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5 Some Thoughts on Savings

Edward P. Lazear

Concern over the poor savings performance of the United States has been growing. Many pointed out the "problem" early, and Feldstein made it a major theme of his time on the Reagan Council of Economic Advisors. Some have tried to explain the differences between savings rates in Japan and the United States, attributing the differences sometimes to measurement and sometimes to real factors.

This essay asks more fundamentally whether differences or inadequacies in savings behavior affect welfare, and if so, how. Essentially, it is an attempt to reconcile taste differences and to ask whether the differences have implications for government-sponsored saving. Further, it asks whether differences in savings behavior across countries or over time have any implications for welfare.

The discussion is divided into three parts. The paper begins with a brief review of the issues, focusing on low U.S. savings rates, the behavior of the rates over time, and the rates in comparison to those of other countries, primarily Japan. Second, implications of low-saving behavior for social welfare are examined. This section forms the heart of the paper because it discusses by which criterion savings rates are too low. Third, some conceptually different measurement issues are discussed. The key points are:

1. There is no apparent way to reconcile differences between the U.S. and Japanese savings rates without an appeal to tastes differences. Even within the United States, it is difficult to explain savings behavior over time in the frame-

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work of a population with a homogeneous utility function. Particularly, differences in demographics cannot go far enough to explain the dramatic fall in savings rates during the 1980s.

2. In a world without tax distortions and other externalities, any attempt to increase American savings rates would raise income for most of the individuals in society, but would lower social welfare.

3. The most obvious type of intergenerational externality, which takes the form of underinvestment in human capital, does nothing to reconcile differences in savings rates. Reducing the externality in the United States would, if anything, increase the divergence between American and Japanese measured savings rates.

4. When we argue that there is too little saving, it is important to specify how we establish the optimal level of saving from which the observed level deviates. Depending on the social welfare function, over- or undersavings can result. If the social planner cares only about efficiency, then private savings decisions are optimal even if they result in low savings rates. If the social planner has a utilitarian function, then saving is too high or too low depending on the amount that parents love their children relative to the amount that children love their parents. If love is symmetric, then private savings rates are optimal. When love goes primarily one way (from parent to the child), undersavings, possibly by a very large amount, by both generations results.

5. The ability of the older generation to free ride on their children results in less saving by both generations. The extent of the undersavings depends on the amount that children care for their parents and on the social welfare function.

6. If the worry over low savings is that one's child suffers for one's current consumption, the concern can be alleviated individually. Any one person can save and pass income to his child directly, without the acquiescence of fellow citizens. Collective action is necessary only when one American cares about another American's child but not about foreign children.

7. On-the-job saving is likely to make it more rather than less difficult to explain differences in saving between the United States and Japan. If anything, taking on-the-job saving and investment into account would make Japanese rates even higher relative to American ones.

The conclusion is that there may well be too little saving in the United States. Whether there is or not depends on the preferences of individuals in society and on the social welfare function. Indeed, some increases in saving may even be Pareto improving under specific assumptions about individual utility functions. Unfortunately, none of the evidence on cross-country comparisons nor on time-series changes in savings rates in the United States bears on the undersaving issue. The fact that the United States saves less than Japan indicates neither that we save too little nor that they save too much. Other evidence about preferences is necessary to determine whether our savings rates are too low.

5.1 Macroeconomic Issues

The thrust of the literature over the past few years is that the American savings rate is too low, particularly when compared to other countries (see Summers 1986; Summers and Carroll 1987; Munnell and Cook 1991; Kopcke, Munnell, and Cook 1991; Auerbach and Kotlikoff 1983; Christiano 1989). A number of researchers have tried to rationalize that fact, whereas others have tried to show that it is not a fact, i.e., that the data give a misleading picture, especially for international comparisons.

5.1.1 The Standard Model

Before considering these claims, let us specify the problem more clearly. The usual way to think about saving is in an overlapping generation context. Each individual lives two or three periods, and the first generation is old when the next generation is young or middle-aged. The model here uses a three-period lifetime. Think of the individual as living to age 90; period 1 corresponds to ages younger than 30, period 2 to ages 30–60, and period 3 to ages above 60. The individual is assumed to work in periods 1 and 2 and to retire during period 3. Retirement can be defined as that period when marginal productivity at work falls short of the value of leisure, so that retirement is endogenous rather than given.

No explicit bequest motive is incorporated into the analysis. Of course, one can think of the utility from consumption in period 3 as being partially the result of own consumption and partially the result of utility from bequests.

An individual of generation i has wages during period t of W_{it}. Individuals of generation i live during periods i, $i + 1$, and $i + 2$, so the first generation lives in periods 1, 2, and 3, whereas the second generation lives during periods 2, 3, and 4, and so forth. Consumption by i in t is denoted as C_{it}, and savings are similarly denoted S_{it}.

First, consider only the first generation's consumption program. Individuals of this generation earn wages during periods 1 and 2 but have no wages in period 3. Their problem is to save so as to maximize utility according to

$$(1) \quad \max_{S_1, S_2} U(W_1 - S_1) + \delta U(W_2 + S_1(1 + \rho) - S_2) + \delta^2 U(S_2(1 + \rho)),$$

assuming time-separable utility. The first-generation subscript is suppressed, δ is the discount factor, and ρ is the rate of return on capital.[1] The first-order conditions are

$$(2a) \quad -U'(W_1 - S_1) + \delta U'(W_2 + S_1(1 + \rho) - S_2)(1 + \rho) = 0,$$

$$(2b) \quad -U'(W_2 + S_1(1 + \rho) + \delta U'(S_2(1 + \rho))(1 + \rho) = 0.$$

1. Under the standard assumptions, in equilibrium, the marginal rate of return to capital equals $(1 - \delta)/\delta$.

Comparative statics are generally ambiguous. They can more easily be illustrated by assuming log utility, as is common. Under these circumstances, equation (2) becomes

$$\frac{-1}{W_1 - S_1} + \frac{\delta(1 + \rho)}{W_2 + S_1(1 + \rho) - S_2} = 0, \tag{3a}$$

$$\frac{-1}{W_2 + S_1(1 + \rho) - S_2} + \frac{\delta}{S_2} = 0. \tag{3b}$$

A number of points can be illustrated using this basic model. First, rewrite equation (3a) as

$$S_2 = W_2 - W_1\delta(1 + \rho) + S_1(1 + \rho)(1 + \delta). \tag{4}$$

It is very likely that W_2 exceeds W_1, since the former is defined as earnings between ages 30 and 60 and the latter as earnings between ages 0 and 30. If so, then $S_2 > S_1$, because the usual equilibrium condition is that $(1 + \rho) = 1/\delta$.

This is the intuitive and empirically valid result that individuals save more when middle-aged than they do when they are young. Even without invoking the impetuousness of youth, it is natural to do more saving as a middle-aged individual because income is higher during the middle years.

The evidence from the United States is consistent with this basic result. Both Auerbach and Kotlikoff (1990) and Attanasio (1993) use the Consumer Expenditure Survey to estimate saving over the life cycle. Both sets of authors find that savings rates are relatively low before age 30, then peak and decline during the final years of life. Auerbach and Kotlikoff find that that consumption is less than earnings approximately between ages 20 and 60, but that consumption exceeds earnings at both ends of the life cycle.

Some of the results are consistent with observed international phenomena and some are not. Of particular interest is the comparison between the United States and Japan. Table 5.1 and figure 5.1 (a histogram) present information on the age distribution of the population in Japan and the United States in 1970. Table 5.2 presents a time series of savings rates.

The tables reveal not only that American rates are low but that Japanese rates are very high. When put in the context of the world economy, the U.S. rates do not appear to be low, except during the period of the 1980s. In some sense, the question is, Why are Japanese rates so high? not, Why are American rates so low? Still, the 1980s present a real discrepancy and one that has persistence without obvious explanation.

There is no particular trend in the difference between Japanese and American savings rates over the 1960–89 period. There has been some convergence since 1970, primarily because the Japanese savings rate, which was around 25 percent in 1970, has declined to more modest levels. But the fall in the American savings rate that occurred during the 1980s is reversing the convergence.

