*dd* and *yd* respectively).

where X (M) are exports (imports) of goods and services, IP is the balance of income payments, Tr unilateral current transfers, I net private investment and ($T - G$) is total government saving (receipts T minus outlays G); as net private saving equals gross national income less consumption and tax payments, domestic absorption ($C+I+G$) can be identified as the key driver of the current account balance. In an open economy an increase in domestic demand also affects demand for goods and services from abroad. More generally a positive growth difference between the United States and the rest of the world induces net imports. This increases foreign countries' income which in turn leads to a higher demand for American exports thereby bringing the current account back towards balance.

The adjustment generally is not complete and does not need to be so because capital imports can replace lacking exports. A net importer of goods and services imports capital on net either by ceding ownership of productive capacities to foreign creditors (foreign direct investment), by selling other assets or by getting indebted to them. The possibility of borrowing and lending on international capital markets enables the country to absorb more than it produces (i.e. to save less than it invests) for many periods. The increase in the current account deficit of the United States in recent years reflects a deep fall in personal saving (only partially offset by a rise in corporate saving) with private fixed investment rising at a dynamic pace during the same time (figure 1). Yet, the difference between gross saving and gross investment looks still moderate compared to the situation in the mid-eighties. Obviously foreign supply of capital was high enough to fill the saving-investment gap. The aggregate savings decision of all households and corporations in a country is thus another key determinant of the current account balance.

Figure 1 - Saving and Investment [a] in the United States



[a] Percent of nominal GDP. - [b] Personal saving plus corporate and other private saving. - [c] General goverment.

However, the rest of the world only has to fill the gap between net investment and net national (not only private) saving: the more a thrifty public sector (including the federal, state and local governments and social security) compensates for the private sector's spending spree, the smaller the current account deficit becomes. Government saving is integrated as an additional independent variable into the model because it rests on general political decisions not affected by private households' behavior.

With demand generally depending negatively on prices, the current account turns negative in case of an appreciation of the US dollar as long as the quantity reaction is stronger than the initial price movement given by the exchange rate change. The condition for this so-called "normal reaction" of the current account is formalized by the Bickerdike condition (Niehans 1986: 72) which reduces to the stronger Marshall-Lerner condition in the long run (i.e. with infinitely flexible supply):

[3] $|h_x| + |h_m| > 1.$

h_x and h_m are the price elasticities of export and import demand, respectively. When exports and imports are estimated separately it is of high interest to know if the sum of the absolute estimated exchange-rate elasticities exceeds one or not. In a model of net nominal exports or of the current account balance, it suffices that the coefficient of the real external value of the dollar be significantly negative for the Marshall-Lerner condition to hold. I treat the real external value of the dollar as an exogenous variable, i.e. a feedback between the current account and the exchange rate making temporary trade imbalances disappear automatically is not modelled. The main reason is that even in the medium run, capital imports can finance a current account deficit. The latter therefore does not necessarily trigger a depreciation.[9] If a depreciation occurs or not depends on the supply of foreign capital. I do not consider the specific determinants of international capital flows to keep the analysis simple. This decision implies the exclusion of variables which affect the current account only indirectly, i.e. via the capital account.[10]

To sum up the theoretical reasoning, one can write the following function for the current account balance (*CA*):

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9 In the last five years a large and growing trade deficit coincided with a strengthening dollar.

10 Often the influence of monetary policy is considered as important for the current account balance (Willms 1992: 85). An expansionary monetary shock increases the real cash of households and leads to higher aggregate domestic demand thereby causing a current account deficit. Subsequently, a decline of foreign currency reserves (with fixed exchange rates) or imported inflation (with flexible exchange rates) make the real quantity of money shrink again, and the trade gap gradually closes. This approach is not discussed here because the quantity of money turned out to be insignificant in the estimation presented in the next section.

$$[4] \quad CA = f(\underset{-}{dd}, \underset{+}{gdp^*}, \underset{-}{e}, \underset{+}{ps}, \underset{+}{gs}),$$

where *dd* is domestic demand[11], *gdp** represents foreign gross domestic product, *e* the real external value of the US dollar, *ps* and *gs* saving of the private and the general government sector, respectively.

In the equation system described by [1] and [4], private sector saving and the current account balance are determined simultaneously with the further influencing the latter but not vice versa. As a consequence, the variables common to both affect the current account deficit directly and indirectly (via private saving). These are the real external value of the domestic currency, government saving and national income.[12] The dependence ratio, the real interest rate and stock market wealth of private households only affect the current account indirectly through private saving.

III. Estimation Results

1. Estimation procedure

The model described in the previous section is estimated using quarterly data from 1974:2 to 1998:3. The starting date is motivated by the fundamental change in international economic relationships following the end of Bretton Woods; estimations on international macroeconomic issues should better start after this

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[11] Domestic gdp cannot be taken because the trade balance (X-M) is part both of it and of CA, the dependent variable.

[12] I renounce to a more economical parametrization introducing two different measures of national income in equations [1] and [4]. The relevant variable for households' saving decisions is real disposable personal income. This variable in turn is not precise enough in modelling current account balance movements because the government, too, acts as an exporter (e.g. of military services) and as an importer (e.g. of machinery and equipment).

major structural break. The last observation is 1998:3 even if data is available until later because figures should not only be up-to-date but also most reliable which generally is not the case before the first annual revision. The current account balance and government saving are expressed as a fraction of nominal and potential nominal GDP, respectively. All other variables except for the real interest rate are logarithms, taken from their 1990 = 100 index values.[13] They are integrated of order 1, i.e. become stationary only after being differenced once, so cointegration is the appropriate tool to analyze the model.[14] According to the original definition by Engle and Granger (1987: 253) applied to the problem discussed here, the (7x1)-vector x_t of private saving and its exogenous determinants in equation [1] are said to be cointegrated of order 1 if there exists a (7x1)-parameter vector α such that the linear combination $\alpha' x_t$ is stationary, i.e. exhibits a (by 1) lower degree of integration than the seven individual I(1) time series composing the model. The same is required for the (5x1)-vector of the current account balance in [4].

