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What Do Bosses Do? Part II

STEPHEN A. MARGLIN *

I. Hierarchy and Savings

Part I of this study was concerned with the origins of the pyramidal hierarchy that characterizes capitalistic organization of production.[1] Now we shift attention to the *function* of hierarchy under capitalism: what role does hierarchy play that can account for the acquiescence of workers to forms of work organization that are otherwise so destructive and costly in human terms? It will be argued that it is not efficiency (at least not as this term is used and understood by neoclassical economists) but capital accumulation that justifies capitalist hierarchy: in brief, the rate of capital formation remains reasonably high in capitalist societies because hierarchical organization permits a relatively small number of individuals to decide how much the rest of us will save. If, by contrast, savings decisions were left to individuals — whether capitalists or workers — accumulation of productive capital, at least in plant and equipment, on which workers depend for increases in wages, would come to a virtual standstill. And an end to accumulation would spell an end to the present basis of the acceptability of capitalism — the ever-increasing abundance of material goods and services.

This argument of course runs counter to all the canons of neoclassical economics. In neoclassical theory there is *no* connection between the hierarchical organization of production and the rate of saving. Aggregate savings are determined by the

* This study is a continuation of a previous study which was published in the Summer, 1974 issue of this review. Copyright by Stephen A. Marglin, 1974.

1. This paper is self-contained and can be read independently of Part I.

decisions of millions of households, each making a conscious, deliberate allocation of current income between present and future consumption as an integral part of a utility-maximizing life-time consumption plan chosen in the light of life-time resources.

The theory would, I submit, hardly command serious attention if it did not serve so admirably to justify the historically determined pace of capital accumulation and the existence of property income. In the form elaborated by Irving Fisher,[2] it is too general to be contradicted by any conceivable empirical evidence, and therefore too general to be confirmed. In an uncertain world, "life-time" resources must necessarily be a subjective, unmeasurable magnitude subject to continued revision by decision makers, whose consistency over time with the axioms of revealed preference is in principle unverifiable.

The difficulty becomes transparent in the work of Fisher's latter-day disciples, Franco Modigliani (and associates Albert Ando and Richard Brumberg) and Milton Friedman. Modigliani's "life-cycle" hypothesis[3] and Friedman's "perma-

2. I. Fisher, *The Theory of Interest*, first published in 1930. Republished by Augustus Kelley, New York, 1954.

3. The original published statement is in an article authored jointly by Modigliani and Brumberg, "Utility Analysis and the Consumption Function: An Interpretation of Cross-Section Data," in K. Kurihara (editor) *Post-Keynesian Economics*, Rutgers University Press, New Brunswick, New Jersey, 1954. Important subsequent articles are Ando and Modigliani, "The Life-Cycle Hypothesis of Saving: Aggregate Implications and Tests", *American Economic Review*, volume 53, March 1963, pp. 55-84, and Modigliani and Ando, "The 'Permanent Income' and 'Life-Cycle' Hypothesis of Saving Behavior: Comparison and Tests" in Irwin Friend (editor)

nent-income" hypothesis[4] in fact have little left of their lofty Fisherian beginnings when put in a form suitable for testing against time-series or cross-section data. For example, the life-cycle hypothesis simply extrapolates current non-property income to estimate future income (corrected for current unemployment in one variant) and the permanent income hypothesis makes expected future income a function of past incomes. As a result, equations that are supposed to represent the Fisherian approach to determination of current savings — as a by-product of a grand allocation of life-time resources to life-time consumption — hardly differ from equations based on myopic decision rules that have nothing to do with life-time optimization. The lessons of the life-cycle and permanent-income hypotheses are at most that current consumption is not determined by current income alone, a hypothesis which (as Friedman points out) no one would maintain in its pure form unless he expected to find orgies of consumption on pay-days and abstinence at all other times.

In any event, the Fisher-Modigliani-Friedman theory of household savings leaves open the question of how household saving, chiefly corporate in character, gets determined. The logic of neoclassical economics, or rather its ideology of consumers' sovereignty, suggests that, all evidence of the separation of ownership and control notwithstanding, corporate managers allocate profits between dividends and investment solely in terms of shareholders' preferences. The corollary is that corporate savings are a substitute for household savings, and that if corporate savings were smaller, household savings would be much larger. The aggregate rate of capital accumulation only appears to be influenced by the institutional separation of ownership and control.

However, the identification of the interest of owners and managers is on the face of it implausible, in view of the manager's multi-dimensional concern with tenure, power, and prestige that contrasts markedly with the shareholder's single-minded interest in the value of his shares and the stream of his dividends. Moreover, the evidence

offered to buttress the orthodox faith at most supports the proposition that shareholders' preferences are *one* of the variables that influence corporate retention policies. For example, John Brittain has presented evidence that corporate retention policy responds to changes in individual tax rates that change the relative desirability (from the shareholders' point of view) of paying out dividends and retaining earnings.[5] Quite apart from the fact that the periods in which the significant changes in tax rates occurred were the '30's and '40's, years of depression and war, so that individual tax rates may be acting as proxies for other variables of the economic climate, Brittain's evidence shows only that managers pay *some* attention to shareholders' interests. Equally irrelevant is Wilbur Lewellen's evidence for the identity of managers' and shareholders' interests. Lewellen shows that the managers of large firms derive much more of their income from profits — in the form of dividends, capital gains, and profit-related compensation such as stock options — than from fixed dollar compensation — salaries and the like.[6] Apart from the difficult conceptual problems involved in aggregating capital gains and ordinary income, the evidence misses the point that the manager has a significant interest in tenure that the ordinary shareholder does not have. Not only does his power, prestige, indeed his very personal identity, depend on his remaining in control of the corporation, but his future possibilities for increasing his ownership interest and income depend on his continuation in office. Lewellen's evidence may demonstrate that the *retired* corporate executive is at one with the ordinary shareholder, but this hardly establishes the identity of managers' and shareholders' interests. Finally, Robert Solow has argued that corporate managers ignore shareholders' interests only at the risk of seeing share prices reduced and laying themselves open thereby to take-over bids.[7] This may be true, as Solow suggests, for all but the largest corporations, but it is a far cry from ignoring shareholders to dancing exclusively to the

Proceedings of the Conference on Consumption and Saving, Vol. 2, Wharton School of Finance and Commerce, Philadelphia, 1960.

4. M. Friedman, *A Theory of Consumption Function*, Princeton University Press, Princeton, New Jersey, 1957.

5. J. Brittain, *Corporate Dividend Policy*, Brookings Institute, Washington D.C., 1966, chapter 4.

6. W. Lewellen, *The Ownership Income of Management*, National Bureau of Economic Research, New York, 1971.

7. R. Solow, "The New Industrial State or Son of Affluence," *Public Interest*, volume 9, Fall 1967.

shareholders' tune. The shareholder may pose some constraints on the retention policies that corporate managers can pursue in order to increase their income, power, prestige, and security of tenure. It does not follow that corporate savings decisions "really" represent the decisions of individual households in the sense that they reflect consistent, conscious and deliberate allocation of household resources between present and future consumption.[8]

In principle it should be possible to test the proposition that the corporation is an extension of the household when it comes to saving decisions. To the extent this proposition is true, cross-sectional household data should reveal a systematic substitution of corporate for household saving, which ought to be reflected in an inverse relationship between direct household savings and the extent of "indirect" saving carried on by corporations "on behalf" of the household. I know of no such study,[9] but Philip Cagan's analysis of the effects

8. The conflict between shareholders, especially the richest group that owns most of the shares, and managers can easily be overdone—and frequently is. It is only in a relatively few dimensions—of which the rate of accumulation is perhaps the most significant—that the proclivities of owners and managers diverge. Even here I would argue that the class *interests* (as distinct from short-run proclivities) of owners in the preservation of capitalism are better served by manager's accumulation-oriented policies than by saving policies owners would follow if individual control of profits replaced corporate control. The rest of us—with no stake as owners or managers—are the losers insofar as accumulation, or more exactly, the ever-increasing standard of living it produces, blinds us to the destructive features of capitalism.