Demographics cannot explain all differences. The peak difference between

Table 5.1 **Population Composition in Japan and the United States, 1970**

Highest Age in Five-year Block	Japan	United States
	Number (millions)	
4	8.7	16.8
9	8.1	19.8
14	7.8	20.5
19	9	18.8
24	10.6	16.1
29	9	13.2
34	8.3	11.2
39	8.2	10.9
44	7.3	11.8
49	5.8	11.9
54	4.8	10.9
59	4.4	9.8
64	3.7	8.4
69	2.9	6.8
74	2.1	5.2
79	1.2	3.6
84	0.6	2.1
85+	0.2	1.5
	Proportion (%)	
30–59	37.7799	33.3668
20–49[a]	47.9065	37.6819
10–39[b]	51.5093	45.5093
40–69[c]	28.1402	29.9047

Sources: United Nations (1971, 1981); U.S. Bureau of the Census (1970, 1980).

[a]Relevant for 1980.

[b]Relevant for 1990.

[c]Relevant for 1960.

U.S. and Japanese savings rates was in 1970, when the difference was 19 percent. But the proportions of individuals 30–59 years old were more equal in 1970 than in 1980 (see table 5.1), even though savings rates were more equal in 1980. Indeed, middle-age population proportions were most equal in 1960, even though savings rate differences were about as large in 1960 as they were in 1980. While different ages can be defined as the high-saving years, it appears that a simple demographic explanation, based on the number of individuals in the high-saving cohort, does not explain the data. Japan always has a much higher savings rate than the United States, and the differences do not conform to differences in the age distribution of the population.

Perhaps a more sophisticated approach will reconcile some of the differences. One approach is to ask, How much higher would the U.S. savings rate be if the United States had the same age distribution as Japan? To do that, I have used the age distribution from table 5.1 and combined it with the earnings

Table 5.2 **Savings Rates, 1960–89**

Year	United States	Japan	Europe	Japan − United States	Europe − United States
1960	0.092	0.220	0.035	0.128	−0.057
1961	0.084	0.238	0.035	0.154	−0.049
1962	0.091	0.217	0.035	0.126	−0.056
1963	0.097	0.207	0.034	0.110	−0.063
1964	0.103	0.204	0.039	0.101	−0.064
1965	0.113	0.192	0.040	0.079	−0.073
1966	0.106	0.199	0.040	0.093	−0.066
1967	0.097	0.222	0.039	0.125	−0.058
1968	0.096	0.240	0.042	0.144	−0.054
1969	0.099	0.252	0.047	0.153	−0.052
1970	0.078	0.269	0.051	0.191	−0.027
1971	0.082	0.245	0.051	0.163	−0.031
1972	0.088	0.244	0.054	0.156	−0.034
1973	0.109	0.256	0.059	0.147	−0.050
1974	0.088	0.231	0.057	0.143	−0.031
1975	0.060	0.194	0.049	0.134	−0.011
1976	0.067	0.201	0.056	0.134	−0.011
1977	0.076	0.196	0.059	0.120	−0.017
1978	0.089	0.200	0.065	0.111	−0.024
1979	0.084	0.190	0.071	0.106	−0.013
1980	0.059	0.183	0.070	0.124	0.011
1981	0.064	0.179	0.062	0.115	−0.002
1982	0.027	0.170	0.064	0.143	0.037
1983	0.022	0.161	0.070	0.139	0.048
1984	0.044	0.170	0.081	0.126	0.037
1985	0.033	0.180	0.087	0.147	0.054
1986	0.022	0.180	0.098	0.158	0.076
1987	0.021	0.183	0.101	0.162	0.080
1988	0.031	0.192	0.119	0.161	0.088
1989	0.032	0.200	0.136	0.168	0.104

Source: National Accounts, 1960–89, Main Aggregates, vol. 1 (Paris: OECD, 1991).
Note: Savings is defined at net savings divided by GDP.

and consumption results from Auerbach and Kotlikoff (1990). I use the base year of 1980, when the difference in savings rates between the United States and Japan was 12 percent. The approach is to calculate weighted earnings and weighted consumption, where the weights are the population proportions. An "actual" number for the United States and a predicted number based on Japanese demographics are reported. They are calculated as

$$\text{(5)} \qquad \text{Actual savings rate on earnings} = \frac{\sum_{j=1}^{N} \gamma_j^{US} (W_j^{US} - C_j^{US})}{\sum_{j=1}^{N} \gamma_j^{US} W_j^{US}},$$

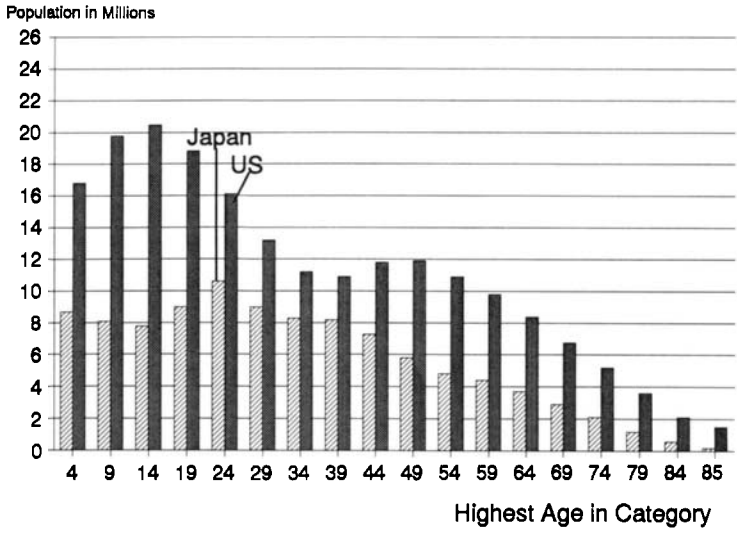

Fig. 5.1 Age distribution of population in Japan and the United States, 1970
Note: Horizontal axis reports highest age in five-year cell, except that "85" refers to individuals 85 or more years old.

where γ_j^{US} is the proportion of the population age group j in the United States in 1980, W_j^{US} is earnings, and C_j^{US} is consumption of group j in 1980. Correspondingly,

$$(6) \qquad \text{Predicted savings rate on earnings} = \frac{\sum_{j=1}^{N} \gamma_j^{\text{Japan}} (W_j^{US} - C_j^{US})}{\sum_{j=1}^{N} \gamma_j^{\text{Japan}} W_j^{US}}$$

The results is that the U.S. savings rate would have been 8.4 percent higher in 1980 if the United States had Japan's demographics.[2] This goes much of the way toward explaining differences across countries. The rest, it might be argued, results from measurement error. But demographics and measurement error cannot explain everything. Specifically, the rapid fall off in U.S. savings in the 1980s and the widening gap between American and Japanese savings cannot be attributed to demographics, which change slowly.

The time-series puzzle has been observed for the United States by others. As a number of authors have pointed out, it is impossible to explain the U.S. time series of savings rates simply by resorting to demographics (see, e.g., Attanasio 1993; Auerbach and Kotlikoff 1990; Summers and Carroll 1987).

2. This savings rate is not the same as the one reported in official accounts. The rate calculated is personal savings and does not correct for differences in business savings.

Attanasio invokes cohort effects to explain the decline in savings rates during the 1980s. He argues that the cohorts born between 1925 and 1939 were responsible for the decline in U.S. savings in the 1980s, because they are a low-saving cohort. During the 1980s, they were in the part of the life cycle when saving is highest. Cohort effects are, in this context, synonymous with taste differences, so resorting to cohort effects is an admission that we have no explanation.

The 1980s were a period when real income declined for a large portion of the population (see, e.g., Murphy and Welch 1991; Katz and Murphy 1991). One additional possibility is that the decline in real income affected saving, either because it was seen as a transitory shock, in which case savings would fall, or because it had an adverse impact on that part of the population which should be saving.

A decline in the wages of middle-aged workers depresses the savings of middle-aged workers but increases the savings of young workers. Differentiating along the first-order conditions in equation (3), one obtains

$$\left.\frac{\partial S_1}{\partial W_2}\right|_{(3)} = \frac{-1}{\delta(1 + 1/\delta)(1 + \rho)} < 0, \tag{7a}$$

$$\left.\frac{\partial S_2}{\partial W_2}\right|_{(3)} = \frac{1}{1 + 1/\delta} > 0, \tag{7b}$$

$$\left.\frac{\partial S_1}{\partial W_1}\right|_{(3)} = \frac{1}{1 + 1/\delta} > 0. \tag{7c}$$

A fall in the wages of the middle-aged would increase savings of the young, who are not big savers, and decrease savings of the middle-aged group that does the most saving. Further, decreased income among the young would depress their savings as well.