I specify two error-correction type rational-distributed-lag (RDL) single equation models of the general form (Hansen 1993: 134)

[5] $$\Delta y_t = \left(\bar{b}_0 - 1\right)\left(y_{t-1} - ß x_{t-1}\right) - \sum_{j=1}^{q-1} \bar{b}_j \Delta y_{t-j} - \sum_{j=0}^{p-1} \bar{a}_j \Delta x_{t-j} + u_t$$

where $\bar{b}_j = \sum_{i=j+1}^{q} b_i$ and $\bar{a}_j = \sum_{i=j+1}^{p} a_i$ (j=1, 2, ...),

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[13] See appendix 1 for the dimension and some descriptive statistics of the data. Data sources are described in appendix 2.

[14] The results of the augmented Dickey-Fuller tests are given in appendix 3.

and where Δy_t is the scalar representing the quarterly change in the current account balance and the one in private saving, respectively. $\bar{b}_j$ and $\bar{a}_j$ are called the short-run dynamics. The a_i and b_i originate from the RDL-model specified in levels (Hansen 1993: 133).

The restriction of the analysis to only two equations reflects the assumption that all the other variables are weakly exogenous. The validity of this assumption is tested for in appendix 4. Especially for the real external value of the dollar, real disposable income and the stock market wealth it turns out that the data do not justify this assumption. The normal therapy to this would be to endogenize the variables in question and to deal with a system of five or even more equations. This therapy is not applied here for three reasons. First, the aim is to keep the analysis simple.[15] Second, it is true that endogeneization saves part of the information required to solve the model, but generally goes hand in hand with a substantial increase in the prediction error.[16] This "price" should not be paid if the estimation results are to be used for forecasting purposes as is the case here when I ask for the sustainability of the current levels of saving and the current account. Third and most importantly, in the presence of I(1)-variables the selection of one or more equations from a more complex simultaneous equations model does not lead to the inappropriateness of the OLS estimators because they are superconsistent (Greene 1997: 857). Superconsistency of the estimators also allows to estimate equations [1] and [4] one by one.

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[15] For example, the system [1] and [4] does not focus on how the current account gets automatically rebalanced by triggering an exchange rate movement. I am rather interested in explaining what forces have driven the current account to its observed levels in the late nineties.

I set $p=q=5$, i.e. four lags are taken into account for all endogenous and exogenous variables. Then Hendry's general-to-specific approach (Gilbert 1986: 287 f.) is applied removing insignificant parameters from the model step by step until there remain only coefficients significant at the 0.1-level.[17] Cointegration is tested for in two ways: first by comparing the t-value of the respective error-correction coefficient with the critical value computed by Banerjee et al. (1992), second by looking at the Wald statistic of joint significance of the loading coefficient and all parameters of the error-correction term (Boswijk 1994). The long-run multipliers and their t-values are determined estimating the Bewley-transformed version of [5].[18] The validity of the assumptions of the OLS-estimation residuals is tested for by the Jarque-Bera test for normality (JB), by the Breusch-Godfrey test for autocorrelation of order one (LM(1)) and four (LM(4)), and by the White heteroskedasticity test (Wh), supplemented by tests for ARCH processes of first and forth order where the White test result is near rejection.

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[16] This is especially the case for variables that have been found to be difficult to predict such as the real exchange rate and equity prices. In most forecasts of gross domestic product, exports or the trade balance the exchange rate therefore is set exogenously by special assumptions although its exogeneity is neither backed by theory nor statistically found in the data (see e.g. OECD 1991:163 f.).

[17] (Joint) insignificance of one (several) parameter(s) is tested for by ordinary t-tests (F-tests).

[18] The problem with [5] is that the vector of long-run multipliers, β, is not estimated directly but is only obtained by dividing the coefficients in the error-correction term by the error-correction coefficient ($1-b_0$). Dividing [5] by this coefficient, solving for y_t and replacing Δy_t by the instrumental variable y_{t-1} yields the Bewley-transformation described in Hansen (1993: 134).

2. *Wealth Effect, Budget Consolidation and Strong Dollar Have Cut Private Saving*

As to real net saving of the private sector, all six determinants discussed in the previous section turn out to be significant. Equation [6] shows the results (t-values in brackets, small letters stand for natural logarithms):

$$[6]\quad \Delta ps_t = \underset{(4.37)}{22.90} - \underset{(-3.78)}{0.14}\, D881 - \underset{(-8.43)}{0.49}\Big[ps_{t-1} + \underset{(4.17)}{10.96}\, dep_{t-1} - \underset{(-5.06)}{2.30}\, yd_{t-1} - \underset{(-2.53)}{2.87}\, R_{t-1} + \underset{(3.77)}{0.88}\, e_{t-1} + \underset{(2.11)}{3.40}\, GS_{t-1} + \underset{(4.70)}{0.54}\, smw_{t-1}\Big] + \underset{(2.69)}{0.22}\, \Delta ps_{t-3} + \underset{(2.23)}{0.13}\, \Delta ps_{t-4} + \underset{(2.80)}{20.70}\, \Delta dep_{t-1} + \underset{(13.75)}{8.52}\, \Delta yd_t - \underset{(-2.10)}{1.76}\, \Delta yd_{t-3} - \underset{(-2.33)}{0.18}\, \Delta smw_{t-4} - \underset{(-3.12)}{0.17}\, D863 + \hat{v}_t$$

(R^2 = 0.79; F = 21.16; STDERR = 0.051; JB [0.24], LM(1) [0.48], LM(4) [0.80], White [0.11], ARCH(1) [0.55], ARCH(4) [0.87]; probabilities in square brackets. The dummy D881 equals 1 from 1988:1 to 1998:3, 0 else; D863 equals 1 in 1986:3, 0 else.))