9. The closest is Modigliani's cross-sectional study using country data, "The Life Cycle Hypothesis of Saving and Intercountry Differences in the Saving Ration" in W. Eltis and others, *Induction, Growth and Trade: Essays in Honour of Sir Roy Harrod*, Clarendon Press, Oxford, 1970, pp. 219-221. Modigliani rightly terms his test inconclusive but refers to a study by Edward Denison, "A Note on Private Saving," *Review of Economics and Statistics*, vol. 40, no. 3, August 1958, pp. 261-267 for confirmation of the substitutability of corporate and household saving. Denison bases his argument on very little data (aggregate observations for 1929 plus nine post-war years), and it is not clear that even the limited data to which he makes appeal supports the argument that "individuals' consumption expenditures are not affected by changes in the proportion of corporate profits paid out as dividends" (p. 264). For one thing, Denison's argument is based on variations in the ratios of corporate and household saving to gross national product rather than on variations of ratios of saving to after-tax private income. For another, the growth in the relative importance of the corporate sector is not taken into account. Indeed, the ratios of corporate saving to after-tax corporate income and

of participation in pension plans on household savings tests an analogous proposition, and Cagan's study hardly gives aid and comfort to those who take Irving Fisher seriously.[10] Adherents to the life-cycle and permanent-income hypotheses would, I presume, expect to find that savings in the form of pension funds, like savings carried out by corporations, substitute for other forms of personal savings, at least to the extent that the point of savings is to provide retirement income. But Cagan's analysis of responses of households to a survey of members of a national consumer product-testing organization suggests a conclusion diametrically opposed to the predictions of neoclassical rationality. In Cagan's own words

Our analysis of this sample suggests that when households come under a pension plan, offsetting reductions in other savings do not occur. The net addition to aggregate personal saving apparently equals the full amount of employers' and employees' contributions.

To say the very least, the evidence is weak that savings rates are independent of capitalist institutions, which give direct control over collective savings decisions to a relatively small number of individuals. Indeed, I argue more — that under a capitalist system, hierarchical organization of production is essential to the maintenance of high rates of capital accumulation. Modern corporate management obliges workers as well as nominal owners of capital to provide for their collective future, just as compulsory retirement, pension, and social security schemes oblige us all to provide for our individual futures. I believe households tend to spend whatever income they can lay their hands on. Households do not save, by and large and on the average, except inadvertently — when their incomes are rising faster than they can adjust their spending. And growth-induced disequilibrium

household saving to disposable income do *not* tend to move in opposite directions, as Denison himself shows (p. 265). Nevertheless, for all its weaknesses, Denison's study is valuable. It suggests tests that might be made using aggregate time-series data, for example, tests of the effect over time on the ratio of total private saving to private income of the growth of the corporate sector.

10. P. Cagan, *The Effect of Pension Plans on Aggregate Saving: Evidence from a Sample Survey*, Occasional Paper 95, National Bureau of Economic Research, New York, 1965.

hardly provides enough savings to cover the costs of construction of owner-occupied housing: virtually nothing is left over to finance the acquisition of new plant and equipment. Hierarchical control of production prevents the spending tendencies of households from putting an end to accumulation because it permits those at the top to set aside resources for expansion of the means of production *before* turning over the value added by producers to workers and shareholders in the form of wages and dividends.

This theory of saving, however, far from the neoclassical view, is in no sense limited to devotees of unconventional political persuasions. Indeed, according to Francis Sutton and his collaborators, it is a basic tenet of the faith of modern capitalism that the corporation bears the primary social responsibility for growth of dividends and wages — a responsibility it can discharge only by plowing back a decent portion of corporate revenues into plant and equipment: “The dominant business opinion,” they say, “is that earnings have to be retained because it is impossible to obtain capital otherwise.”[11] As one business leader asked of a Congressional committee:

. . . if you give it [earnings] all to the stockholder, by what rhyme or reason do we assume that they are going to save enough and have it ready for you when you want it?

He quickly provided his own answer:

. . . we have to take calculated risks in business, but as an administrator, I would not care to take that risk.[12]

If shareholders are not to be trusted to save in adequate amounts, it is hardly to be expected that workers would be. Latter day Andrew Ures are quick to point out that high profits are the workers’ best friend: in the words of the National Association of Manufacturers,

about half of what industry [earns] goes “right back into the pot” to help pay for the development and expansion that brings more products, more jobs, and greater security for all.[13]

11. Francis Sutton, Seymour Harris, and others, *The American Business Creed*, Harvard University Press, Cambridge, Massachusetts, 1956, p. 86.

12. Quoted in Sutton, *et al.*, *op. cit.*, p. 86.

13. *Ibid.*

one firm has even defined American capitalism as a system “which permits management to assure progress for itself, its employees and its shareholders by plowing savings back into the business.[14] The short-sightedness of workers who would raise wages at the expense of profits borders on the unpatriotic: what true patriot could have answered negatively when asked, as the Cold War was gathering steam, “Would you sell your country’s future for \$140.85 [total corporate profits averaged over the population in 1948]?”[15]

The acceptability of capitalism to the overwhelming majority of people who have no significant direct stake in private ownership of the means of production is intimately bound up with corporate saving, just as the corporation’s defenders aver. This does not mean we need take seriously the claim that corporate management acts out of its sense of social responsibility in retaining earnings. It is undoubtedly more realistic to interpret corporate saving decisions in terms of managers’ perceptions of their own self-interest: managerial power, security, prestige, and income are all furthered by plowing back earnings. But in retaining earnings for investment, corporate managers serve a wider social function. Without the savings of hierarchically controlled organizations, among which the corporation is preeminent, the rate of capital accumulation would hardly be adequate to sustain the proposition that capitalism provides, with the passage of time, an ever-increasing abundance of material goods and services for an ever-increasing proportion of the population. And this proposition well may be essential to the survival of the capitalist system. American capitalism has not typically depended on forcible repression of the working class for its survival. In the large, if not in every detail, Americans generally — workers as well as capitalists — accept that what is good for General Motors is good for the country.

Why this easy and general acceptance? One essential ingredient has been the creation of a culture that elevates material consumption to an all-embracing value; other basic human needs — such as the need for community and the need for the satisfactions of creative work — are either sacrificed to the consumption god or sublimated into it. A new automobile not only provides transportation, it compensates the owner for the frustrations of his

14. Quoted in Sutton *et al.*, *op. cit.*, p. 85.

15. Quoted in Sutton *et al.*, *op. cit.*, p. 130.

job and gives him an identity that it otherwise absent from his life. Of course, emphasis of material consumption is only necessary, not sufficient for the survival of capitalism. It is important. Capitalism must be able to satisfy the material wants that define the consciousness of capitalist man.

But there is a dilemma here. To the extent that material consumption fulfills psychological needs of prestige, power, and the like — rather than physical needs — the utility of consumption is largely relative. The value of a Cadillac to Jones is enhanced by knowing Smith drives a Ford. And so long as Smith takes his cues from Jones and Jones watches Smith, only one can be satisfied. Fortunately for capitalism, the dilemma can be resolved by growth insofar as Jones and Smith compare their respective levels of consumption not with each other, but with their own past attainments and future aspirations. Provided Jones and Smith look sideways primarily for guidance in fixing goals for the future, a growing capitalist economy can satisfy most, if not all, of the people. Thus, paradoxically, the key to social stability is economic growth,^[16] and the key to growth is the accumulation of productive capital. The key to accumulation, in turn, is the hierarchical structure of the corporation and other organizations that mediate between households and incomes.

A major premise of this argument is that individual households save relatively little and then only by accident, not by a conscious and deliberate choice with respect to a life-time consumption plan. The facts might seem at first glance to refute this assertion. After all, national income statistics show household saving in the United States equal — year in, year out — to some six percent of disposable income, more if one were to include consumer durables in saving. How do we reconcile these facts with the assertion that economic growth depends on the saving of corporations and other organizations?

The resolution of the paradox lies in part in the growth of household incomes. Household spending adjusts to increased income only with a lag; it takes time to learn to spend. Under conditions of virtually continuous growth (characteristic of the postwar American economy), spending never

catches up to income. Thus saving and growth are intimately connected, but as far as households are concerned, the direction of causality is opposite to that customarily assumed; household savings are not a cause of growth, but the result. Moreover, if we limit attention to savings that households make available to finance expansion of the means of production, an appropriate limitation for certain of the purposes of this paper, the magnitude of household savings, both absolute and relative to corporate savings, becomes quite modest.

