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MEASURES OF SAVING AS INDICATORS
OF ECONOMIC GROWTH

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Martin Feldstein [7, p. 109] and others point to the decline of the rate of net private saving as measured in the National Income Accounts (NIA) in the 1980s as an indication that the U.S. may have a lower income and a lower rate of income growth than otherwise might have been possible had we saved more. This paper contends that NIA saving rates have been sending out misleading signals about the U.S. economy in the 1980s. The individuals' saving rate from the flow-of-funds accounts (FFA) is shown to be a much better indicator of resources made available for future economic growth. It did not decline in the 1980s.

The comparisons of FFA saving rates to NIA saving rates incorporate Granger-causality tests, in which a measure of economic output is regressed on a lagged saving rate. The results of the tests indicate that NIA saving rates do not Granger-cause increases in economic growth, but that the individuals' saving rate probably does.

1. Major Criticisms of NIA Saving and Investment.

There are six main criticisms of NIA saving and investment. They are:

- (1) The NIA do not classify as saving any funds raised by government to finance its purchases of goods and services.
- (2) Funds raised by consumers to finance their purchases of durable goods are not classified as saving.
- (3) The NIA exclude from saving most funds used to finance research and development expenditures.

- (4) Funds used for improving human capital are excluded from saving.
- (5) Net exports are defined as foreign investment, but they include consummable as well as capital goods.
- (6) Personal saving in the NIA is calculated as the residual left when personal outlays are deducted from disposable personal income.

Robert Eisner [6] has articulated most of these criticisms eloquently. David Aschauer [2] has also argued persuasively that certain types of government purchases of nonmilitary goods should be considered investment spending and, hence, funds used to buy them should be included in saving.

2. Alternative Saving Rates

A number of economists have advocated alternative systems of economic accounts whose saving rates incorporate the above criticisms of NIA saving.² Particularly interesting are Eisner's [6] Total Incomes System of Accounts (TISA)--available annually from 1946 to 1981, and the Jorgenson-Fraumeni [9] system--available annually from 1948-84. Both of these systems broaden the definition of national product substantially by including human capital, among other things. Hendershott and Peek [8] have also developed an interesting adjusted saving rate, which is available from 1950-85.

²Cullison examines five of the major alternative definitions of saving in his survey article [3].

In addition to the alternative savings rates that derive from newly developed alternative systems of national accounts, there are two that have been published regularly, and on a timely basis, for some time. These two are individuals' saving from the flow-of-funds accounts and net saving from the United Nations system of national accounts (UNSNA). Saving in the UNSNA is similar to NIA saving except that it includes funds raised to finance nonmilitary government construction and equipment purchases.

Individuals' saving, which is published quarterly by the Board of Governors of the Federal Reserve System, satisfies two of the criticisms of NIA saving completely and a third criticism in part. First, individuals' saving includes funds used for purchases of consumer durables. Second, it is not calculated as a residual of income unspent, but rather, as the sum of increases in individuals' financial³ and tangible assets⁴ less their net increase in debt.⁵ Third, individuals' saving includes one

³Financial assets include checkable deposits, time and savings deposits, money market fund shares, U.S. Treasury securities, U.S. Government agency securities, tax-exempt obligations, corporate and foreign bonds, open-market paper, mutual fund shares, other corporate equities, private life insurance reserves, private insured pension reserves, private uninsured pension reserves, government insurance and pension reserves, and miscellaneous financial assets.

⁴Tangible assets include owner-occupied homes, other fixed assets (including corporate farms), consumer durables, and inventories (also includes corporate farms).

⁵Individuals' debt includes mortgage debt on nonfarm houses, other mortgage debt (includes corporate farm), consumer credit, security credit, policy loans, and other debt (includes corporate farm).

source of funds for government, namely, increases in Government insurance and pension reserves.

Because of its broader nature, the FFA saving measure seems better able to satisfy the conceptual requirements of a saving measure than is the UNSNA saving rate. In a recent article, Block [3] also concluded that a variant of individuals' saving would be preferable in concept to NIA saving as a measure of U.S. national saving.

There is, however, the issue of whether funds used by government for investment-type spending should be considered as saving. UNSNA does include them, but individuals' saving includes only one source of funds for government, namely, increases in government insurance and pension reserves. As the FFA concept of individuals' saving is the change in individuals net worth, another source of government funds should be considered: the year-to-year change in the social security trust fund.

Hendershott and Peek [7] argue that social security contributions should be included in saving. Robert Eisner does not think social security contributions should be included. He argues that social security taxes are indistinguishable from other taxes, adding that "...What accountants designate as 'in' the social security trust funds has little to do, in any economic sense, with what may be available to pay retirees or other beneficiaries in the future" [5, p. 24].