Still, this can at best explain the decline in savings rates in the 1970s and 1980s. It cannot reconcile differences across countries, nor is it consistent with low rates of saving during the 1960s.

In some sense, the life-cycle model, or some variant of it, is the only real model to explain savings behavior. Unfortunately, the model in its purest form, where tastes are assumed to be stable across countries and over time, does not explain enough. Invoking cohort effects, as Attanasio does, is analogous to using taste differences across countries to explain differences in saving behavior. Differences in the utility function (rather than prices or income) are the most natural candidate to explain differences in savings by cohort. But this is little better than saying that the Japanese save more than Americans because the Japanese have longer horizons and Americans live for today.

5.1.2 Interest Rate Sensitivity

One possibility is that interest rate differences over time or across countries explain savings behavior. At least the time-series behavior of savings and inter-

est rates can be easily examined. It is quite apparent that interest rates do not explain the U.S. time series of savings behavior.

Regressions of U.S. savings rates from table 5.2 on interest rates are presented in table 5.3. Three definitions of interest rates are used. In the first regression, nominal six-month T-bill rates are the independent variables. In the second and third regressions, real rates, either ex ante or ex post, are used. OLS regressions of savings on these rates do not support the view that savings responds positively to interest rates. Of course, there is a question of simultaneity here. Under the assumption that capital markets are global, American savers can be assumed to be price takers. If so, the elasticity of savings with respect to interest rates should be positive. But if individual countries face a given interest rate, then interest rates cannot possibly reconcile differences between U.S. and Japanese saving behavior. Both would face the same rates, and the United States saves at lower rates. Only if Japan were in one market and the United States in another could differences in interest rates reconcile international saving behavior.

A regression is not needed to point out the obvious. Table 5.4 presents data on interest rates and savings for the United States during the past 30 years. During the late 1960s, savings rates fell as interest rates rose. The relatively high savings period during the late 1970s had, on average, low interest rates. There is no clear pattern that emerges from looking at the data.

Table 5.3 **Regression of U.S. Savings Rates on Six-Month T-Bill Rates: Dependent Variable is U.S. Savings Rate**

Variable	DF	Parameter Estimate	Standard Error	*T*-Ratio	Prob > |*T*|
		1: Independent Variable Is the Nominal Rate			
INTERCEP	1	0.156995	0.03075496	5.105	0.0001
tbill	1	−2.000409	0.83798562	−2.387	0.0249
tbill×tbill	1	9.063007	5.10747294	1.774	0.0882
		$n = 28$, $R^2 = .34$			
		2: Independent Variable Is the Ex Ante Real Rate[a]			
INTERCEP	1	0.085371	0.00657687	12.981	0.0001
Real	1	−0.199755	0.22157425	−0.902	0.3759
Real×Real	1	−10.476829	2.68034044	−3.909	0.0006
		$n = 28$, $R^2 = .39$			
		3: Independent Variable Is the Ex Post Real Rate[b]			
INTERCEP	1	0.081496	0.00562217	14.496	0.0001
"Real"	1	−0.404860	0.18993127	−2.132	0.0430
"Real"×"Real"	1	−3.418567	3.34519428	−1.022	0.3166
		$n = 28$, $R^2 = .33$			

[a]Calculated as the nominal rate minus the predicted rate of inflation, using a three-year moving average of CPI-based inflation figures.

[b]Calculated as the nominal rate minus actual inflation during the subsequent year, based on CPI figures.

Table 5.4 **Savings and Interest Rates in the United States**

Year	Savings	Six-Month *T*-Bill	Real Ex Ante	Real Ex Post
1962	0.091	0.030	0.018	0.018
1963	0.097	0.030	0.018	0.016
1964	0.103	0.037	0.024	0.013
1965	0.113	0.039	0.025	0.024
1966	0.106	0.047	0.031	0.020
1967	0.097	0.048	0.027	0.016
1968	0.096	0.054	0.025	0.011
1969	0.099	0.063	0.025	0.007
1970	0.078	0.079	0.030	0.001
1971	0.082	0.045	−0.009	0.026
1972	0.088	0.037	−0.012	0.013
1973	0.109	0.055	0.015	0.000
1974	0.088	0.076	0.021	−0.041
1975	0.060	0.065	−0.018	−0.041
1976	0.067	0.052	−0.041	−0.002
1977	0.076	0.048	−0.031	0.000
1978	0.089	0.067	0.005	−0.020
1979	0.084	0.095	0.024	−0.026
1980	0.059	0.119	0.019	−0.044
1981	0.064	0.139	0.022	0.001
1982	0.027	0.129	0.016	0.056
1983	0.022	0.079	−0.000	0.092
1984	0.044	0.091	0.036	0.036
1985	0.033	0.080	0.042	0.055
1986	0.022	0.071	0.032	0.041
1987	0.021	0.055	0.025	0.057
1988	0.031	0.063	0.032	0.014
1989	0.032	0.084	0.050	0.017

Either the assumption of exogeneity does not hold or the savings elasticity is negative, which seems difficult to accept. The naive analysis contradicts some earlier claims (see, e.g., Summers 1984), but is backed up by more recent sophisticated studies. Since the positive relation of saving to interest rates cannot be observed in simple correlations, it is necessary to argue that simple OLS is inappropriate. Standard simultaneity arguments provide one reason for doubt. One of the more compelling studies is Hall (1988). By estimating elasticities of intertemporal substitution, Hall finds that the interest elasticity of savings is very low, which implies that exogenous shifts in interest rates do little to explain the time series of saving behavior. The conclusion, applied to the cross section, is that neither interest rates nor demographics can by themselves explain differences between U.S. and Japanese saving behavior.

5.2 International Differences in Tastes

Apparently, savings rates in the 1980s are much lower in the United States than in other developed countries, particularly Japan. If demographic and interest rate differences do not account for this savings rate differential, then perhaps other measurement considerations do. These are discussed below, but suppose, as is likely, that the differences are real and not mere measurement. The obvious question to ask is, Why should we care?

The differences in savings rates that cannot be rationalized most likely reflect differences in tastes across countries rather than differences in income or prices. But economists rarely pass judgement on taste differences. Few would be willing to criticize an individual because he prefers chocolate to vanilla ice cream. What is different about time preference that makes economists so uncomfortable? The purpose of this section is to discuss systematically the arguments for and against saving stimulation.

First, let us return to the model in equation (1). Differentiating the first-order conditions with respect to δ yields

$$(8a)\quad \frac{\partial S_1}{\partial \delta}\bigg|_{(2)} = \frac{-U'(W_2 + S_1(1+\rho) - S_2)(1+\rho)}{U''(W_1 - S_1) + \delta U''(W_2 + S_1(1+\rho) - S_2)(1+\rho)^2} > 0,$$

$$(8b)\quad \frac{\partial S_2}{\partial \delta}\bigg|_{(2)} = \frac{-U'(S_2(1+\rho))(1+\rho)}{U''(W_2 + S_1(1+\rho) - S_2) + \delta U''(S_2(1+\rho))(1+\rho)^2} > 0.$$

An increase in δ increases saving among both the young and middle-aged. One way to rationalize the differences between the Japanese and American saving rates is to argue that δ is higher in Japan than in the United States.

If this were true, then for a given wage structure, the typical middle-aged or elderly Japanese would be richer than the typical middle-aged or elderly American. But younger Americans would have higher consumption than younger Japanese. It also follows immediately from optimization that, if an American were somehow induced (say through a tax or subsidy policy) to adopt the Japanese savings schedule, he would have lower lifetime utility, even though his consumption throughout most of his lifetime would be higher. If differences in time preference account for the results of the cross-country comparison, they do not imply that America's situation would be improved by closing the gap.

5.2.1 Intergenerational Externalities in Investment

In order to justify a concern over low savings rates, the basic model must be embellished to take other effects into account. The most obvious candidate is that future generations suffer as a result of the current generation's actions in a way that is not internalized by the current generation.[3] One direct way in which

3. There is now a long literature on intergenerational considerations. Some early papers are by Becker (1974), Barro (1974), Bernheim and Bagwell (1988), and Bernheim, Shleifer and Summers (1985).

this can work is within the family. Suppose that there are actions that a father can take on behalf of his child which yield higher than the market rate of return.