That what, pending a more descriptive name, I shall call the “disequilibrium hypothesis” accounts at least as well as the Fisher-inspired competition for the observed behavior of households can, I think, be demonstrated even to the satisfaction of the neoclassically inclined, provided similar standards of rigor are applied here as when the results are more congenial to accepted dogma. Indeed, as we shall see, the real econometric problem lies in distinguishing the disequilibrium hypothesis from the explanations advanced by Friedman and Modigliani.

The basic idea behind the disequilibrium hypothesis is that households tend to spend all their income, but that at least some of the response of changes in consumption to changes in income may be delayed by a learning process. A simple algebraic formulation of this hypothesis is a linear equation relating the rate of change of consumption (\dot{C}) to saving, which, as the gap between income (Y) and consumption (C) can be thought of as a reflection of the learning yet to take place, and to the rate of change of current income (\dot{Y}):

$$\dot{C} = \Theta(Y - C) + \delta\dot{Y} \quad (1)$$

The parameter δ measures the immediate adjustment of consumption to income, otherwise known as the short-run marginal propensity to consume; Θ measures the speed of adjustment to an equilibrium in which all income is spent.

However, equation (1) prejudices one of the questions at issue: namely, is the equilibrium ratio of household consumption to income equal to one? A more general formulation, which allows us to bring data to bear on this question, is

$$\dot{C} = \Theta(kY - C) + \delta\dot{Y} \quad (2)$$

16. The relationship between the social stability of capitalism and economic growth is lucidly articulated by Herbert Gintis in an article entitled “The New Working Class and Revolutionary Youth,” in *Socialist Revolution*, May-June 1970, especially pp. 37-43.

In equation (2), k represents the equilibrium ratio of consumption to income, in other words, the long-run marginal propensity to consume.

The disequilibrium hypothesis turns on the parameter values more than on the degree to which observed data fits the general form of equation (2). It is central to the disequilibrium hypothesis that k be close to 1.0. Moreover, it is implicit in this hypothesis that the numerical values of Θ and δ are together sufficiently large that adjustment of consumption to income is reasonably complete within a short period, say a year or so, rather than requiring anything like a life time.

Before we confront the data, we have to take some care with the definitions of the variables, particularly with consumption (C) and its complement, savings ($S = Y - C$). Actually two definitions of consumption and saving are appropriate since two separate propositions are at issue. One proposition is that households do not make resources available for widening and deepening capital in the form of plant and equipment, the form of saving responsible for the secular rise in the real wage and thereby of the standard of living of the overwhelming majority of people who depend on wages. The second proposition is that all household saving is purely passive, not at all the result of conscious and deliberate decisions.

With respect to the first proposition, household saving is appropriately defined in terms of acquisition of financial assets and liabilities, including the investment of the household sector in unincorporated businesses, since financial savings represent the resources that households make available to the rest of the economy. The importance of savings to social stability stems from the fact that by and large people do not own the means of production they use in their daily work, so what matters is not aggregate saving but saving in the form of producers' goods.[17] In an economy of small proprietors with no market in labor, saving would be a purely individual matter. Others would be no more concerned with individuals' savings decisions than with their decisions with respect to hair styles. By this token, what a household accumulates in the form of consumers' durables, including owner-occupied housing, is of no relevance to the growth of labor productivity and real wages in general (except to the extent that

17. Aggregate saving is of course of crucial importance to stabilization policy, but that is a question totally separate from our present interest.

acquisition of consumer durables and homes affects the rate of saving at some later date). Thus, so long as we focus on the functional relationships between savings and hierarchy within the capitalist system, it is reasonable to define household savings in terms of the net acquisition of financial assets.

But to the extent the goal is to refute the idea that household savings are small *because* corporate savings are large, the acquisition of physical assets by households is relevant — so long as these assets are fungible. That is, insofar as it is the deliberation and consciousness of the household saving decision that is at issue, investment in physical assets acquired for personal use is legitimately included in saving, provided these assets can be readily converted into money, and therefore into generalized consumption. For the acquisition of fungible physical assets, like the acquisition of financial wealth, can conceivably reflect a conscious and deliberate desire to postpone consumption in order to maximize life-time utility, and it is precisely this hypothesis that is here under attack.

Of all the durable physical assets that households normally purchase for their own uses, housing would appear to be the only one that qualifies as a surrogate depository for resources allocated to future consumption. A home-owner not only has the possibility of realizing his nominal equity at almost any time, but casual empiricism suggests that this option is exercised sufficiently often by retired couples to give the benefit of the doubt to the view that acquisition of equity in housing represents deliberate abstinence from current consumption. I say "benefit of the doubt" because of the considerable folklore that suggests that the saving that takes place as mortgages are paid off is from the point of the household inadvertent, or more accurately, unavoidable. It is highly likely that ownership reflects a desire to reap the considerable tax advantages it affords the middle class or simply the desire for status, and that the saving that takes place in reducing the principal outstanding on the mortgage is nothing but a payment for these benefits. It is certainly suggested often enough that the typical home-owner neither knows nor is concerned with the division of his monthly payment between interest and the reduction of principal. Be this as it may, prudence indicates that insofar as the issue is the consciousness or deliberation behind household saving decisions, net investment in owner-occupied housing be included in

saving.[18]

This argument distinguishes saving in the form of owner-occupied housing from saving in the form of consumer durables such as washing machines, automobiles, and television sets. Consumer durables are in my view rightly excluded from saving whether it is the rationality of household saving decision or their effect on the expansion of the means of production that is at issue. Washing machines and cars are acquired for their direct usefulness or their prestige value, not as a surrogate for a savings bank. The fact that these goods provide a flow of services over a relatively long period, the usual justification for including them in saving, is quite beside the point. Our present interest is in the rationality of household saving decisions and the availability of household savings for investment that increases the level of real wages. And relative to these questions, it is wholly immaterial whether a good provides its services at a single point in time or over a long interval. Indeed, if the interval of time over which a good provides utility is the touchstone of whether it represents capital or current consumption, then a particularly exquisite dinner I ate twelve years ago in one of Boston's finer restaurants should be considered as capital; it still brings a warm glow whenever I think about it, a glow that to a neoclassical economist ought to represent a current service every bit as much as the nightly flow of pleasure from the television set I bought two years ago.

Thus, to a reasonable first approximation, total household savings is defined as the residual obtained by subtracting personal outlays, as measured by the Department of Commerce,[19] from household incomes. This approximation is improved by excluding imputed expenditures, chiefly the net rental value of owner-occupied housing, from personal outlays.[20] The Department of Commerce series on disposable incomes serves as a

18. A similar argument suggests that household saving in the form of life-insurance reserves be included in total household saving, as well as in financial saving, even though it can be argued that the acquisition of equity in life-insurance policies does not reflect in general a savings decision.

19. Reported in the *Survey of Current Business*, U.S. Department of Commerce, Washington D.C., supplemented by *The National Income and Product Accounts of the United States, 1929-1965*, also published by the Department of Commerce.

20. The *Survey of Current Business* and *The National Income and Product Accounts* include an annual series of

first approximation to household income. Of course, the same imputations that are excluded from consumption must be excluded from income. Moreover the approximation to the income controlled by households is improved by excluding net contributions to pension funds, which are no more household saving than are the retained earnings of corporations.[21] Total household saving is then defined by the difference between disposable income (less imputations and pension fund contributions) and personal outlays (less imputations).

Financial saving, including investment in unincorporated business, is measured by data reported on a quarterly basis by the National Industrial Conference Board. On the one hand households accumulate assets in the form of cash, demand deposits, savings accounts, credit and equity market instruments, net investment in unincorporated business, and life insurance reserves. On the other hand, households incur debt, principally in the form of consumer credit and mortgage credit. "Financial saving" is defined as the difference between the net increment in holdings of these assets and the net increment in household debt.[22] Household income is defined as before — as disposable income, net of imputations and pension-fund contributions. Household consumption is, for purposes of measuring households' contributions to wage-related capital, the difference between

imputations. The imputations subtracted from both disposable income and personal outlays are the following:

1. Space rental value of owner-occupied dwellings *minus* associated purchases of goods and services *minus* capital consumption allowances *minus* interest.
2. Space rental value of owner-occupied farm dwellings *plus* food and fuel produced and consumed on farms *minus* associated purchases of goods and services *minus* capital consumption allowances *minus* interest.
3. Services furnished without payment by financial intermediaries.
4. Food furnished employees.
5. Standard clothing issued to military personnel.
6. Employees' lodging.

The annual series were converted to quarterly series by linear interpolation.