Eisner's argument about the economic importance of the social security trust fund is accurate. Still, one's decision about considering social security contributions as saving depends upon whether one thinks the prospect of receiving social security benefits has a significant effect on individuals' consumption behavior. Since the prospect of future social security benefits probably does affect the consumption decisions of a large number of individuals, an alternative data series is presented: one that adds the year-to-year increase in the social security trust fund to individuals' saving. The resulting series, IS + SS, is plotted in Chart 1 in comparison to individuals' (IS) and net private (NPS) saving rates.

Conceptual issues aside, the question of which saving rate is the better indicator of resources effectively freed up for future economic growth can only be answered empirically. The remainder of the paper presents the results of the empirical tests.

3. Granger Causality Tests

The Granger-causality test employed a regression equation that incorporated a measure of aggregate output as the dependent variable. The output variable was regressed on its own lagged value, trend, trend squared, and a lagged saving rate.⁶ The

⁶The number of lagged values of the output variables and the saving rates was selected using the Akaike "final prediction error criterion" [1]. The final prediction error, in each case, was minimized with one lagged value.

equation is shown in Table I. The data were annual, since the concern is with long-run effects.

Two flow-of-funds-based saving rate series, IS and IS + SS, and two NIA saving rate series, personal saving and NPS, were tested to determine which series Granger-caused economic growth. The hypothesis tested was that the regression coefficient on the lagged saving rate would be positive and significantly different from zero.

The Table shows the "F" statistics that resulted from two sets of regressions run using annual data from 1953 to 1989. As noted in the Table, the F statistics for the coefficients on IS and IS + SS were significant at the 0.05 level⁷ when regressed against the index of industrial production and the index of industrial production for manufactured products. In contrast, the F statistics for the coefficients on the lagged NIA saving rates were not significantly different from zero.⁸ To ensure that the F statistics were not biased, Godfrey tests for serial correlation were run which indicated that there was no first, second, or third degree autocorrelation of the residuals of the regressions.

The table also presents the Granger-causality test results for the 1953-81 period. It shows that the F statistics on the

⁷The regression coefficients were also of the correct (positive) sign.

⁸Tests were also run on personal saving as a percent of disposable personal income with identical results. Also, the lagged UNSNA saving rate was tested but found to be not significant.

net private saving rate (NPS), which were not significant at the 0.05 level over the 1953-89 period, were significant and positive over the shortened time period. This finding is very interesting, for as the chart shows, the graphs of net private saving and individuals' saving were very similar until 1980.

The regressions were also estimated with NPS as the lagged saving rate, over the 1953-82, 1953-83, and 1953-84 periods. The resulting F statistics on lagged NPS in the industrial production equation were significant at the 0.05 level in 1953-82 and 1953-83, but not significant in 1953-84.⁹ The results thus indicated that the net private saving rate's ability to predict future economic growth began to decline in 1983. Referring again to the chart, the sharpest divergence between NPS and IS began in 1982, when NPS began a precipitous decline.

4. Conclusions

NIA saving rates declined in the eighties, but individuals' saving rates did not. According to the Granger causality test results, moreover, the individuals' saving rate is a better indicator of future economic growth than either the net private or personal saving rate. Individuals' saving also seems preferable conceptually, as it is based upon individuals' direct actions to restrict consumption and put the remainder of their income to use in some sort of saving account or tangible asset.

⁹The F statistic was 4.58 for 1953-82, 4.54 for 1953-83, and 4.12 for 1953-84.

To be sure, net private saving apparently did Granger-cause economic growth in 1953-1981, but there was relatively little difference between IS and NPS in that period--the average absolute spread between the IS and NPS was only 0.9 percentage points. The two series began to diverge substantially only after 1981, and the average absolute spread between the two saving rates over 1982-1989 was 4.1 percentage points.

Therefore, although there was a significant decline in the NIA-measured net private saving rate, that decline does not seem to have been significantly related to the future rate of economic growth of the U.S. economy in the 1980s. As there was no significant decline in individuals' saving as a percent of NNP in the 1980s, I conclude that the NIA saving data has been giving misleading signals about the economy since 1982.

References

1. Akaike, H. "Fitting Autoregressive Models for Prediction." Annals of International Statistics and Mathematics, 1969, 21, 243-47.
2. Aschauer, David A. "Public Investment and Productivity Growth in the Group of Seven." Federal Reserve Bank of Chicago, Economic Perspectives, September/October 1989, 17-25.
3. Block, Fred. "Bad Data Drive Out Good: the decline of Personal Savings Reexamined." The Journal of Post Keynesian Economics, Fall 1990, 13, 3-19.
4. Cullison, William E. "Is Saving Too Low in the United States?" Federal Reserve Bank of Richmond, Economic Review, May/June 1990, 20-35.
5. Eisner, Robert. "The Real Rate of U.S. National Saving." Forthcoming: The Review of Income and Wealth, March 1991.
6. Eisner, Robert. The Total Incomes System of Accounts (Chicago: University of Chicago Press, 1989).
7. Feldstein, Martin. "Tax Policies for the 1990's: Personal Saving, Business Investment, and Corporate Debt," American Economic Review, May 1989, 79, 108-112.
8. Hendershott, Patric H. and Joe Peek. "Aggregate U.S. Private Saving: Conceptual Measures." In Robert Lipsey and Helen Tice, eds., The Measurement of Saving, Investment, and Wealth. NBER Studies in Income and Wealth, Volume 52, Chicago: The University of Chicago Press, 1989.
9. Jorgenson, Dale W. and Barbara M. Fraumeni. "The Accumulation of Human and Nonhuman Capital, 1948-84." In Robert Lipsey and Helen Tice, eds., The Measurement of Saving, Investment, and Wealth. NBER Studies in Income and Wealth, Volume 52, Chicago: The University of Chicago Press, 1989.