The null of "no cointegration" is rejected at the 1pc-level because the t-value of the loading coefficient (-8.43) largely exceeds its critical value (-4.92)[19] and because the χ^2-statistic of the Wald coefficient test (116.34) clearly dominates the relevant critical value (38.83).[20] The error-correction coefficient of (-0.49) shows that deviations from the equilibrium saving level are corrected by nearly the half in the following period, which indicates a fairly quick adjustment.

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[19] Critical value with 100 observations, a constant in the long-run relationship and five exogenous variables Banerjee (1992: 42). The case of six regressors is not tabled but should not be much higher than 5.

[20] The χ^2-value is the F-statistic multiplied by the length of the cointegrating vector (Boswijk 1994: 57 f.).

All coefficients within the square brackets of [6] can be interpreted as long-run elasticities except the ones of government saving and the real interest rate because they are no logarithms. Changes in GS and R are interpreted in an additive manner: for example, an interest rate rise of 100 basis points over the original value increases the volume of private saving by 2.87 pc. The substitution effect thus dominates the income effect. The other positive determinant of private saving is real disposable income. The multiplier of 2.30 translates into a marginal propensity to consume out of current income lower than but near to unity during most of the nineties.[21] In the short run, too, real disposable household income and private saving move into the same direction. But the latter clearly "overreacts" to contemporaneous changes in the overall business situation of the country (approximated by household income). This reaction alone accounts for a substantial part of the whole short-run dynamics of the quite volatile series of private saving. This should mainly be due to the fact that the large aggregate of household income fluctuates much less than the small one of corporate profits. Yet undistributed profits represent a huge and growing part in private saving. Retained earnings are even more volatile than overall corporate profits because corporations try to smooth the time profile of dividend payments for the sake of good investors relations.

Unlike the predictions of the life-cycle hypothesis, a growing share of persons aged 15 to 64 years in the total population lessens private saving rather than boosting it. As shown in [6], further dampening factors for private saving are, as

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[21] The marginal rate of private saving computable with the help of [6] positively depends on the original level of saving. Between 1990 and 1997, real private saving amounted to roughly 400 bn $ on average, real disposable income to around 5000 bn $. With all other determinants held constant, a 1 pc increase in income (50 bn $) triggers a 9.2 bn $ rise in real private saving (1 pc of 400 bn $ times 2.30) corresponding to a marginal saving rate of 18 pc as the isolated effect. With the level of private saving shrinking, this rate has declined to less than 10 pc in the recent past.

expected, a real appreciation of the dollar — the long-run multiplier (-0.88) is relatively small — and a rise in government saving. There is an only partial substitution between changes in government and private saving suggesting that not all households are convinced that budget surpluses combined with modest increases in public outlays will last forever.[22]

It is of interest to judge the size of the negative stock market wealth effect on private saving. The relatively low elasticity should be assessed in view of the tremendous pace of wealth gains between 1974 and today. Out of all time series used in [6], stock market wealth by far exhibits the strongest growth. An average fall of 0.54 percent in private saving when stock market wealth increases by 1 percent allows to assume that consumers do not perceive the totality of the wealth gains as permanent. At recent levels of private saving, this elasticity translates into a marginal utility to consume out of stock market wealth of roughly 2 pc.[23] In this respect, equation [6] is roughly in line with or even more conservative than other recent empirical investigations of the wealth effect (Ludvigson and Steindel 1999 and Boone et al. 1998, respectively). So on average American households do not overconsume just because they feel richer.

The coefficient of the dummy variable *D881* indicates a significant downward shift in the constant in 1988:1. The dummy stands for a structural break in the

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[22] With private saving at 400 bn in the nineties, a fiscal consolidation of 1 pc relative to nominal GDP (equivalent to roughly 70 bn $ or 65 bn chained (1992) dollars) triggers a decline of 400*0.034 = 13.6 bn $ in private saving, i.e. about one-fifth of the budget consolidation.

[23] With households' stock market wealth hovering around 12 000 bn$ and net saving of the private sector at 400 bn$ in most of the second half of the nineties, this means that saving shrinks by 2.2 bn$ when stocks appreciate by 120 bn$ (1 pc). This implies a marginal propensity to consume out of wealth of 0.018. Ludvigson and Steindel (1998: 38) find one of 0.024 for the period 1983:1 to 1997:1. Boone et al. (1998) find one of at least 0.04 for the period 1974:2 to 1997:2, but they also get an implausibly low marginal propensity to consume out of income.

absolute level of private saving. Households did not save more after the crash of late 1987 as suggested by [6], probably because this crash did not last. It was overcome by an accommodating monetary policy; economic activity even picked up in 1988 instead of slowing. The benign aftermath of the crash probably changed the private sector's perception of stock market risks. Private economic agents likely reduced the cautionary reserves held due to the uncertainty of the future stream of revenues.[24]