For example, in an early study, I estimated that there was a high payoff to being born in the urban north over the rural south (see Lazear 1983). The payoff was sufficiently high that a child could pay his parent to move to the urban north and apparently make both parties better off. But two conditions are necessary. First, the unmeasured costs borne by the parent must not be so large as to swamp the benefits. Second, the parent must be able to extract payment from the child either directly or through altruistic utility considerations. A move would imply deferred consumption by the parent now, in return for higher consumption (observed or true) later.

In the same paper, I found that black children benefit when they come from an educated household.[4] It is impossible to say whether black parents internalize these effects or not, but the potential exists for large gains from additional saving and investment in parental human capital among this disadvantaged group.

While these examples are interesting, they do not address the issue of differences in observed savings rates across countries. Even if we were to argue that these effects were large, they would not imply that the measured savings rate would rise. Additional schooling by the first generation shows up not only as low consumption, but also as low income. If anything, the measured savings rate would probably fall if more internally financed human capital investment were undertaken, since people may borrow when in school. Similarly, geographic relocation would probably imply a reduction in current earnings and an increase in the observed consumption/earnings ratio among those who move. Nor do these externalities speak to the decline in the U.S. saving rate during the 1980s. What kind of intergenerational externality would result in too little physical savings as we currently measure it?

5.2.2 Individual Utility and Social Welfare Functions

Bequests and inter vivos transfers from parents to children, during middle and old age, have been ignored. But even if they are taken into account, the argument for increased saving is not an obvious one. Suppose, for example, that consumption by generation 1 during period 3 were really a bequest to generation 2, at that point middle-aged. The choice of S_2 determines the size of the bequest, and if S_2 were higher, the bequest would be higher. But inducing a higher bequest is not obviously social welfare increasing.

In fact, there is nothing necessarily intertemporal about the argument. A transfer from one individual in generation 1 to another individual in generation 1 could provide both with utility, if the donor has the recipient in his utility

4. More recently, Borjas (1992) has documented a similar, but more general phenomenon across a large number of ethnic groups.

function. But it does not follow that the amount of transfer undertaken privately is necessarily socially inefficient.

To determine whether intergenerational considerations imply too little saving, let us return to the model in equation (1). Recall that C_{it} is consumption of generation i in period t (and similarly for other variables). Let us simplify the problem by shortening each person's life to two periods.

First, it is necessary to specify a social welfare function. There are two obvious candidates: efficient and utilitarian. Attention is restricted to these two welfare functions not only because they are the most commonly used, but also because a sufficiently perverted social planner might well have preferences over intergenerational consumption that deviate from any privately optimal allocation.

If the social welfare function maximizes efficiency, then the private saving rule must be optimal. The parent maximizes

$$\text{(9)} \qquad \underset{T_{12},S_{12}}{\text{Max}}\ U(W_{11} - S_{11}) + \delta[U(W_{12} + S_{11}(1 + \rho) - T_{12}) + \lambda U(W_{22} + T_{12} - S_{22})] + \delta^2\lambda U(W_{23} + S_{22}(1 + \rho)),$$

where T_{12} is the transfer in period 2 from generation 1 to generation 2 and where the parent takes into account the child's saving behavior. The parent's altruism is measured by λ, which is the weight of the child's utility in the parent's utility function.

The child in turn maximizes

$$\text{(10)} \qquad \underset{S_{22}}{\text{Max}}\ U(W_{22} + T_{12} - S_{22}) + \delta U(W_{23} + S_{22}(1 + \rho)),$$

given the transfer T_{12} from his parent.

All choices of T_{12} are on the utility frontier and are efficient. Since saving choice is privately optimal, efficiency is always served. There are no externalities; there is no amount that the child could pay the parent to save more. The child can borrow or lend at the market rate, and there is no necessity to obtain the funds from or lend directly to his parent. Further, as long as T_{12} is positive, additional saving does not affect the child's income. If the criterion is efficiency, there is no deviation of the private savings path from the welfare-maximizing path.

The utilitarian criterion allows for the possibility of undersavings. One reasonable social welfare function is

$$\begin{aligned} &\text{Welfare} = (\text{Discounted utility of generation 1}) \\ &\qquad + \gamma\,(\text{Discounted utility of generation 2}), \\ \text{(11)}\quad &\text{Welfare} = U(W_{11} - S_{11}) + \delta[U(W_{12} + S_{11}(1 + \rho) - T_{12}) + \\ &\qquad (\lambda + \gamma)U(T_{12} + W_{22} - S_{22})] + \delta^2(\lambda + \gamma)U(W_{23} + S_{22}(1 + \rho)), \end{aligned}$$

where γ is the weighting that the social planner places on generation 2 relative to generation 1.

The social planner counts the utility of the second generation $\lambda + \gamma$ times. Generation 2's utility enters the social welfare function directly, with a scalar of γ, but also indirectly since it boosts the welfare of the altruistic parent.

The social planner's first-order conditions are

$$(12a)\quad \frac{\partial}{\partial S_{11}} = -U'(W_{11} - S_{11}) + \delta U'(W_{12} + S_{11}(1 + \rho) - T_{12})(1 + \rho) = 0,$$

$$(12b)\quad \frac{\partial}{\partial T_2} = -U'(W_{12} + S_{11}(1 + \rho) - T_{12}) + (\lambda + \gamma)U'(T_{12} + W_{22} - S_{22}) = 0,$$

$$(12c)\quad \frac{\partial}{\partial S_{22}} = U'(T_{12} + W_{22} - S_{22}) + \delta U'(W_{23} + S_{22}(1 + \rho))(1 + \rho) = 0.$$

By contrast, the private maximization problem proceeds in two stages. The parent can choose the transfer that he makes to the child during period 2, and he takes into account that the transfer affects the child's saving behavior as the child maximizes equation (10). For any given transfer of T_{12}, the child chooses S_{22} to maximize equation (10). The child's first-order condition is

$$(13)\quad \frac{\partial}{\partial S_{22}} = -U'(T_{12} + W_{22} - S_{22}) + \delta U'(W_{23} + S_{22}(1 + \rho))(1 + \rho) = 0.$$

The parent's problem is then to choose S_{11} and T_{12} so as to maximize equation (9), taking into account that the child behaves in accordance with equation (13). The parent's first-order conditions are

$$(14a)\quad \frac{\partial}{\partial S_{11}} = -U'(W_{11} - S_{11}) + \delta U'(W_{12} + S_{11}(1 + \rho) - T_{12})(1 + \rho),$$

$$\frac{\partial}{\partial T_2} = -U'(W_{12} + S_{11}(1 + \rho) - T_{12}) + \lambda U'(T_{12} + W_{22} - S_{22})$$

$$(14b)\quad -\lambda U'(T_{12} + W_{22} - S_{22}) \frac{\partial S_{22}}{\partial T_{12}}\bigg|_{(13)} + \delta\lambda U'(W_{23} + S_{22}(1 + \rho))(1 + \rho) \frac{\partial S_{22}}{\partial T_{12}}\bigg|_{(13)}.$$

Savings and transfers are determined by the solutions to equations (13), (14a), and (14b). The social planner would like the choices to solve equations (12a)–(12c), instead. The difference between the two systems is that equation (12b) differs from equation (14b). The parent takes into account the effect of his transfer on his offspring in a different way than does the social planner. Most important, the parent only counts the utility that the child receives by λ,

whereas the social planner counts it $\gamma + \lambda$. For reasonable parameters, this generally leads to too small a private transfer from the parent to child, which in turn leads to undersavings by both the parent and child.

Since the parent does not transfer as much as is socially desirable, he is richer in period 2 than he otherwise would be. As a result, he saves less. Put alternatively, he saves less because he must finance a smaller transfer to his child in period 2. Also, since the child's income in period 2 is lower than it would be under the social optimum, he has less income to smooth into generation 2. So savings by generation 2 are lower in period 2 as well.

To get a sense of the importance of the effect, consider a frequently used utility function, $U = \ln(C_t) + \delta \ln(C_{t+1})$. Further, suppose that the parent cares for his child as much as he does for himself, so that $\lambda = 1$. Finally, suppose that the social planner treats all generations the same (except for discounting), so that $\gamma = 1$. Initially, let income be constant over time, so that all wages in the economy are 1 and let $\delta = .95$. Table 5.5 gives the solution to the social planner's problem in equation (12) and to the private optimization in equations (13) and (14). Panel A reveals that savings are eight to nine times higher when society's objective function is maximized than when private optimization is done. These large differences obtain even when parents are genuinely altruistic, treating children's utility as as valuable as their own.