21. Pension fund contributions are reported in *Flow of Funds Accounts 1945-1968*, published by the Board of Governors of the Federal Reserve System, Washington D.C. Again the reporting (Table 9, line 27 minus line 5) is on an annual basis, and linear interpolation has been employed to convert the annual information to a quarterly series.

22. "Discretionary Spending Supplement No. 2", National Industrial Conference Board, February 1969.

household income and financial saving.

To summarize: for total household saving we use the following variables

Total $Y = DIS - IMP - PF$
 Household $C = PO - IMP$
 Savings: $S = Y - C$

DIS= Disposable income (Department of Commerce)

IMP= Imputations to personal income (Department of Commerce)

PF= Net contributions to pension funds (Federal Reserve)

PO= Personal outlays (Department of Commerce)

For financial savings,

Financial $Y = DIS - IMP - PF$
 Savings: $S = \Delta FA - \Delta FL$
 $C = Y - S$

ΔFA = Change in households' financial assets, including net investment in unincorporated business, but excluding contributions to pension funds (National Industrial Conference Board).

ΔFL = Change in financial liabilities (National Industrial Conference Board)

The historical record from which the parameters of equation (2) are estimated consists of 61 quarterly observations running from the end of the Korean War to mid-1968. The extraordinary conditions of the early post-World War II period and the controls and scare-buying of the Korean War make 1953 appear a sensible beginning point. The lack of data beyond 1968 have dictated the end point.

Throughout, ordinary least squares has been used for estimating purposes. As a preliminary to application of regression techniques, equation (2) had to be put into a discrete form. I have followed the suggestion of Hendrik Houthakker and Lester Taylor[23] in translating differential into difference equations; this in essence means assuming (1) that the actual observation for any quarter is exact for the mid-point of the quarter, and (2) that variables

follow linear paths between actual observations.[24] Thus integrating

$$\dot{C} = \Theta(kY - C) + \delta \dot{Y} \quad (2)$$

we obtain

$$C - C_{-1} = \frac{\Theta}{4} k \frac{Y + Y_{-1}}{2} - \frac{\Theta}{4} \frac{C + C_{-1}}{2} + \delta(Y - Y_{-1})$$

where the subscript -1 represents the observation for the previous quarter. Solving for C , we have

$$C = A_1 C_{-1} + A_2 \frac{Y + Y_{-1}}{2} + A_3 \Delta Y \quad (3)$$

with

$$A_1 = \frac{1 - \Theta/8}{1 + \Theta/8}, \quad A_2 = \frac{\Theta k/4}{1 + \Theta/8}, \quad A_3 = \frac{\delta}{1 + \Theta/8}.$$

Thus, after obtaining estimates \hat{A}_1 , \hat{A}_2 , and \hat{A}_3 from ordinary-least-squares regressions, we can solve for Θ , k , and δ according to the formulas

$$\hat{\Theta} = \frac{8(1 - \hat{A}_1)}{1 + \hat{A}_1}, \quad \hat{k} = \frac{\hat{A}_2}{1 - \hat{A}_1}, \quad \hat{\delta} = \frac{2\hat{A}_3}{1 + \hat{A}_1}.$$

There is one final and important hurdle to be surmounted before we can profitably examine the data. The parameters of direct interest — Θ , k , and δ — are nonlinear functions of the parameters A_1 , A_2 , and A_3 . Therefore the standard errors of the estimates \hat{A}_1 , \hat{A}_2 , and \hat{A}_3 are not immediately translatable into confidence intervals. A relatively elaborate procedure, due to Fieller, had to be followed to estimate confidence intervals around $\hat{\Theta}$, \hat{k} , and $\hat{\delta}$. [25]

24. For example, observations for first quarter 1965 (1965:I) are assumed to represent exact measurements for February 14, 1965, and observations for 1965:II are assumed to reflect the actual state of affairs on May 15, 1965. The level of each variable for any date between February 14, 1965, and May 15, 1965, is assumed to be a weighted average of the observations for these two dates, with the weights proportional to the length of time separating the date in question from February 14 and May 15, respectively.

23. H. Houthakker and L. Taylor, *Consumer Demand in the United States, 1929-1970*, Harvard University Press, Cambridge, Massachusetts, 1966, chapter 1.

25. See Zvi Griliches, "Distributed Lags: A Survey," *Econometrics*, January 1967, especially pp. 32-33.

Consider now the parameter estimates when household saving is defined in Department of Commerce terms, to include investment in owner-occupied housing.[26] The estimates of \hat{A}_1 , \hat{A}_2 , and \hat{A}_3 that result from fitting equation (3) to 61 quarterly observations (1953:II-1968:II) are given immediately below, with standard errors in parentheses:[27]

Total
Household
Saving

$$C = 0.798 C_{-1} + 0.197 \frac{Y + Y_1}{2} + 0.479 \Delta Y$$

(0.079) (0.075) (0.105)

$$R^2 = 0.9994 \quad S_e = 2.063$$

The estimates of $\hat{\Theta}$, \hat{k} , and $\hat{\delta}$, together with 0.90 and 0.95 confidence intervals, are presented in the following table.

Parameter Estimates	Confidence Intervals	
	0.90	0.95
$\hat{\Theta} = 0.898$	[0.288, 1.604]	[0.177, 1.758]
$\hat{k} = 0.976$	[0.960, 1.302]	[0.957, 1.081]
$\hat{\delta} = 0.533$	[0.345, 0.717]	[0.307, 0.753]

What results emerge from these parameter estimates? First, though the long run marginal propensity to consume is less than unity, $k = 1.00$ is in-

26. All computations were carried out by Michael Clurman, using a program written by William Raduchel. I am indebted to Professor Raduchel for writing a special sub-routine for computing confidence intervals according to Fieller's procedure.

27. This equation was also estimated with a constant term:

$$C = -0.679 + 0.802 C_{-1} + 0.196 \frac{Y + Y_{-1}}{2} + 0.453 \Delta Y$$

(1.24) (0.0799) (0.0756) (0.116)

$$R^2 = 0.9994 \quad S_e = 2.075$$

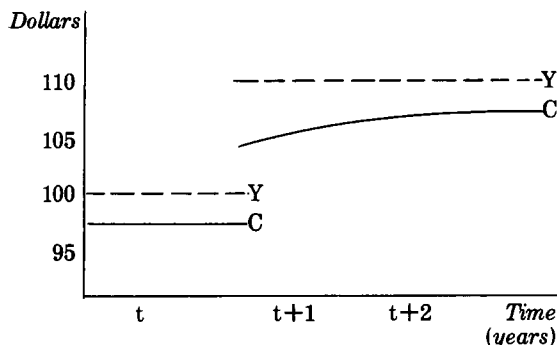
The Durbin-Watson statistic was 2.31.

cluded in both the 0.90 and 0.95 confidence intervals. Thus aggregate consumption and income data cannot be used to contradict the hypothesis that the long-run marginal propensity to consume is unity even if household saving is defined to include investment in owner-occupied housing. In any event, the estimate $\hat{k} = 0.976$ is considerably higher than the average propensity to consume, which — on present definitions of income and consumption — was just under 0.95 over the 15-year period in question.

Second, the estimate of the short-run marginal propensity to consume, $\hat{\delta} = 0.533$, is significantly different from zero. This estimate suggests a rapid immediate adjustment of consumption to income, an adjustment hard to reconcile with Friedman's idea that "transitory" income has no impact on consumption.[28]

Taken with the estimate $\hat{\Theta} = 0.898$, a \$1.00 increase in household income from an initial position of equilibrium would, if sustained, produce a consumption change of \$0.80 within a one-year period. The figure below illustrates the response of consumption over time to a once-and-for-all income change at time t , assuming households are in equilibrium at time t .

FIGURE 1:



$C(t^-) = 97.6$	$C(t + 5/4) = 106.0$
$C(t^+) = 102.9$	$C(t + 6/4) = 106.3$
$C(t + 1/4) = 103.7$	$C(t + 7/4) = 106.5$
$C(t + 2/4) = 104.5$	$C(t + 2) = 106.7$
$C(t + 3/4) = 105.2$	$C(t + 3) = 107.0$
$C(t + 1) = 105.6$	$C(\infty) = 107.4$

The implications of quarterly time-series data are even more striking when financial saving replaces total saving. First of all, the accumulation of financial assets net of liabilities, taken together with investment in noncorporate business, was

28. Friedman, *op. cit.*, chapter 3.

hardly two percent of household income over the 15 year period 1953-1968.[29] Second, the estimate of the long-run marginal propensity to consume is almost precisely 1.00. Third, the lag in adjusting spending to income, which (along with the growth in household incomes) explains the difference between the average and marginal propensities to consume, is even shorter than on the previous definition of saving.