CHART 1

INDIVIDUALS' VS. NET PRIVATE SAVING

IS (FFA) also with Changes in SS Trust

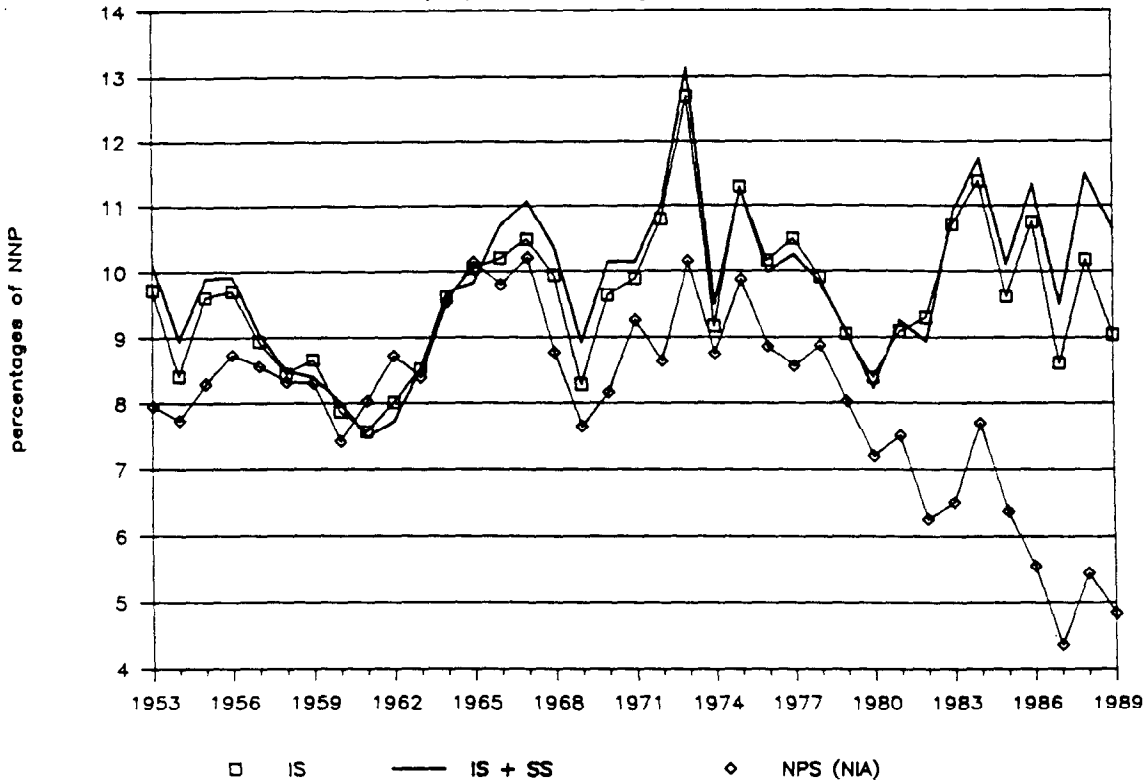


TABLE I
GRANGER CAUSALITY TEST RESULTS^a

DEPENDENT VARIABLE	"F" STATISTICS FOR SAVING RATES FROM EQUATION: $Y_t = a + b_1Y_{t-1} + b_2TREND + b_3TREND^2 + b_4SAVING_{t-1}$			
	Y_t	INDIVIDUALS' SAVING FFA ^b	IS + SS ^c	PERSONAL SAVING NIA ^d
(Annual data from 1953 to 1989)				
Ln(IP) ^e	4.72*	5.62*	1.49	2.40
Ln(IPMFG) ^f	4.67*	5.54*	1.96	2.16
(Annual data from 1953 to 1981)				
Ln(IP)	4.43*	4.50*	0.37	4.16
Ln(IPMFG)	4.87*	4.69*	0.32	4.80*

*Significant at the 0.05 level (exceeds critical value for F(1,30) of 4.17 or critical value for F(1,24) of 4.26), and regression coefficient carries correct (positive) sign.

^aAll saving rates are percentages of NNP.

^bFlow of funds accounts.

^cIndividuals' saving plus the change in the Social Security Trust Fund.

^dNational income accounts.

^eIndex of industrial production.

^fIndustrial production, manufacturing