Key here is the double counting of children's utility by the social planner. The social planner prefers larger transfers because a transfer to the child contributes not only to the child's utility, but also to the parent's utility. Taking a dollar from the parent and transferring it to the child has no effect on the parent's utility at the private optimum, but increases social welfare by the marginal value of a dollar.

Assumptions can be changed to alter the size of these effects. One alteration is to build technological change that shows up through wage growth into the model. Suppose that wages in period 1 are 1, but that they grow by 10 percent each period. Panel B of table 5.5 contains the results of the simulation. Now private savings and transfers are actually negative. Since children are going to be richer than their parents, parents would like to take money away from their

Table 5.5 **Optimal Savings and Transfers**

Variable	Social Optimum	Private Optimum
	A: All Wages = 1	
S_{11}	.3555	.0415
S_{22}	.3705	.0424
T_{12}	.7175	.0441
	B: Wages Grow at 10 Percent per Period	
S_{11}	.2926	−.0519
S_{22}	.3044	−.0557
T_{12}	.6827	−.0564

kids and do so by extracting income from generation 2 when parents are old and children are young. As a result, parents are richer in period 2 and consequently borrow in period 1. But the same is true for generation 2. Since children are poor in period 2 relative to period 3, not only because wages are growing, but also because parents extract transfers from them, they wish to borrow as well. While the socially optimal level of transfers and saving falls, the extent of the reductions are smaller and none of the variables becomes negative.

The conclusion is that there is potential for undersavings when the social welfare function takes into account intergenerational utility in what might be termed an egalitarian way. These effects can be quite large. This conclusion depends crucially on an asymmetry. The parent cares about the child, but the child does not care about his parent. If altruism goes in both directions to the same extent, the deviation between private and social savings rates disappears.

The child cannot affect the transfers from parent to child because the parent can always fail to consume and simply bequeath the residual.[5] Thus, the private solution remains unchanged. But now the social welfare function becomes

$$\underset{S_{11},S_{22},T_{12}}{\text{Max}} \quad (1+\theta)U(W_{11}-S_{11}) + \delta[(1+\theta)U(W_{12}+S_{11}(1+\rho)-T_{12}) + (\lambda+\gamma)U(T_{12}+W_{22}-S_{22})] + \delta^2(\lambda+\gamma)U(W_{23}+S_{22}(1+\rho)), \tag{15}$$

where θ is the relative weight that children give to their parent's utility. As before, let utility be logarithmic and suppose that $\theta = 1$, so that children love their parents as much as themselves. It can then be shown that the social optima that are the maximum of equation (15) are exactly the private optima given in table 5.5.

The intuition before was that undersavings occurred because parents overvalued their own consumption, not taking into account that their child's consumption produced utility twice—once directly for the child and once indirectly for the parent. But now, parental consumption also produces utility twice—once directly for the parent and once indirectly for the child. Thus, social savings are lower because savings and subsequent transfers to the children reduce the utility that the children would receive from seeing their parents happy.

If the argument for undersavings is that the parent's utility-maximizing behavior differs from social-welfare-maximizing behavior, it must rely on an asymmetry that has parents loving children more than children love their parents. While the asymmetry is hardly an unreasonable assumption, I doubt that it lies behind most fears that Americans undersave. Nor does it help reconcile the differences between U.S. and Japanese savings rates. What kind of argument would one need to make to claim that the difference between U.S. and

5. This ignores tax and timing issues.

Japanese savings behavior reflects suboptimal savings by Americans? Unreciprocated love of their children by Americans could result in substantial undersavings. But it is difficult to understand why the Japanese would save at the socially optimal rates, rather than the privately optimal ones. If Japanese children were more loving of their parents than American children, the socially optimal rate of savings in Japan would fall to the privately optimal one in the United States, not the reverse. Then it would be necessary to explain why Japanese saving is too high, not why American savings are too low.

Key here is the idea that saving can be too low only after some criterion has been specified. Selecting a social welfare function is equivalent to selecting an optimal saving path, but the choice of the appropriate social welfare function is far from obvious. A strong case that Americans undersave can be made, but neither the cross-country comparisons nor the time-series decline provides evidence for this kind of undersaving.

5.2.3 Free Riding by the Elderly

Now that altruism has been considered, it is straightforward to analyze another possible concern about undersavings, namely, free riding by the elderly. One possibility is that individuals will undersave when young, leaving themselves destitute when old. As long as the young generation cares about the utility of the older generation, they will transfer resources toward parents. But these ex post transfers may differ from those that would be chosen if parents did not have the ability to force their children to care for them.

Above, T_{12} was positive, so there was no way for the child to force the parent to consume. But if T_{12} is negative, so that the net transfer goes from child to parent, then the child can affect T_{12} directly through inter vivos transfers, which the child can be confident will be consumed by the parent.

Suppose that parameters are such that the parent's optimum implies a negative level of transfer. The parent may be able to extract payments from his child while the child is under his direct supervision. The more interesting case, which captures the spirit of free riding, is that the child cares about his parent. Knowing this, the parent overconsumes when young, inducing his offspring to support him through direct inter vivos transfers when he is old.[6] While this may result in low saving levels by the parent, the issue is whether the savings level is low relative to some benchmark. One benchmark is the social welfare function. As already shown, savings may be higher or lower than optimal, depending on the social welfare function. In this case, however, a more natural comparison is the consumption path that the child would choose if he could control his parent's consumption before his own birth. The essence of free riding is that the child's love for his parent creates an opportunity for the parent to overconsume, relative to what the child would like. Let us consider this formally.

6. The importance of inter vivos transfers has been examined empirically by Donald Cox (1987).

The child is going to support his parent on net, so it is natural to determine the levels of consumption and savings that the child would choose were he able to control parental choice. Suppose that the child values his parent's utility at θ relative to his own. Then if the child could choose all variables, his problem would be

$$(16) \quad \underset{S_{11},S_{22},T_{22}}{\text{Max}} \; \theta U(W_{11} - S_{11}) + \theta\delta U(W_{12} + S_{11}(1 + \rho) + T_{22}) + \delta U(W_{22} - S_{22} - T_{22}) + \delta^2 U(W_{23} + S_{22}(1 + \rho)),$$

where $T_{22} \equiv -T_{12}$, i.e., the transfer from child to parent. The first-order conditions are

$$(17a) \quad \frac{\partial}{\partial S_{11}} = -U'(W_{11} - S_{11}) + \delta(1 + \rho)U'(W_{12} + S_{11}(1 + \rho) + T_{22}) = 0,$$

$$(17b) \quad \frac{\partial}{\partial S_{22}} = -U'(W_{22} - S_{22} - T_{22}) + \delta(1 + \rho)U'(W_{23} + S_{22}(1 + \rho)) = 0,$$

$$(17c) \quad \frac{\partial}{\partial T_{22}} = \theta U'(W_{12} + S_{11}(1 + \rho) + T_{22}) - U'(W_{22} - S_{22} - T_{22}) = 0.$$

If the parent can lead, however, by choosing sufficiently high consumption in period 1, then he will be destitute in period 2, inducing the child to make larger transfers. The child then takes S_{11} as given and maximizes

$$(18) \quad \underset{S_{22},T_{22}}{\text{Max}} \; \theta U(W_{11} - S_{11}) + \delta\theta U(W_{12} + S_{11}(1 + \rho) + T_{22}) + \delta U(W_{22} - S_{22} - T_{22}) + \delta^2 U(W_{23} + S_{22}(1 + \rho)),$$

with first-order conditions

$$(19a) \quad \frac{\partial}{\partial S_{22}} = -U'(W_{22} - S_{22} - T_{22}) + \delta(1 + \rho)U'(W_{23} + S_{22}(1 + \rho)) = 0,$$

$$(19b) \quad \frac{\partial}{\partial T_{12}} = \theta U'(W_{12} + S_{11}(1 + \rho) + T_{22}) - U'(W_{22} - S_{22} - T_{22}) = 0.$$

The problem for the parent (who does not care about his child) is

$$(20) \quad \underset{S_{11}}{\text{Max}} \; U(W_{11} - S_{11}) + \delta U(W_{12} + S_{11}(1 + \rho) + T_{22}),$$

with first-order condition

$$(21) \quad \frac{\partial}{\partial S_{11}} = -U'(W_{11} - S_{11}) + \delta U'(W_{12} + S_{11}(1 + \rho) + T_{22})\left[1 + \rho + \frac{\partial T_{22}}{\partial S_{11}}\bigg|_{(19b)}\right],$$

where $\left.\frac{\partial T_{22}}{\partial S_{11}}\right|_{(19b)}$ reflects the parent's taking into account that his child's transfer responds to his (the parent's) consumption. Note that

(22)
$$\left.\frac{\partial T_{22}}{\partial S_{11}}\right|_{(19b)} = \frac{-\theta U''(W_{12} + S_{11}(1+\rho) + T_{22})(1+\rho)}{\theta U''(W_{12} + S_{11}(1+\rho) + T_{22}) + U''(W_{22} - S_{22} - T_{22})} < 0.$$

A decrease in savings in period 1 by the parent causes the child to transfer more to him in period 2. If θ were zero, so that the child did not care about his parent, then the expression in equation (22) would be zero. The child's love is necessary for the parent to overconsume in period 1.