The interaction between short-run and long-run effects of isolated shocks is shown in figure 2. The only major short-run effects stem from changes in real disposable income and in the dependence ratio. Rather than being of size 1 pc the shocks simulated are given a "most realistic" dimension in order to assess the relative historical importance of each variable for the time path of private saving in the nineties (see footnote of figure 2). Accordingly, the simulation results are generated by increases of 1.66 pc in real disposable income, 124 basis points in the real interest rate, 0.83 percentage points in the structural government balance relative to GDP, 0.24 pc in the dependence ratio, 4.19 pc in the real external value of the dollar and 13.26 pc in real stock market wealth of private households. It turns out that the tremendous gains in stock market wealth contributed most to the absolute fall in private saving. Until 1995, this wealth effect was well counterbalanced by an increase in income and in real interest rates. But then the latter stopped rising and the stock market rally accelerated more than income growth. The unprecedented budget consolidation since 1993 and the substantial appreciation of the dollar since 1995 further added to the striking fall in real private saving.

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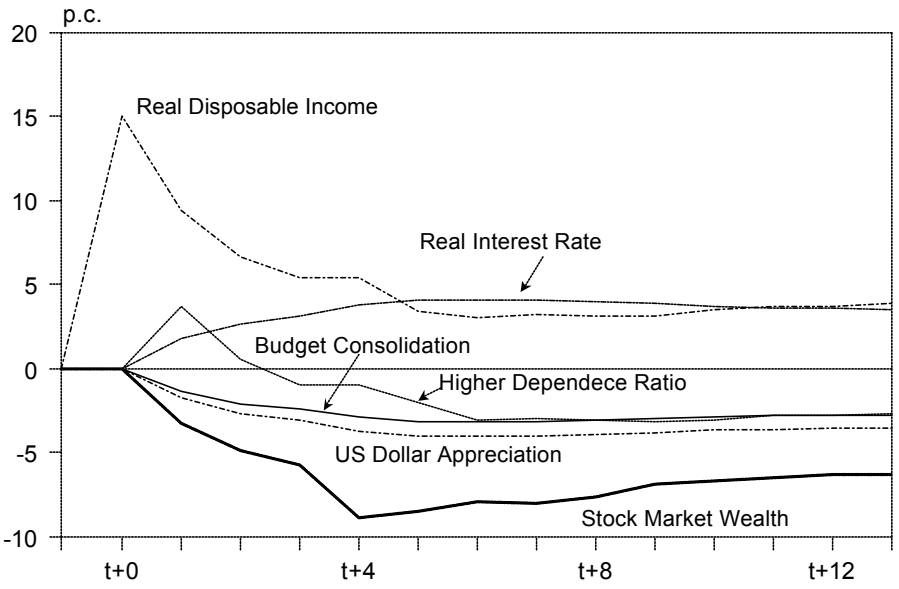
[24] The theoretical extension of the conventional life-cycle model introducing this kind of precautionary saving is given by Deaton (1991). The choice of 1988:1 as the starting date for dummy D881 is plausible on historical and on statistical grounds. Compared to all possible breaks in the constant between 1984:1 and 1989:4, *D881* has the highest absolute t-value.

Figure 2 - Response of Private Saving to Realistic Shocks in Its Determinants [a]

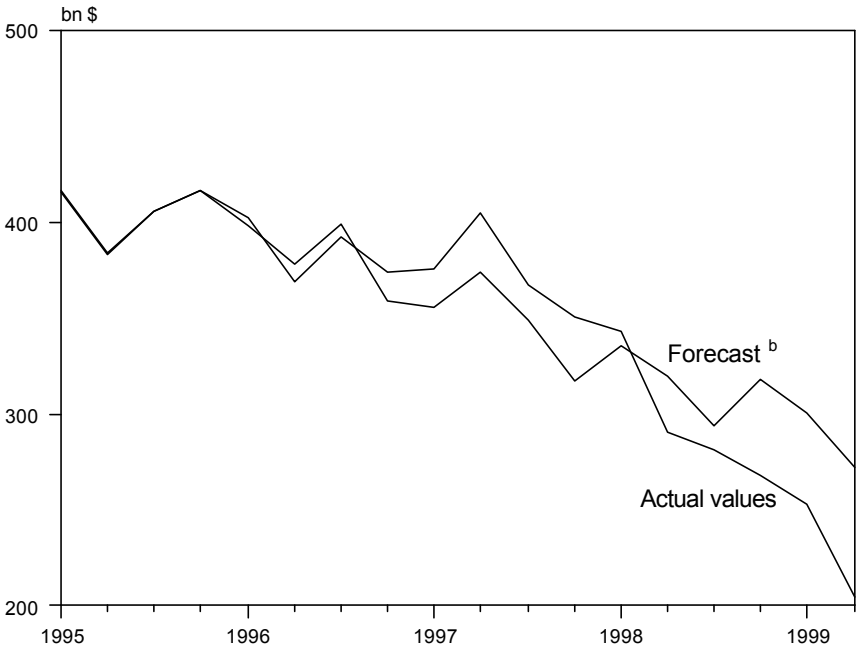


[a] In percent. Shocks are one standard deviation of the nineties for the dependece ratio, the external value of the dollar and the real interest rate, the sum of trend growth and one standard deviation from the linear trend for real disposable income and stock market wealth, and the average annual consolidation of government structural balance since 1993 for government saving (see figures in appendix 1).