Specifically, the equation relating consumption to income becomes

Financial
Saving

$$C = 0.408 C_{-1} + 0.594 \frac{Y + Y_1}{2} + 0.130 \Delta Y$$

(0.119) (0.119) (0.278)

$$R^2 = 0.9957 \quad S_e = 5.610$$

The coefficient of ΔY is less than half its standard error, presumably because of multicollinearity. This does not, however, mean that consumption adjusts slowly to income; if we estimate the relationship between consumption and income without ΔY , we obtain the equation[30]

Financial $C = 0.387 C_{-1} + 0.616 \frac{Y + Y_1}{2}$
Saving

(0.110) (0.108)

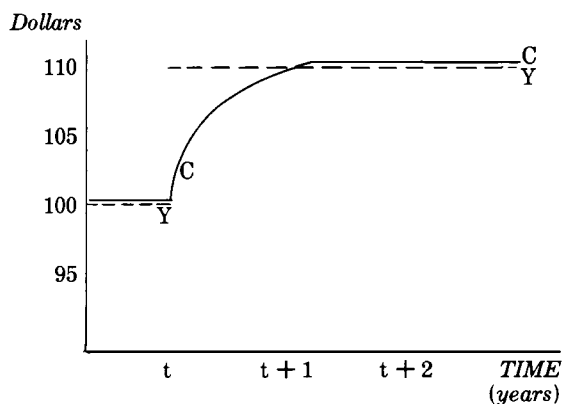
$$R^2 = 0.9957 \quad S_e = 5.572$$

Estimates for $\hat{\Theta}$ and \hat{k} are presented below, together with their confidence intervals:

Parameter Estimates	Confidence Intervals	
	0.90	0.95
$\hat{\Theta} = 3.537$	[2.189, 5.298]	[1.958, 5.712]
$\hat{k} = 1.005$	[0.998, 1.017]	[0.996, 1.021]

The estimate $\hat{\Theta} = 3.537$ implies that within one quarter a \$1.00 increase in income leads to a \$0.60 increase in spending. If the \$1.00 increase is sustained for a year, spending adjusts to \$0.95. Figure Two illustrates the path of adjustment from one equilibrium to another that accompanies a jump in income.

FIGURE TWO:



$C(t) = 100.5$	$C(t + 5/4) = 110.4$
$C(t + 1/4) = 106.4$	$C(t + 6/4) = 110.5$
$C(t + 2/4) = 108.7$	$C(t + 7/4) = 110.52$
$C(t + 3/4) = 109.9$	$C(t + 2) = 110.54$
$C(t + 1) = 110.2$	$C(\infty) = 110.55$

29. A simple regression of consumption against income yielded the equation

$$C = 0.988 Y$$

(0.0023)

$$R^2 = 0.9942 \quad S_e = 6.375$$

30. Regressions were also run with constant terms, with the following results:

$$C = 8.688 + 0.275 C_{-1} + 0.70 \frac{Y + Y_1}{2} + 0.348 \Delta Y$$

(3.51) (0.126) (0.121) (0.281)

$$R^2 = 0.9961 \quad S_e = 5.377 \quad D.W. = 2.15$$

$$C = 7.327 + 0.245 C_{-1} + 0.735 \frac{Y + Y_1}{2}$$

(3.35) (0.125) (0.118)

$$R^2 = 0.9960 \quad S_e = 5.402 \quad D.W. = 2.00$$

The constant terms are significant at the 0.95 level, though barely so in the second equation. In view of the inherent unreliability of the data and what I understand to be an upward bias in the estimate of the constant term due both to simultaneous-equations bias and to errors of measurement in the independent variables, the evidence hardly seems to warrant rejecting the hypothesis that the constant term is in fact zero. Cf. Ando and Modigliani, *op. cit.*, p. 63.

The estimate of the long run marginal propensity to consume, $\hat{k} = 1.005$, is in close harmony with the overall view of household savings propounded in this paper. Equally impressive, perhaps, is the narrow band of the confidence interval. These results, taken together with the relatively rapid adjustment of spending to income implied by the data, can give little comfort to anyone who would rely on household decisions to provide for the expansion of the means of production.

With a long-run marginal propensity to consume in the neighborhood of 1.00, feasible rates of long-run growth are nonexistent or miniscule for combinations of parameter values suggested by household behavior and conventional estimates of capital productivity. Assuming

$$\dot{C} = \Theta(kY - C) + \delta\dot{Y},$$

the general formula relating steady-state consumption and income is

$$\frac{C}{Y} = \frac{\Theta k + \delta g}{\Theta + g}$$

where g represent the rate of growth. That is to say, (4) holds when income, consumption, and saving are all growing continuously at the rate of g . [31]

The problem is that equation (4) takes g as exogenous, which is reasonable only if the rate of growth is determined primarily outside the household sector. If households controlled all income, the equilibrium growth rate would have to take account of the relationship

$$\sigma s = g$$

where σ represents the incremental output:capital ratio and s represents the rate of aggregate saving (= aggregate investment) to income; that is, if households controlled all income, we should have

$$s = 1 - \frac{C}{Y} \quad (5)$$

31. Thus, with $k = 1.005$, $\delta = 0.0$, and $\Theta = 3.54$, $g = 0.06$ is consistent with $C/Y = 0.988$, the trend ratio over the 15 years of record with saving defined in financial terms. In other words, with steady growth at a rate of 6%, an average propensity to consume of 0.988 is consistent with a long-run propensity to consume of 1.005 and adjustment coefficients of $\Theta = 3.537$, $\delta = 0.0$.

Substituting from (5) into (4) gives the equilibrium relationship

$$\frac{g}{\sigma} = \frac{\Theta(1 - k) + g(1 - \delta)}{\Theta + g} \quad (6)$$

With k approximately 1.00 and δ equal to 0.0, equation (6) reduces — for nonzero g — to

$$\sigma = \Theta + g,$$

so that positive steady-state growth is infeasible unless the output:capital ratio exceeds the rate of adjustment of spending to income, that is, unless $\sigma > \Theta$. Steady growth pretty clearly requires intermediation between households and resource allocation, since σ may reasonably be taken to lie between 0.2 and 0.4, and the 0.95 confidence interval puts Θ between 1.96 and 5.71.

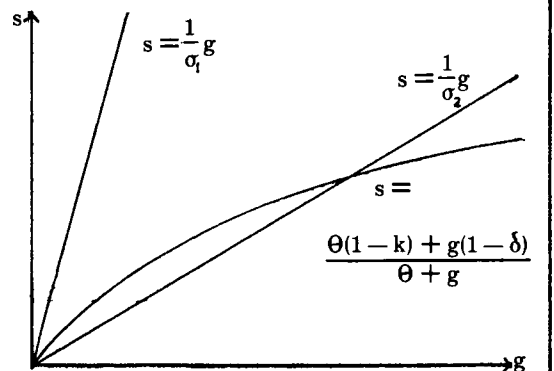
If we look at total saving rather than financial saving, steady growth is feasible for all values of σ , [32] but the rates of growth corresponding to the values of σ between 0.2 and 0.4 are hardly encouraging. [33] Substituting the maximum-likelihood estimates $\hat{\Theta} = 0.90$, $\hat{k} = 0.976$, $\hat{\delta} = 0.53$, equation (6) becomes

$$\frac{g}{\sigma} = \frac{0.0216 + 0.47g}{0.9 + g}$$

32. Plotting the productivity identity and the savings equilibrium

$$s = \frac{1}{\sigma} g \quad s = \frac{\Theta(1 - k) + g(1 - \delta)}{\Theta + g}$$

on a common graph, we have a picture like the following for the case $k = 1$:



Existence of an equilibrium in the interior of the positive orthant depends on the slopes of the two curves. In the picture a positive equilibrium exists for $\sigma = \sigma_2$ but not for $\sigma = \sigma_1$.