To get a sense of the effect and to see that it can result in undersaving, consider the log utility example above, but let all wages equal 1, except for the wage in period 3 which equals 10. The high last-period wages make optimal (in almost any sense) that transfers go from child to parent, because the child is relatively rich. Table 5.6 reports the results of solving system (17) as well as (19) and (21) for the case of log utility with $\theta = 1/2$ and wages equal to 1, except that the period-3 wage equals 10.

The transfer to the parent is higher when the parent can lead the child. The parent, whose income is only 1 in each period, impoverishes himself by borrowing 2.911 during the first period. He has only 1 in period 2 and without his child's help would be bankrupt. But the child loves his parent to the tune of 3.811, allowing the parent to repay the loan and still have more left than he would in the absence of a child. If the child could choose the parent's saving/consumption stream, he would still end up transferring money to his parent, again, because of the high income that he receives in period 3. But the transfer would be considerably lower at 2.104, which would induce the parent to borrow much less in period 1 (0.959 instead of 2.911). Thus, savings by the parent are lower when he can affect the transfer of the child. Further, the child saves less, as well, in the parent-controlled environment. When the parent "free rides," he makes the child relatively poor in period 2. As a result, the child borrows more than he would were he in direct control of parental savings decisions (6.032 instead of 5.200).[7]

While free riding may be a problem, there is nothing inherently intergenerational about it, nor is the phenomenon one that bears only, or even primarily, on savings. In an economy where individuals care about one another, there is always an incentive to induce someone else to pay for one's consumption. This

7. Some have extended consideration of intergenerational externalities to other individuals' children. This is undersaving because each parent who cares about the child of another saves insufficiently, in order to force the other parent to save for the next generation. All individuals would rather see the next generation richer, but they would prefer that others in this generation bear the cost. The equilibrium level of savings is too low as a result.

Table 5.6 **Savings and Transfers with Free Riding by the Elderly**

Variable	Child's choice (eq. [17])	Parent's Choice (eqs. [19] and [21])
S_{11}	−0.959	−2.911
S_{22}	−5.200	−6.032
T_{22}	2.104	3.811

would be true even if everyone lived only one period and at exactly the same time, where saving is precluded by definition.

Further, while free riding might result in lower savings, it results in higher utility for the parent and lower utility for the child. Whether society disdains this outcome depends directly on the social welfare function. Again, saving is low relative to what the child would have arranged for his parent (and himself), not necessarily relative to what the parent likes.

The cross-country comparisons are consistent with the view that parents are taking advantage of their children in the United States to a greater extent than in Japan. In order for the differences to go in the right direction, however, it would be necessary that American children care more for their parents than Japanese children do for theirs. Then American parents would be more likely to play on their children's love (see eq. [22]). This could be done privately, through individual consumption, or through the government, by running large deficits and Social Security debt.

While possible, the view that American children are more attached to their parents than their Japanese counterparts contradicts the view that the Japanese family is a closer-knit unit than the American family. Perhaps more likely is that Japanese parents love their children more than American parents love theirs and so are less likely to put themselves in the position of requiring support in old age.

5.2.4 Concern over Identity of Capital Owners

One argument that is often heard, usually in the context of trade deficits, is that our children are going to be forced to pay for our consumption today. The implication is again that we are doing a disservice to our children. There are two types of disservice that can be done. The first is that the capital stock in the future will be too low. The second is that, while the capital stock may be sufficiently high, the wrong people will own it.

The first argument pertains most directly to growth in capital and endogenous technical change: if the economy were to save and invest more, future productivity and corresponding wages would be higher. While true, these arguments depend more on the total amount of saving and investment in the world than on the amount of savings by Americans. As long as capital (or labor) is mobile, and over the period of a generation there is reason to believe that there

is reasonable mobility of capital,[8] the location of savings may be unimportant. If true, concern should be focused on the total amount of savings globally, not on the differences between American and Japanese savings rates. While total savings may be too low by the criteria of the last section, international differences in savings rates provide no evidence on this point. Japan's high savings rate may mean that total savings are too high. America's low savings rate may mean that world savings are too low. Or neither may be true.

The second argument is that while aggregate worldwide savings may not be too low, the problem is that the Japanese rather than the Americans have claim to capital. There are two variants of this argument. One is that the Japanese will use their capital only to help the Japanese. The other is that even if the capital flows to the United States, the Japanese will receive the return on the capital, making Japanese children rich relative to American children.

The first worry, that the Japanese will use their savings to help Japan, is an issue of investment, not saving. If the Japanese save by buying U.S. corporate (or government) bonds and if most of that investment is then used to create capital in the United States, then the Japanese will affect the productivity of future American workers, not of Japanese. Thus, worry about low American saving is misdirected, if the concern is the location of capital. Indeed, if capital is country specific, then encouraging foreign investment rather than high U.S. saving may be the correct strategy.

Further, physical capital depreciates over time. It is quite possible to argue that the capital that is most important for economic growth and the prosperity of our children is human rather than physical. Investments in human capital, as measured by education and health investments, are high in the United States relative to Europe and comparable to levels in Japan (see Becker 1991).

If the second worry holds—namely that Japanese children, rather than American children, will receive the return to capital—no collective action need be taken. Even if all other Americans choose not to save, any given individual can bestow ownership of capital on his children by his own personal saving. Whether he decides to do so depends on utility considerations discussed above. But the capital ownership issue is more closely tied to transfer and bequest behavior than it is to national savings rates.

The conclusion is altered when Americans care about the welfare of other children as well as that of their own. Then collective action might be needed to avoid free-rider problems which arise when each individual wants others to save for the future generation. But if the care is for all children, not only American ones, the issue becomes one of global saving rates, not American saving rates, and there is little evidence that total savings are too low relative to some benchmark.

8. See Barro and Sala-i-Martin's (1992) work on convergence of income within the United States and across international borders.

5.2.5 Substitution of Government Savings for Private Savings

It is possible that U.S. saving rates are not as low as they appear, say, because U.S. government savings displaces private savings and because the government accounts do not properly reflect government savings.[9] If so, the question is not so much about savings, but about investment policy. Government saving, which yields government investment, may be put to poorer use than private saving, which finances primarily private investment. Little evidence is available on which to base any conclusions. Further, if this is the concern, the remedy is to revise government expenditure patterns, not to encourage more private saving.

5.2.6 Taxes

One reason to be concerned about the low U.S. savings rate is that the U.S. tax system may create distortions which induce too little saving. The most obvious candidate is the double taxation of income, which results because income is taxed when it is earned and interest on it is also taxed. Capital gains taxation, if not properly indexed, can also lead to saving distortions.[10] This essay is not the place to argue the validity or importance of tax-induced distortions. One point is clear, however. In order for the tax argument to be important, there must be a significant (positive) interest elasticity of savings. Obviously, if the supply of savings is relatively inelastic, then it is difficult to argue that there is substantial undersaving as a result of a distorted return. The evidence in this paper and elsewhere does not support a large saving elasticity. Although the question remains open, the current evidence does not persuade this author that the tax distortion is an important reason to worry about undersaving.

5.2.7 Growth

There is a general perception that links savings to growth. But the focus here really should be on investment, not saving. No theory argues that saving per se is important to growth. Empirically, saving and investment are likely to be highly correlated, but there is no necessity that they are. The Japanese could use their savings to build factories in the United States, hiring American workers and taking their profits in American-made goods. Right now, many developing countries, particularly those of Eastern Europe, look to other countries to inject capital into their struggling economies. While their attempts are likely to be frustrated, there is nothing at the theoretical level to suggest that their strategies are misguided.