Although strong, the fall in real private saving can well be explained by the determinants quantified in [6] until the end of the observation period (1998:3) as is shown by the out-of-sample forecast in figure 3. After then, however, the forecast errors grow much bigger with the model overestimating the actual level of private saving. While equation [6] is stable in the sense of the CUSUM, the CUSUM of squares, all n-step forecast and almost all quarterly one-step forecast tests when being estimated until 1998:3, a tentative prolongation until 1999:2 leads to rejection of the null of stability in the n-step forecast test for all quarters after 1996:1. It is too early to judge whether the determinants of private saving have changed temporarily or permanently. Whereas one doubts that economic agents changed their overall economic behavior over night, a downside correction of stock market risks followed by a decrease in precautionary saving may well have occurred once again in 1998/99. The stock market correction in the summer of 1998 resembles the one in autumn 1987 in many respects: the wealth depreciation was even stronger in absolute terms but an expansionary re-

action of monetary policy made it an only temporary event. Contrary to widespread fears the business expansion gained momentum instead of losing it, and private saving did not pick up at all.[25]

Figure 3 - US Net Private Saving: [a] Actual and Forecast



[a] Real personal saving and undistributed corporate profits. - [b] ECM estimation until 95 IV, out-of-sample forecast afterwards.

3. *Strong Dollar and International Growth Difference Inflated the Current Account Deficit*

With the reaction patterns for private saving in mind one can turn to the analysis of the current account balance. The estimation here yields

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[25] This changed risk perceptions seem more convincing to me than the introduction of an element of irrationality or asymmetry into the model. In line with the finding that a business-cycle expansion needs some time before creating jobs while a slowdown immediately leads to heavy lay-offs (Horn 1998: 176 f.), a dummy was introduced for all quarters of a late upswing exceeding its average post-war duration to account for some degree of over-enthusiasm materializing e.g. in the debates of a "New Age" for the economy. Such attempts are not successful.

$$[7]\quad \Delta CA_t = \underset{(-8.62)}{-0.37}\left[CA_{t-1} - \underset{(-5.72)}{5.88}\, gd_{t-1} - \underset{(-2.71)}{1.83}\, ps_{t-1} + \underset{(9.04)}{7.48} e_{t-1} - \underset{(-2.06)}{12.84} GS_{t-1} + \underset{(12.46)}{0.034}\, t \right]$$

$$- \underset{(-2.97)}{10.75}\, \Delta gdp^*_t - \underset{(-2.88)}{8.07}\, \Delta dd_{t-1} - \underset{(-3.13)}{9.27}\, \Delta dd_{t-4} + \underset{(2.49)}{3.16}\, \Delta e_{t-2} - \underset{(2.40)}{11.24}\, \Delta GS_{t-2} + \underset{(7.14)}{1.91}\, D911 + \hat{u}_t$$

(R^2 = 0.64; F = 13.74; STDERR = 0.251; JB [0.96], LM(1) [0.43], LM(4) [0.89], White [0.25]; probabilities in square brackets. The dummy D911 equals 1 in 1991:1, 0 else.)

As in the case of private saving, the absolute t-value of the loading coefficient (|-8.62|) exceeds the Banerjee critical value for a significance level of 1 pc with constant and trend, 4 regressors and 100 observations (|-5.07|). Therefore the null of "no cointegration" is rejected.[26]

Of course one would like to know to what extent private saving influences the current account balance. The long-run coefficient has the expected positive sign but is rather small: a 1 pc decline in real private saving increases the current account deficit by 0.0183 points of nominal gdp. Lagged differences of private saving turn out to be insignificant. The shock simulation in figure 4 plots the case of a 10.5 pc fall in private saving which corresponds to the average annual decline from 1996 to 1998. The effect is a deterioration of the current-account-to-gdp ratio of nearly 0.2 percentage points.

The variable *gd* in equation [7] signifies the growth difference and is the logarithm of the quotient of real gdp in all OECD partner countries (*GDP*)* and U.S. domestic demand (*DD*). Merging the two variables was necessary to avoid multicollinearity because of their very high positive correlation in the long-run. In the short run, however, the lag structure of domestic and foreign growth influences on the current account is not the same so that merging *dd* with *gdp** in

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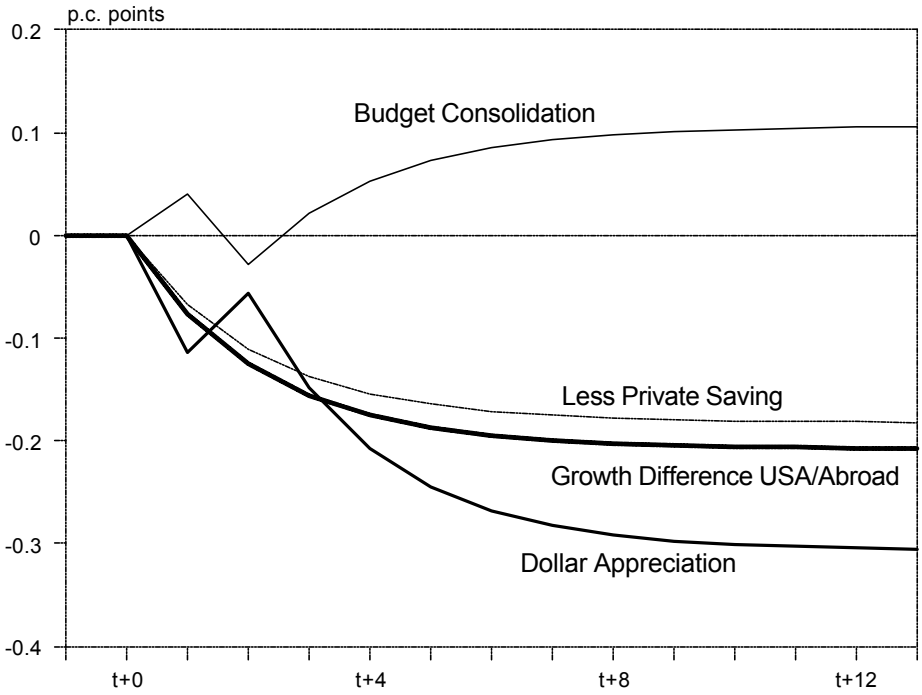
[26] This decision is confirmed by Boswijk's χ^2-version of the cointegration test (73.39 > 28.51).