Thus, with households controlling all income,

$$\sigma = 0.20 \text{ implies } g = 0.0054$$

$$\sigma = 0.30 \text{ implies } g = 0.0084$$

$$\sigma = 0.40 \text{ implies } g = 0.022.$$

With a growing population, these rates of growth are hardly adequate even to maintain a constant standard of living, much less to increase it at a rate consistent with the proposition that capitalism provides ever-increasing abundance for all.[34]

Up to a point, these results are consistent with the Fisherian hypothesis of Friedman and Modigliani, as well as with the disequilibrium hypothesis. As long as we do not take Fisher so seriously that we assume the estimates $\hat{\Theta}$, $\hat{\delta}$, and \hat{k} are conditioned by the existence of non-household saving — provided, in other words, we do not attempt to explain the high marginal propensity to consume and rapid adjustment of spending to disposable income by the existence of savings households don't control — the difference between competing explanations of household behavior turn principally on the values of the parameters estimated from income and spending data. When Friedman and Modigliani reduce permanent income or life-time resources to observable magnitude, their consumption functions hardly differ *in form* from the consumption function suggested by the disequilibrium hypothesis.[35]

Take Friedman. Consumption is supposed to

depend on permanent income, Y_p . In particular, it is hypothesized to be strictly proportional:

$$C = k' Y_p$$

so that the rate of change of consumption is proportional to the rate of change of permanent income

$$\dot{C} = k' \dot{Y}_p. \quad (7)$$

But how is permanent income estimated? By a recursive relationship that makes the change in each household's permanent income proportional to the difference between its actual income and its current idea of permanent income, as well as to current permanent income, the second term supposedly reflecting long-run growth in permanent income:

$$\dot{Y}_p = B(Y - Y_p) + a\dot{Y}_p. \quad (8)$$

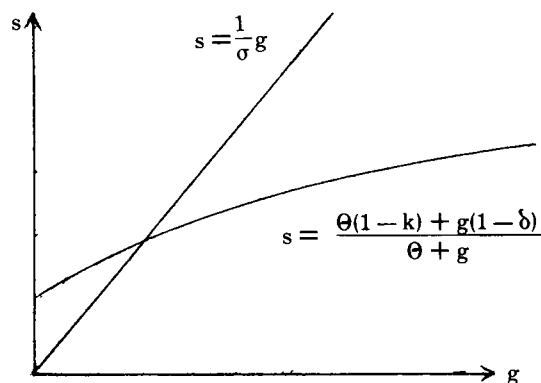
Combining (7) and (8), we have

$$\dot{C} = k' B Y - (B - a) C \quad (9)$$

Here is the rub: equation (9) is but a restricted version of equation (2) in which θ is constrained to be zero. Except for the suppression of Y , the sole difference between (2) and (9) lies in the interpretation of the parameters, which are related to one another by the formulas

$$\Theta = B - a \quad k = \frac{k' B}{\Theta}$$

With $k < 1$, we have a positive intercept for the savings-equilibrium function



and a positive equilibrium exists for every value of σ .

33. Indeed, if output and capital include the rental value and stock of owner-occupied housing as well as producers' goods, the reasonable range of σ might be shifted

downward considerably at both ends.

34. Would zero population growth rescue capitalism? Probably not, for the output:capital ratio would be adversely affected if the opportunity for widening capital that population growth presents were to disappear, and all investment became of necessity capital-deepening.

35. It can be shown that the rule

$$\dot{C} = \Theta(Y - C)$$

emerges from maximization of a utility function of the form

$$U = \int_0^T e^{-\Theta t} \log C(t) dt$$

subject to the life-time wealth constraint

$$\int_0^T C(t)e^{-\rho t} dt = \int_0^T Y(t)e^{-\rho t} dt + A_0$$

where A_0 represents material assets, ρ the rate of interest, and Θ the (subjective) rate of discount of utility.

That is, the discrete analog of (9) can be interpreted in terms of the permanent-income hypothesis or in terms of the disequilibrium hypothesis. In both cases we have

$$C = A_1 C_{-1} + A_2 \frac{Y + Y_{-1}}{2}$$

and

$$\Theta = \frac{8(1 - A_1)}{1 + A_1} \quad k = \frac{A_2}{1 - A_1}$$

or

$$B - a = \frac{8(1 - A_1)}{1 + A_1}$$

$$k = \frac{A_2}{1 - A_1 + a/8(1 + A_1)}$$

Apart from interpretation, the only difference between the two approaches is that Friedman's introduces an extra parameter a , to reflect an autonomous growth in permanent income that supposedly exists apart from the pull of current income on permanent income. Since two variables permit us to estimate at most two parameters, one of Friedman's three must be specified exogenously. Friedman opts for setting a equal to the long-term rate of growth in actual income, which he puts at 0.02. Following him, we have

$$a = 0.02 \quad B = \frac{8(1 - A_1)}{1 + A_1} + 0.02$$

and

$$k = \frac{A_2}{1.0025 - .9975 A_1}$$

Using the concepts of income and consumption elaborated earlier, the regression equation estimated for the period 1953:II—1968:II for total household saving is

Total
Household
Saving:

$$C = 0.678 C_{-1} + 0.318 \frac{Y + Y_{-1}}{2}$$

$$(0.0864) \quad (0.0813)$$

$$R^2 = 0.9992 \quad S_e = 2.385$$

If the estimates $\hat{A} = 0.678$ and $\hat{A}_2 = 0.138$ are interpreted in terms of the permanent-income hypothesis, we obtain the following results:

$$\hat{B} = 1.556 \\ \hat{k}' = 0.975$$

In terms of the disequilibrium hypothesis, the results are

Parameter Estimates	Confidence Intervals	
	0.90	0.95
$\hat{\Theta} = 1.536$	[0.781, 2.433]	[0.646, 2.630]
$\hat{k} = 0.986$	[0.972, 1.023]	[0.970, 1.038]

If saving is defined to exclude owner-occupied housing, the relevant equation has already been reported:

$$\text{Financial Saving } C = 0.387 C_{-1} + 0.616 \frac{Y + Y_{-1}}{2}$$

$$(0.110) \quad (0.108)$$

$$R^2 = 0.9957 \quad S_e = 5.572.$$

The results are

$$\hat{B} = 3.557 \\ \hat{k}' = 1.00$$

and

Parameter Estimates	Confidence Intervals	
	0.90	0.95
$\hat{\Theta} = 3.537$	[2.189, 5.298]	[1.958, 5.712]
$\hat{k} = 1.005$	[0.997, 1.017]	[0.996, 1.021]

If the data are interpreted in terms of the permanent-income hypothesis, the response of permanent income to actual income is quite rapid. $B = 1.556$ implies that, if initially permanent income and actual income are equal, a change in actual income of \$1.00 sustained for only one year leads to a revision of permanent income of \$0.79. $B = 3.557$ implies a virtually complete adjustment within a year's time: a \$1.00 sustained increase in actual income leads to a \$0.97 response in permanent income.

Such rapid adjustment is formally consistent with the permanent income hypothesis. Any speed of adjustment is! But the more rapidly permanent

income responds to current income, the less meaningful is the concept of permanent income as a distinct basis of spending decisions. If permanent income adjusts to actual income as quickly as the data suggests, it is hard to take seriously the idea that this unobservable construct represents a forecast of the sustainable yield on life-time resources, material and human.[36]

Modigliani's life-cycle hypothesis leads to equations equally easy as Friedman's to reconcile with the equations suggested by the disequilibrium hypothesis. But it is equally hard to reconcile the life-cycle hypothesis with the parameter estimates that emerge from the quarterly regressions. After aggregating over age cohorts, Ando and Modigliani[37] obtain a consumption function of the form

$$C = a_1 Y_L + a_2 Y_L^e + a_3 A, \quad (10)$$

where Y_L represents current (nonproperty) income; Y_L^e represents what Ando and Modigliani call the "average annual expected [nonproperty] income," defined as the present value of future expected labor earnings averaged over the earning span; and A represents households' net worth. Y_L^e , like Friedman's Y_p , is not observable. Ando and Modigliani assume that Y_L^e is equal to Y_L , which is to say that nonproperty income is expected to grow at a rate equal to the rate at which households discount future income.[38] Setting Y_L^e equal to Y_L , equation (10) becomes

$$C = (a_1 + a_2)Y_L + a_3 A. \quad (11)$$

36. Friedman's own regressions (*of. cit.*, chapter 5) differ in four respects for the present ones. First, they utilize annual rather than quarterly data. Second, the period covered is 1897 to 1949. Third, savings are defined to include consumer durables in addition to the elements of accumulation we have included under "total household saving." Fourth, the integral form of equation (9) is used, so that current consumption is regressed against a distributed-lag function of income. Friedman obtains an estimate $\bar{B}=0.40$, hardly one-quarter as large as our estimate based on total saving and one-ninth the size of our estimate based on financial saving.