Even if high levels of domestic saving were necessary for growth, it is not automatic that more saving and more growth is better. Indeed, the ρ term that

9. Hayashi (1986) has discussed differences in savings measurement between the United States and Japan. The discussion on whether government savings crowds out private savings is illustrated by the debate between Barro (1974) and Feldstein (1974).

10. There is a large literature on the effects of taxes on savings. See, e.g., Kotlikoff (1984), King (1980), Feldstein (1974), and Auerbach and Kotlikoff (1983).

reflects the rate of return on capital can be interpreted as the growth parameter. Without growth externalities (which are not incorporated into the models), everything said about the trade-offs between current and future consumption pertains to growth as well.

5.3 Measurement Issues

A number of authors have attempted to reconcile the low U.S. savings rate and some of the differences between American and Japanese saving behavior by appealing to measurement differences (see, e.g., Hayashi 1986). Rather than reiterate those arguments, a few different points are briefly discussed in this section.

The point that is emphasized here is not new, but its application to savings and earnings is.[11] When savings rates as low as 3–5 percent are observed in the United States, they may well be swamped by implicit savings and investment that occurs on the job.

To see the point, suppose that every individual in the economy produced output stream $A(t)f(k(t))$, with $f' > 0$, $f'' < 0$. Let the economy run for two periods (0 and 1) with initial capital stock being given as k_0 and investment in period 0 denoted Δk. There is no depreciation, and $A(t)$ reflects exogenous technical change. Capital stock in period 1 is therefore $k_0 + \Delta k$ so the investment decision is

$$\max_{\Delta k} A(0)f(k_0) - \Delta k + \delta A(1)f(k_0 + \Delta k). \tag{23}$$

The first-order condition is

$$A(1)f'(k_0 + \Delta k) = 1/\delta, \tag{24}$$

and there is a Δk^* that solves equation (24). Since $f'' < 0$, Δk is increasing in δ.

How would a change in δ affect measured saving? The answer depends on reporting. Lowering the discount rate, say, from infinity to zero (i.e., increasing δ from 0 to 1), would increase Δk, while leaving unchanged $f(k_0)$. If firms were owned by individuals other than their workers and workers were paid a piece rate instead of being self-employed, each would take home $f(k_0)$ and would save Δk^* explicitly, say, by putting that amount in the bank. Firms would then borrow Δk^* to undertake optimal investment as in equation (24). Thus, raising δ would raise measured saving and measured investment.

But if workers were self-employed, the increase in saving and investment would be more likely to get lost. For example, suppose that investment takes the form of using workers' time and perhaps some cannibalized parts from an existing machine to build an additional machine to be used in period 1. Mea-

11. Jorgenson and Pachon (1983) recalculated the capital stock with the inclusion of human capital.

sured output would be $f(k_0) - \Delta k$, rather than $f(k_0)$, and measured saving and investment would be zero, even though the situation is identical to the one where firms are owned by outsiders and all transactions occur through the market.

Human capital is the kind of saving and investment that is perhaps most likely to be lost (see Jorgenson and Pachon 1983). Some human capital investment is explicit and works through the market. Formal schooling and health care fit into this category. But on-the-job training is most likely to go unrecorded in the firm's books, even though workers who invest in on-the-job training are undertaking both savings and investment. Measured output of the firm is reduced because of time spent on training, and wages of the worker who receives the training are correspondingly lower. The worker's reported saving does not include the value of the on-the-job training. Indeed, reported saving may be lower since the worker substitutes higher-return on-the-job saving for lower market-observed saving.

While the on-the-job training story may be plausible, it probably does not help reconcile the disparity between American and Japanese saving rates. First, it has been observed that age-earning profiles are steeper in Japan than in the United States (see Hashimoto 1990; Mincer and Higuchi 1988). If the slope reflects higher investment in on-the-job training in Japan, then observed savings rates understate true saving by more in Japan than in the United States. Second, today's on-the-job training is tomorrow's output. If the on-the-job training story were important, labor productivity would be positively affected. Unless the increase in investment is a very recent phenomenon, early investments in on-the-job training should already be affecting productivity today. But except for the last few years, productivity growth has been higher in Japan than in the United States, contradicting the hypothesis that unreported saving and investment is higher in the United States.

Another type of on-the-job saving may differ across countries. Consider a worker who lives two periods and produces \$100 in each. There are no on-the-job training or work-life productivity effects. In one country, say, the United States, the worker is paid \$100. During the first period, he consumes \$90, puts \$10 in the bank, and has an observed personal savings rate of 10 percent. In the last period, he consumes \$100 plus $\$10(1 + \rho)$.

In another country, say, Japan, the worker receives \$90 during the first period. In the last period, the worker receives wages of $\$100 + \$10(1 + \rho)$. The Japanese firm then uses the proceeds to invest in its own plant and equipment or to buy stocks and bonds of other corporations.

This story fits the stylized facts. Japanese use financial institutions and their firms to do much of their investment. Firms hold portfolios of stocks and bonds in other firms. The steeper age-earnings profile seen in Japan is perfectly consistent with this story, even if no on-the-job training occurs. There would be no need to observe higher labor productivity growth rates in the United States, because investment patterns could well be identical across countries. Unfortu-

nately, since Japanese in-firm saving is more likely to get lost in official accounts than is U.S. market-transacted saving, true Japanese saving would be understated by a greater margin than true U.S. saving. Once again, differences in tastes must be invoked to explain international differences in consumption patterns.

5.4 Conclusion

There appear to be some differences in saving behavior, both over time and internationally, that can be explained by resorting to demography. But large disparities remained unexplained. The big question is, So what? While there may be reasons to be concerned about the low and declining American savings rates, the mere discrepancy between U.S. and Japanese savings rates does not speak to these concerns. In most cases, reasonable assumptions about differences between the United States and Japan do not imply that American saving is too low. Similarly, the decline in the U.S. savings rate in the 1980s may be cause for concern, but not for the reasons generally presented when arguing that the United States undersaves.

Only a few of the many potential reasons for believing that the United States undersaves have been presented. In some sense, I have presented too many. It is quite clear that under some not unreasonable assumptions, a case can be made that the United States undersaves. But the point made herein is that neither the time-series nor cross-country data provide evidence on the issue. The fact that Japan's savings rate is higher than that of the United States does not imply that we undersave nor that they oversave. The fact that our rate is low today relative to 15 years ago does not imply that the savings rate then was closer to the social optimum than is the savings rate now. This essay, in attempting to shed some light on the issue, has a much more agnostic tone than the earlier literature. In large part, it reverts to the position that economists are not good at comparing one set of tastes to another.

References

Attanasio, Orazio P. 1993. A cohort analysis of savings behavior by U.S. households. NBER Working Paper no. 4454. Cambridge, Mass.: National Bureau of Economic Research.

Auerbach, Alan J., and Laurence J. Kotlikoff. 1983. National savings, economic welfare, and the structure of taxation in behavioral simulation methods. In *Tax policy analysis,* ed. Martin Feldstein, 459–98. Chicago: University of Chicago Press.

———. 1990. Demographics, fiscal policy, and U.S. saving in the 1980s and beyond. *Tax Policy and the Economy* 4:73–101.

Barro, Robert J. 1974. Are government bonds net wealth? *Journal of Political Economy* 82 (November/December): 1095–1117.

Barro, Robert J., and Xavier Sala-i-Martin. 1992. Convergence. *Journal of Political Economy* 100 (April): 223–51.

Becker, Gary S. 1974. A theory of social interactions. *Journal of Political Economy* 82 (November/December): 1063–94.

———. 1991. *A treatise on the family*, enlarged ed. Cambridge: Harvard University Press.

Bernheim, B. Douglas, and Kyle Bagwell. 1988. Is everything neutral? *Journal of Political Economy* 96 (April): 308–38.

Bernheim, B. Douglas, Andrei Shleifer, and Lawrence H. Summers. 1985. The strategic bequest motive. *Journal of Political Economy* 93 (October): 1045–76.

Borjas, George. 1992. Ethnic capital and intergenerational mobility. *Quarterly Journal of Economics* 107 (February): 123–50.

Christiano, Lawrence J. 1989. Understanding Japan's saving rate: The reconstruction hypothesis. *Federal Reserve Bank of Minnesota Quarterly Review* (Spring): 10–25.