the short-run relationship would waste precious information. Figure 4 indicates that a growth difference of 3.6 percentage points (the accumulated growth difference in 1997 and 1998) between the U.S. and abroad deteriorates the current account balance by slightly more than 0.2 percentage points relative to gdp. The negative short-run impact of foreign gdp delays somewhat the increase in the current account balance in the case of an upswing abroad while the mainly negative short-run influences of domestic demand add to the finding that a positive growth differential deteriorates the balance.[27] [28]

Figure 4 - Response of the Current Account Balance to Realistic Shocks in Its Deteminants [a]



[a] In percentage points relative to nominal GDP. Shocks are one standard deviation for growth difference, the real external value of the dollar and private saving, and the average annual consolidation of government structural balance since 1993 in government saving (see figures in appendix 1).

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[27] This finding is in line with Gern et al. (1998:354 f) and Lapp et al. (1995: 14) who show that US exports need several quarters to fully react to a pick-up in foreign production while a corresponding increase in domestic production triggers a strong and simultaneous rise in imports.

[28] As the growth difference is focused on no matter if it derives from a change in domestic or in foreign demand, the short-run adjustment is not shown in figure 4.

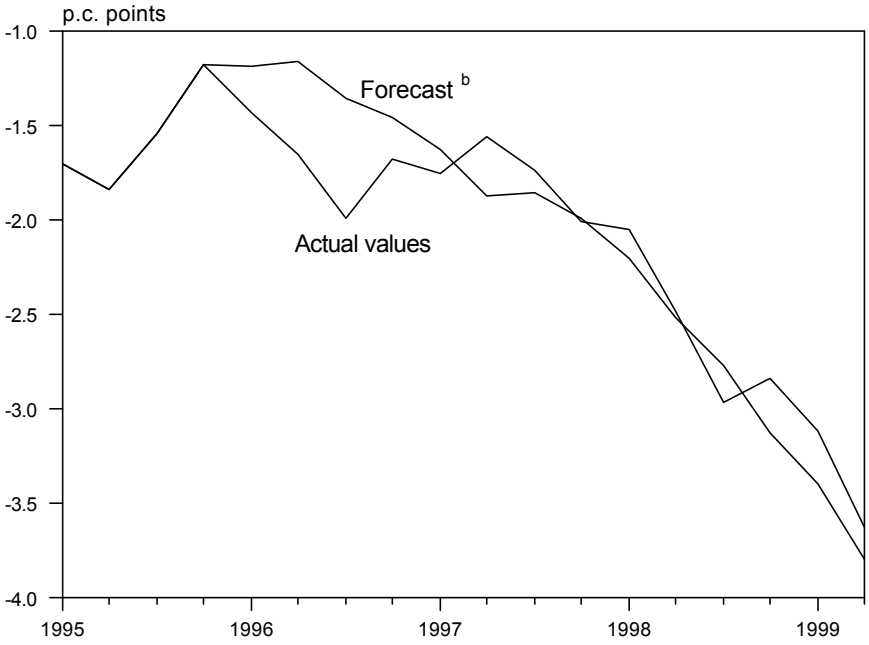
The real external value of the U.S. dollar turns out to have the expected negative sign. According to the results, the appreciation of the US dollar has been the main driver of the current account deficit in recent years. An appreciation of 4.2 pc (corresponding to one standard deviation during the nineties) pulls down the current account balance by 0.3 percentage points relative to gdp, with only one half of the adjustment occurring during the first year after the shock.

The only stabilizing contribution to the current account balance during the nineties came from government saving. Figure 4 illustrates by how much the balance rises if the structural budget balance is lifted by about 0.8 percentage points of gdp, the average annual consolidation since 1993. So after a decade of "twin deficits" the nineties have shown a combination of increasing current account deficits with falling budget deficits. The current account deficit would be larger by at least 0.5 percentage points without fiscal consolidation.

The empirical analysis reveals a predominant influence of international business cycle differences and the real effective exchange rate of the dollar compared to the one of private saving. This contradicts the assertion that a return of the current account to levels closer to the long-run average can only be obtained "at the price" of a strong correction in private saving which is known to trigger a recession. Even if the two possible imbalances of rising foreign debt and falling private saving are interrelated as suggested in chapter 2, there is room for an improvement of the current account balance that does not stem from an increase in private saving. For example, surging economic activity abroad would reduce the growth difference between the U.S. and its trading partners thereby stopping the deterioration of the current account. It could also improve with further rising budget balances.

The adjustment process after a deviation of the current account balance from its long-run level predicted by the model takes more time than for private saving, with about one third of the correction occurring in the quarter after the deviation. But has there been such a deviation from the long-run level in the recent past as is frequently asserted in the economic policy debate? The clear answer is no and can be seen in figure 5. Except from some divergence in the first half of 1996 the out-of-sample forecast almost perfectly redraws the growing deficit in the current account as long as historical values of private saving are used. The performance of equation [7] would be worse if forecast values of private saving were used instead because the relationship between private saving and its determinants is somewhat disturbed in 1999. Insofar the usefulness of the presented model as an instrument to forecast saving and the current account is limited at the moment.