37. Ando and Modigliani, *op. cit.*

38. Ando and Modigliani also test an alternative specification, in which current income is corrected by the unemployment rate in forecasting expected income. As they note, the analysis is not changed much by this relatively minor correction.

The formal similarity between the consumption functions that emerge from the life-cycle and disequilibrium hypotheses emerges clearly when equation (11) is differentiated with respect to time:

$$\dot{C} = (a_1 + a_2)\dot{Y}_L + a_3\dot{A} \quad (12)$$

Since \dot{A} , the rate of change of net worth, is the current rate of saving

$$\dot{A} = Y - C,$$

equation (12) can be written

$$\dot{C} = (a_1 + a_2)\dot{Y}_L + a_3(Y - C). \quad (13)$$

But this is the same equation as (1) except for the substitution of \dot{Y} for Y . Ignoring this difference and differences in the treatment of capital gains and consumer durables,[39] we have

$$a_1 + a_2 = \delta \quad a_3 = \Theta.$$

The life cycle hypothesis thus shares with the disequilibrium hypothesis the prediction that the long run marginal propensity to consume is 1.00. But the "long run" for Modigliani is of the order of a life time, not the year or two that is implicit in the disequilibrium hypothesis. The data suggest parameters more in accord with the disequilibrium view of saving than with the life-cycle view.

Modigliani and Ando make three assumptions that enable them to predict a range of numerical values for the coefficients $a_1 + a_2$ and a_3 : (1) households' utility functions are such that they allocate resources uniformly over life spans assumed to be 50 years; (2) earnings of various age groups are the same in any given year, and expected to remain the same at all times within the earning span assumed to be 40 years overall; and (3) the rate of return on households' assets is constant over time and over households and expected to remain constant.[40] With these assumptions, the anticipated ranges of $a_1 + a_2$ and a_3 are respectively [0.61, 0.73] and [0.08, 0.12] for rates of return and growth rates lying respectively between 0 and 5 percent and 0 and 4 percent.[41]

39. Ando and Modigliani include both in their definition of saving.

40. Ando and Modigliani, *op. cit.*, p. 59.

41. *Ibid.*, p. 60.

The estimate of $a_1 + a_2$ that emerges from the very first regression reported in this paper

Total Household Saving:

$$C = 0.798 C_{-1} + 0.197 \frac{Y + Y_{-1}}{2} + 0.479 \Delta Y$$

(0.079) (0.075) (0.105)

$$R^2 = 0.9994 \quad S_e = 2.063$$

$$\hat{a}_1 + \hat{a}_2 = \hat{\delta} = 0.533 \quad \hat{a}_3 = \hat{\Theta} = 0.898$$

is not far from the Ando Modigliani prediction. Moreover the estimate $\hat{a}_1 + \hat{a}_2 = 0.533$ agrees rather closely with the Ando-Modigliani estimate based on annual data from an earlier period and on a definition of saving that includes capital gains and consumer durables.[42] But the estimate $\hat{a}_3 = 0.898$ is well outside the range plausibly consistent with the Ando-Modigliani prediction that \hat{a}_3 would fall in the interval [0.08, 0.12]. It is hard to interpret the estimate $\hat{a}_3 = 0.898$ in terms of a deliberate and conscious allocation of wealth between current and future consumption.[43]

All these tests and comparisons of the disequilibrium hypothesis — comparisons with the permanent-income hypothesis as well as comparisons with the life-cycle hypothesis — are limited by the

form in which the data come to us. Aggregate time series based on national income accounts suffer from defects too obvious to require extensive discussion. But it should be borne in mind that for our purposes aggregate time series appear to offer the only worthwhile basis for comparison of competing explanations of household behavior, at least until such time as an adequate number of long-term profiles of income and spending of individual households become available. Certainly cross-sections of the kind used by Friedman and Modigliani are beside the point. These cross-section analyses may discriminate between the permanent-income or the life-cycle hypothesis and the naive hypothesis that consumption depends solely on current income, and it may have been important at one time to lay the naive view to rest.[44] But I can detect no results from these cross-sections that are not as consistent with the disequilibrium hypothesis as with the permanent-income or life-cycle hypothesis. For example, both Friedman[44] and Modigliani[45] interpret the inconsistency between estimates of the propensity to consume based on cross-section relationships between consumption and income and the estimates based on time-series relationships in terms of a positive correlation between transitory income and observed income in cross-

42. Ando and Modigliani obtain the estimate $\hat{a}_1 + \hat{a}_2 = 0.52$ in equation (6), p. 64, *ibid.*

43. With k constrained to be equal to 1.00, as both the life-cycle and disequilibrium hypotheses predict, a regression of consumption against income and lagged consumption variables give the results below. Saving is here defined to include investment in owner-occupied housing (but not consumer durables, capital gains, or pension fund contributions).

$$C = 0.120 \left(\frac{Y + Y_{-1}}{2} - C_{-1} \right) + 0.477 \Delta Y$$

(0.031) (0.105)

$$R^2 = 0.5988 \quad S_e = 2.066$$

$$\hat{a}_1 + \hat{a}_2 = \hat{\delta} = \frac{2(0.477)}{2 - (0.12)}$$

$$\hat{a}_3 = \hat{\Theta} = \frac{8(0.12)}{8 - 4(0.12)}$$

Parameter Estimates

Confidence Intervals

	0.90	0.95
$\hat{a}_1 + \hat{a}_2 = \hat{\delta} = 0.507$	[0.329, 0.678]	[0.292, 0.710]
$\hat{a}_3 = \hat{\Theta} = 0.513$	[0.287, 0.751]	[0.244, 0.700]

44. Obviously many Keynesians believed this naive view in the years immediately following the publication of *The General Theory of Employment, Interest, and Money*, Harcourt Brace and Co., New York, 1936. But Keynes himself was more circumspect in limiting the dependence to a relatively short period in which the lagged values of income and consumption might reasonably be regarded as fixed. Consider how Keynes qualifies his "fundamental and psychological law . . . that men are disposed, as a rule and on the average, to increase their consumption as their income increases, but not by as much as the increase in their income" (p. 96):

This is especially the case where we have short periods in view, as in the case of the so-called cyclical fluctuations of employment during which habits, as distinct from more permanent psychological propensities, are not given time enough to adapt themselves to changed objective circumstances. For a man's habitual standard of life usually has the first claim on his income, and he is apt to save the difference which discovers itself between his actual income and the expense of his habitual standard, or, if he does adjust his expenditure to his income, he will over short periods do so imperfectly. Thus a rising income will often be accompanied by increased saving, on a greater scale at first then subsequently.

45. Friedman, *op. cit.*, chapter 4.

sections. But the inconsistency is equally explicable in terms of the disequilibrium hypothesis: in a random cross section of households one would expect that the upper-income brackets would include a larger than average proportion of families that recently enjoyed income increases to which they have not yet adjusted their consumption; similarly, it is to be expected that a larger than average proportion of low income families recently suffered reverses to which they have not yet adjusted. Disequilibrium rather than any differences between transitory and permanent incomes would thus account for the relatively low propensity to consume estimated from cross-section studies.[46]

This is not to say that cross sections are of no value in assessing the relative merits of the disequilibrium hypothesis and its Fisherian competitors. On the contrary: at the very beginning of this section, I emphasized the importance of studying the impact of corporate saving on household saving. And Philip Cagan's analysis of the effects of pension plans on household saving was cited in support of the disequilibrium hypothesis.

Indeed, Cagan's results may contain more implications than have thus far been exploited. In terms of the disequilibrium hypothesis, the rise of private pension plans and the assumption of public responsibility for old-age insurance explicit in the social-security system would be explained as social responses to a lack of deliberation and planning in households' saving decisions. In fact, I know of no society in which provision for retirement is left to the individual or the nuclear family. In much of the world, the extended family predominates, and the maintenance of the elderly is a common responsibility of their able-bodied kin — children, nephews, and so forth. Capitalist societies, it is true, for a time experimented with individual responsibility, only to learn that for the typical household the benefits of saving for a distant future were no match for the temptations of current spending. My university — and it is in no sense exceptional in this regard — never asked me if I wished it to set aside income for my retirement rather than paying it out to me. Possibly it fears that if I were to control the money it allocates to my future, I might put off saving for so long that I would eventually join the ranks of the street people in Harvard Square, besmirching the name of Fair Harvard by importuning passers-by for spare change.