Figure 5 - US Current Account Balance: [a] Actual and Forecast



[a] In percent of nominal GDP. - [b] ECM estimation until 95 IV, out-of-sample forecast afterwards.

IV. Conclusions

The paper investigates the balance of the current account and private saving from 1974 to the recent past. The estimation shows that the currently high current account deficit can be explained by the reaction patterns prevailing in the past. The deficit mainly stems from the marked growth difference between the United States and the rest of the world as well as from the strength of the dollar. The empirical impact of private saving on the current account is significantly positive but not very strong.

Saving of the private sector positively depends on current income and the short-term real interest rate with the substitution effect obviously dominating the income effect. Further there is a substitutional relationship between private and public saving in the sense of Ricardian equivalence. Moreover stock market wealth of private households has the expected negative effect on saving. It is true that the marginal propensity to consume out of wealth seems not to be excessive, also compared to other recent studies. Nevertheless the wealth effect turns out to be the strongest dampening factor on private saving during the nineties because of the strength of the stock market rally. In spite of the explicit consideration of stock market wealth private saving in 1998 and 1999 was substantially lower than what the out-of-sample forecast predicts. A structural break is found in the last quarter of 1998, which reduces the forecasting quality of the equation at the moment.

There are two interpretations of the structural break. On the one hand unusually strong stochastic deviations from the long-run level may have occurred. Model misspecification does not need to be the reason for such deviations; they can also result from one-off effects. In 1998, for example, many home-purchase lenders lowered mortgage rates even for existing mortgage plans. Households enjoyed

the windfall of a lower than originally expected interest burden by raising their consumption expenditures. Such a one-off dampening effect should be followed by a correction in private saving.

On the other hand preferences of economic agents may have changed shifting the long-run level of private saving. It seems most plausible to me that households have revised downwards the risk of a large and sustained decline in stock prices because they are more convinced than before that share prices are part of the Fed's reaction function. Actually the stock market correction in the second half of 1998 was short-lived because it was followed by a substantial loosening of monetary policy — just as in the fall of 1987. All other private reaction patterns held constant, this brighter assessment of stock market risks triggers a reduction in the equilibrium level of private saving. Thus an upward jump in the personal saving rate and a subsequent recession are not necessarily imminent. In order to discriminate between these two interpretations further research is needed.

Appendix 1 – Some Descriptive Statistics of the Time Series Used in the Model[a]

Table A1 – Descriptive Statistics of the Time Series

Series	**Symbol**	**Dimension**	**Mean / Trend Function**	**Standard Deviation[b]**	**Mean / Trend in the 90ies**	**Standard Deviation in the 90ies[b]**
Private Saving	PS	bn of chained (1992) dollars	371.93	41.77	372.24	36.70
Current Account Balance	CA	Percent of nominal GDP	-1.12 CA = 0.09-0.024*t	1.04	-1.38 CA = -0.52-0.050*t	0.52
Dependence Ratio	DEP	Percent	65.58	0.82	65.47	0.16
Real Disposable Income	YD	bn of chained (1992) dollars	3971.06 YD = 2694.24+25.04*t	72.25	4816.38 YD = 4353.35+27.24*t	54.85
Real Interest Rate	R	–	2.13	2.30	2.30	1.24
Real External Value of the US dollar	E	Index March 1973 = 100	96.23	10.17	88.78	4.19
Government Saving	GS	Percent of potential nominal GDP	-2.52	1.36	-1.97	1.51
Stock Market Wealth	SMW	bn of chained (1992) dollars	3360.90 SMW=186.91+62.24*t	1163.33	5790.32 SMW=2459.52+195.93*t	592.54
GDP in Foreign Industrialized Countries	GDP*	bn of (1990) US-dollars	10311.64 GDP*=6707.47+70.67*t	165.82	12758.48 GDP*=11712.91+61.50*t	124.64
US Domestic Demand	DD	bn of chained (1992) dollars	5497.53 DD=3627.79+36.66*t	172.76	6734.53 DD=5883.69+50.05*t	129.20
Growth Difference	GD	dlog(GDP*)-dlog(DD) percentage points	0.002	1.12	-0.20	0.79

[a]Sample Period: 74:2 to 98:3. – [b]Standard deviation from trend where trend function is given.

Appendix 2 – Data Sources

Data related to the National Income and Product Account (NIPA) are delivered by the Federal Reserve Economic Database (FRED) at the Federal Reserve Bank of St. Louis (1999). The original source is the Survey of Current Business of the U.S. Department of Commerce (1999) for private saving (table 5.1.), the current account balance (table F.2.), which is divided by U.S. nominal GDP (table 1.1.), for real disposable personal income (table 2.1.) and for the deflator of GDP (table 7.1.). Domestic demand is the difference between real GDP and real net exports, both taken from table 1.2. Note that all NIPA series are those from before the eleventh benchmark revision published in October 1999. Deflated U.S. time-series are thus in chained (1992) dollars. GDP in the rest of the world is represented by OECD-total GDP less U.S. GDP (OECD 1999a).

The dependence ratio is obtained dividing the population of 15-to-64-years old persons (OECD 1999b) by the total population (IMF 1999b). The real interest rate is the U.S. Treasury Bill Rate (IMF 1999b) deflated by the GDP deflator. The real external value of the U.S. dollar is the broad index delivered by the Federal Reserve Board's (1999a) Bulletin (table 3.28 in the annex). The calculation method is described in detail in Federal Reserve Board (1998). Government Saving is the structural budget balance relative to potential GDP, as published by the OECD (1999b). As quarterly data are not available at the OECD before 1990, the series until then is taken from Citibank (1999). Both series are chained together with 1990 being the chaining year. Finally, stock market wealth of private households is taken from the Federal Reserve Board's (1999b) flows of funds account (see lines 17 to 21 in sheet L.100 of the Z.1 release of September 1999). Stock market wealth of private households is computed as the sum of direct equity holdings by private households as well as their mutual fund shares; corporate equity holdings of private pension funds and of federal retirement

plans as well as their mutual fund shares; corporate equity holdings of life-insurance companies and their mutual fund shares. This sum is deflated by the GDP deflator and seasonally adjusted using the multiplicative census-x-11 procedure.

All variables except from the current account balance, the real interest rate and the structural budget balance are logarithms of their 1990=100 index values.[29] The dimensions of the variables can be found in appendix 1.

[29] The index of the real external value of the dollar is March 1973 = 100.

Appendix 3 – Results of the Unit Root Tests

Table A2 – Results of the Augmented Dickey-Fuller tests

Variable	Test for I (0)[a] Model[b]	lagged level[c]	trend[d]	intercept[e]	Test for I (1)[a] Model[b]	lagged first difference[c]	Result
CA	T, 0	-1.78	1.62		T, 0	-9.13 ***	
	C, 0	-1.40		1.28			
	N, 0	-0.46					I (1)
ps	T, 0	-4,64 ***	11.01 ***		T, 0	-13.39 ***	I (0)[f]
gd	T, 1	-1.91	2.09		T, 0	-6.37 ***	
	C, 1	-2.03		2.14			
	N, 1	-0.42					I (1)
e	T, 0	-1.07	0.59		T, 0	-6.96 ***	
	C, 0	-1.08		0.63			
	N, 0	0.17					I (1)
GS	T, 0	-1.71	2.75		T, 0	-12.91 ***	
	C, 1	-0.96		0.52			
	N, 0	-0.97					I (1)
smw	T, 4	0.37	4.33		T, 3	-5.46 ***	
	C, 4	2.64		5.74 **			I (1)
dep	T, 18	-3.22 *	5.55 *		N, 13	-3.18 ***	I (0)[g]
yd	T, 0	-2.51	3.49		T, 0	-12.01 ***	
	C, 0	0.57		26.22 ***			I (1)
R	T, 4	-2.55	4.58		T, 2	-7.03 ***	
	C, 1	-2.46		3.16			
	N, 1	-1.41					I (1)

[a]*** (**, *) means rejection at the 1 pc (5, 10 pc) significance level. – [b]T: model with drift and trend; C: model with drift; N: model without either trend or drift. The figure indicates the number of lagged variables in the test equation (criterion is freedom of autocorrelation). – [c]Augmented Dickey-Fuller t-test. – [d]F-Value of the joint test of a unit root an no trend. If no rejection then respecify test equation without trend. The procedure is proposed by Enders (1995: 257). – [e]F-Value of the joint test of a unit root an no constant. If no rejection then respecify test equation without constant. – [f]Result not clear-cut: if specification without trend and intercept, then null of unit root cannot be rejected. The stationarity of *ps* does not cause any problem because the regressors of equation [6] are cointegrated. In an Engle-Granger equation with *yd* as dependent variable, the residuals are stationary because the absolute t-value of the ADF term (|-4.47|) exceeds the relevant critical value (|-4.33|) derived by Engle and Yoo (Hansen 1993: 146 f.). – [g]ADF test equation with intercept and without trend yields I (0), as well, at lag length 2 and a significance level of 5 pc.

Appendix 4 –Testing for Weak Exogeneity

Weak exogeneity is tested for by an LM-test proposed by Boswijk (1991). The error-correction terms (in square brackets) from [6] and [7] are implemented as additional regressors in a VAR of the first differences of the presumably exogenous variables. The null of weak exogeneity is tested for by a significance test of the error-correction terms in the VAR. The LM-statistic follows a χ^2 (number of restrictions) distribution. The lag-length chosen here is three. The results are shown in table A3.

Table A3 – Results of the Tests of Weak Exogeneity

Group of H0-exogenous variables	Weak exogeneity for ps		Weak exogeneity for CA		Weak exogeneity for system	
	LR-statistic[a]	Probability (pc)	LR-statistic[a]	Probability (pc)	LR-statistic[a]	Probability (pc)
gd, e, GS, dep, yd, R, smw	64.1966	0.00	47.0384	0.00	111.3291	0.00
gd, e, GS, dep, R, smw	30.7445	0.00	29.9442	0.00	70.5155	0.00
gd, GS, dep, R, smw	30.4261	0.00	5.9793	30.82	42.8851	0.00
gd, dep, R, smw	17.3121	0.17	5.6774	22.46	27.3589	0.06
gd, GS, dep, R	20.4211	0.04	4.4472	34.89	28.2925	0.04
gd, dep, R	5.0070	17.13	4.0048	26.09	9.7958	13.35

[a]Chi-square value of the Wald coefficient test.

The growth difference, the dependence ratio and the real interest rate can be considered as weakly exogenous to the system. In addition to that, the structural government balance and stock market wealth of private households are weakly exogenous with respect to the current account, but not with respect to private saving. The tests have also been carried out under the assumption that the block-recursive nature of the model holds, i.e. private saving influences the current account but not vice versa. These tests are available upon request.

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