Formal models apart, there is one disaggregative test of the competing hypotheses that a fair number of you who are reading these words are in a position to perform, prospectively or retrospectively. Graduate students, as a group, have current incomes far below their "permanent incomes," on any reasonable interpretation of the term. Certainly if graduate students planned their current consumption in terms of their life-time resources, they would live well beyond their present means. But how many in fact exhaust the possibilities for borrowing in order to bring their standard of living up to anything like what it might reasonably be on the basis of their life-time resources? Casual empiricism suggests that the overwhelming majority limit their borrowing to the expenses of their education and the basic necessities of life.

And the plot thickens. A further test of the disequilibrium theory of saving is the effect on savings behavior of the transition from graduate student to academician or bureaucrat. It will be the case, I am willing to predict, that upon taking your first full-time job and suddenly finding yourself with a salary in excess of \$10,000 you will save incredible amounts of money — perhaps a quarter of more of your disposable income. You will have to search for ways to spend sums that far exceed the income on which your life style has been patterned the last several years. But don't worry. If your experience resembles mine, you will learn quickly enough. It won't be long before you have as much trouble making ends meet as you did as a graduate student.[47]

Indeed, the Fisherian paradigm is in my view much more notable as an illustration of the intellectual sleight of hand that characterizes the teaching of the neoclassical theory of choice than as a model of household behavior. After struggling with and finally mastering the intricacies of the house-

47. Thus the disequilibrium hypothesis as well as the permanent-income hypothesis affords little comfort to those who argue that income inequality promotes capital accumulation. This idea has such obvious appeal for the rich, especially for oligarchies that dominate most poor countries, in providing a social justification for their wealth and income, that it is not easily shaken by argument or evidence. Insofar as there is truth to the view that inequality promotes accumulation, it is—according to the argument developed here—inequality of control, not inequality of income or wealth, that matters. The two kinds of inequality are obviously related in capitalist society. Egalitarian, nonhierarchical societies well might forge collective decision-making mechanisms for allocating generous amounts of resources to accumulation, but how long it would take is an open question.

46. Modigliani and Brumberg, *op. cit.*, pp. 406 ff.

wife's choice between canned peaches and canned pears, the grateful student is one day told that at last he possesses a general theory equally applicable to all household decisions. All that is required to apply the model in unfamiliar contexts is a suitable relabeling of the axes of the choice diagram: to apply the model to intertemporal choice problems, it is merely necessary to substitute "present consumption" for "canned peaches" and "future consumption" for "canned pears;" and the interpret the "budget line" in terms of "life-time resources" and the relative "prices" of present and future consumption rather than in terms of income and the prices of peaches and pears. The student's profound relief at learning that he has mastered a universally applicable theory, coupled with the teacher's reassuring confidence in the theory, typically prevents him from examining the substantive differences hidden by the formal similarity with the peaches-pears paradigm.[48]

These substantive differences are of two kinds. First, formal statements of the theory of neoclassical choice simply take preferences — endowed with such mathematical properties as completeness and consistency — as given. Presumably a neoclassical economist would argue that this is a legitimate simplification of the outcome of a process by which trial and error determine preferences. And when it comes to peaches and pears, I suppose I have no serious quarrel with this justification of the assumption of a meaningful preference ordering. But there are serious differences between the plausibility of a trial-and-error process in the context of choosing between peaches and pears and its plausibility in the context of intertemporal choice. In the peaches-pears model, it is reasonable to suppose that choices are made repeatedly in the space of a short time, with little time elapsing between any specific decision and the realization of its consequences. The housewife buys canned fruit on Monday, her family eats it during the week, and the process is repeated seven days later. By contrast, the choice of an intertemporal consumption plan can reveal its consequences to the decision-maker only gradually. By the time a twenty-five year old realizes the consequences of his choices, he is — let us say — thirty, with new responsibilities and obligations. For relevant purposes, he can reasonably be considered a different person. Certainly he is not

48. With luck, however, you may save enough over the learning period to make the down-payment on a house.

making a similar decision in a similar context, in the sense that the housewife can be assumed to be in the trial-and-error processes that lie behind the preferences she exhibits in the supermarket. For the housewife the relationship between the choice of canned fruit and realization of the consequences of this choice is clear, immediate, and direct. By contrast, the lack of such a clear, immediate and direct relationship between a household's saving decisions and its future consumption pattern presents a significant obstacle to basing the assumption of a meaningful preference ordering on a trial-and-error process of comparing intertemporal consumption plans. And apart from a background of trial and error, I know of *no* justification for the neoclassical postulate that complete and consistent preferences exist.

But whatever one believes about the similarity of intertemporal preferences to the timeless "indifference maps" on which neoclassical choice theory is built, there can hardly be any question that the budget line must play a role in the neoclassical model of intertemporal choice that differs fundamentally from its role in the timeless model. In the intertemporal context, the budget line must necessarily reflect a subjective estimate of one's future earnings, as distinct from the income that the budget line can plausibly be assumed to represent with certainty in a model of the housewife's decisions in the local supermarket. In my view, the uncertainties that surround most households' estimates of future earnings, especially insofar as these reflect wages and salaries, reduce the idea of deliberate choice of a life-time consumption plan based on maximization of life-time utility subject to a life-time "budget" constraint to a parody of the actual choice process.[49]

This is not to say that literally no one saves deliberately. Hardly a month goes by, for example, that a newspaper does not print a story about an old man or woman who, having lived in abject poverty, dies with a hoard of carefully accumulated cash stuffed under the mattress. Obviously these savings, like the savings of the Calvinist entrepreneur of Weberian fame,[50] are not adequately ac-

49. Of course, the deeper he studies the formal properties of the paradigm, and the greater the effort he is obliged to make, the greater the psychological investment he has in the theory. The less tempting, therefore, is serious and thorough questioning.

50. In a survey of households conducted by George Katona and Eva Mueller, only 15 percent of the respon-

counted for by the disequilibrium theory.[51] But neither, I would submit, are such savings accounted for by the utility calculus of neoclassical theory. Surely the power, prestige, status, and psychological security that derive from financial or industrial empire are more relevant to the explanation of atypically large individual saving rates than is a balancing of the gratifications of future consumption against the pleasures of present consumption. Surely it is ludicrous in the extreme to suppose that the Rockefeller clan balances an extra yacht today against a yacht and a half ten years hence, as the Fisherian model would suggest.

Whatever qualifications may be necessary to explain deviations from the norm, my hypothesis remains that capitalists as individuals, like workers,

dents claimed to have a "pretty firm idea how much they ought to save." The majority said they saved whatever they could manage. (Katona and Mueller, *Consumer Responses to Income Increases*, Brookings Institution, Washington, D. C. 1968, p. 90).

51. Max Weber, *The Protestant Ethic and the Spirit of Capitalism*.

52. But there is no reason to retreat overly hastily. The savings of an Arkwright might as well be accounted for by the disequilibrium hypothesis as by the Protestant Ethic. The income of many early entrepreneurs, like the income of the proverbial Texas oil baron, may simply have grown faster than it could be spent, no matter how aristocratic one's tastes

save principally when their incomes rise faster than they can manage to spend them. On a statistical basis capitalists may save a significantly larger portion of their disposable incomes than do workers, and for many purposes there may be adequate justification for reflecting this statistical regularity in the postulate that saving propensity is a matter of income class. But this does not in itself contradict the disequilibrium hypothesis: successful workers become capitalists and failed capitalists become workers; the differences in savings rates are thus accountable in terms of income changes. In my view the significant dichotomy with respect to saving rates is not based on differences in individual incomes, but on the differences between individuals and organizations. It is not the size of the capitalists' incomes or a special set of attitudes, a drive towards accumulation, that matters. It is rather capitalist control of the production process that gives this class a dominant role in determining the rate of saving.

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*Those who take the meat from the table
Teach contentment.
Those for whom the taxes are destined
Demand sacrifice.
Those who eat their fill speak to the hungry
Of wonderful times to come.
Those who lead the country into the abyss
Call ruling too difficult.
For ordinary folk*

—Bertolt Brecht