Cox, Donald. 1987. Motives for private income transfers. *Journal of Political Economy* 95 (June): 508–46.

Feldstein, Martin. 1974. Incidence of a capital income tax in a growing economy with variable savings rates. *Review of Economic Studies* 41 (October): 505–13.

Hall, Robert E. 1988. Intertemporal substitution in consumption. *Journal of Political Economy* 96 (April): 339–57.

Hashimoto, Masanori. 1990. *The Japanese labor market in a comparative perspective with the United States*. Kalamazoo, Mich.: Upjohn Institute.

Hayashi, Fumio. 1986. Why is Japan's saving rate so apparently high? *NBER Macroeconomics Annual* 1:147–210.

Jorgenson, Dale W., and Alvaro Pachon. 1983. The accumulation of human and nonhuman capital. In *The determinants of national saving and wealth*, ed. Franco Modigliani and Richard Hemming, 302–50. New York: St. Martin's.

Katz, Lawrence F., and Kevin M. Murphy. 1991. Changes in relative wages, 1963–87: Supply and demand factors. NBER Working Paper no. 3927. Cambridge, Mass.: National Bureau of Economic Research, December.

King, R. 1980. Savings and taxation. In *Essays in public policy*, ed. Gordon A. Hughes and Geoffrey M. Heal. London: Chapman and Hall.

Kopcke, Richard W., Alicia Munnell, and Leah M. Cook. 1991. The influence of housing and durables on personal saving. *New England Economic Review* (November–December): 3–16.

Kotlikoff, Laurence J. 1984. Taxation and savings: A neoclassical perspective. *Journal of Economic Literature* 22 (December): 1576–1629.

Lazear, Edward P. 1983. Intergenerational externalities. *Canadian Journal of Economics* 16 (May): 212–28.

Mincer, Jacob, and Yoshio Higuchi. 1988. Wage structures and labor turnover in the United States and Japan. *Journal of the Japanese and International Economies* 2:97–133.

Munnell, Alicia, and Leah M. Cook. 1991. Explaining the postwar pattern of personal saving. *New England Economic Review* (November–December): 17–28.

Murphy, Kevin M., and Finis Welch. 1991. Wage differentials in the 1980s: The role of international trade. In *Workers and their wages: Changing patterns in the United States*, ed. Marvin Kosters, 39–69. Washington, D.C.: American Enterprise Institute.

Summers, Lawrence. 1984. The after-tax rate of return affects private savings. *American Economic Review* 74 (May): 249–53.

———. 1986. Issues in national savings policy. In *Savings and capital formation*, ed. F. Gerard Adams and Susan M. Wachter, 65–88. Lexington, Mass.: Lexington Books.

Summers, Lawrence, and Carroll, Chris. 1987. Why is U.S. national saving so low? *Brookings Papers on Economic Activity* 2: 607–42.

United Nations. 1971. *Demographic yearbook, 1970.* New York: United Nations.
———. 1981. *Demographic yearbook, 1980.* New York: United Nations.
U.S. Bureau of the Census. 1970. *Statistical abstract of the United States, 1970.* Washington, D.C.: Government Printing Office.
———. 1980. *Statistical abstract of the United States, 1980.* Washington, D.C.: Government Printing Office.

Comment

Jonathan Skinner

Many economists and politicians have sounded the alarm about the low U.S. level of saving in the 1980s. If we cannot save more, the argument goes, investment will fall, the Germans and Japanese will buy up the United States, and we will enslave our children to economic dependency. Edward Lazear's response is, So what? This may appear to be a callous question to ask, but in fact it is a very good question—in fact the first question—that should be asked before the government tries to "cure" the "problem" with regulatory or tax schemes.

Lazear argues that the low saving rates are a consequence of different tastes for saving. If Americans prefer consuming more today relative to the future, then that is their choice, and they should not be required, or even encouraged, to save more. Lazear considers alternative explanations for why the United States saves so little, but ultimately concludes that the difference in saving is a matter of taste.

The U.S. national saving rate has been consistently below comparable saving rates of other countries since the 1960s. In 1962, national saving (as a percentage of GDP) in the United States was 9.1 percent. In the same year, national saving was 21.7 percent in Japan, 17.4 percent in the Netherlands, 17.3 percent in France, and 18.6 percent in Germany (U.S. Congress, Joint Committee on Taxation 1991).

It is likely that much of these differences can be attributed to tastes, as Lazear suggests. What has many policymakers worried, however, is the sharp decline in national saving, and in personal saving, during the 1980s. National saving in the United States fell from 8.9 percent in 1978 to 2.2 percent in 1986. A part of this decline was due to the increased deficit, but a substantial part was a consequence of reduced private saving as well.[1] To explain this decline as a reflection of "tastes," one must identify *changes* in individual preferences toward saving.

Alternatively, the decline in saving could be the consequence of a market or

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1. One could also interpret the increase in the deficit as a symptom of the taste shift away from saving and toward current consumption inclusive of government consumption.

government failure that got worse during the 1980s. If such a failure were the cause, the policy implication would be much different. In that case, either fixing the distortion or providing preferential treatment of saving to offset the inefficiency would be the appropriate course of action.

Was the decline in saving a consequence of tastes or of market (or government) failure? To shed light on this question, I will randomly pick five from the many explanations for why saving fell in the 1980s (also see Bosworth, Burtless, and Sabelhaus 1991). Which of these explanations are market failures that should be rectified, and which are a consequence of individual tastes?

1. Suppose that bequests are a function of the number of one's children and that bequests comprise a large fraction of the national capital stock (e.g., Kotlikoff and Summers 1981). Then the smaller size of families could have shifted the demand for bequests to the left and thereby reduced saving. This is certainly one explanation that relies solely on tastes; there is no rationale for government intervention to push saving rates back up.[2]

2. The saving rate in the national income accounts does not reflect capital gains, either in housing wealth or in the stock market. Rapid increases in stock market wealth during the mid-1980s, by stimulating consumption, could have pushed down conventionally measured saving rates. In fact, an alternative measure of the saving rate that includes such capital gains in housing and wealth (and adds these gains to national income) implies saving rates of over 15 percentage points during 1983–88, that is, saving rates roughly equal to those during 1974–79 (Skinner and Feenberg 1990; also see Hendershott and Peek 1989). Of course, this explanation denies the existence of a saving problem at all; instead, it attributes the entire fuss to confusion over the proper measurement of "saving."

3. An increased fear of nuclear war may have caused the sharp decline in saving rates during the 1980s (Slemrod 1986). That is, why save if one faces nuclear annihilation? Whether this is a change in tastes or a failure of the U.S. (or the former Soviet) government to reduce nuclear tension is not entirely clear, but I will call this a draw.

4. An alternative explanation is the higher rates of return accruing to defined-benefit pension funds. Because pensions face fixed liabilities, a higher rate of return on their investment allows firm-owned pension funds to reduce contributions or even revert pension assets to the firm (Bernheim and Shoven 1987). Because pension funds are quintessential "target" savers, the higher interest rates during the 1980s could have reduced saving. Again, it is not clear whether the reduction in pension fund saving reflects individual tastes or opportunistic pension fund managers.

5. A final explanation suggests that corporate buy-outs and capital gains realizations led to the influx of cash into the hands of investors (Hatsopoulos,

2. Whether this is a plausible explanation is another question, since the decline in saving rates seemed too rapid to be explained by gradual shifts in fertility rates.

Krugman, and Poterba 1989). With the cash hot in their pockets, the theory suggests, the lucky investors spent their wealth on cars and other consumption goods rather than reinvesting it. If true, this view of saving and consumption behavior would bode ill for any optimizing model of intertemporal consumption behavior. The presumption that individuals are doing what is "best" for them presupposes that cashing out stock should have little or no real effects on consumption.

Of the five explanations presented above for the decline in saving in the 1980s, only one is clearly a matter of changes in tastes. Other explanations are possible, but they are unlikely to be motivated entirely by changing tastes toward saving. To be on the safe side, one should therefore admit the possibility that the saving decline has been encouraged by government regulatory or tax policies. If so, an active role for the government in encouraging saving behavior would be appropriate.

References

Bernheim, B. Douglas, and John Shoven. 1987. Pension funds and saving. In *Pensions in the U.S. economy*, ed. A. Bodie, J. B. Shoven, and D. A. Wise. Chicago: University of Chicago Press.

Bosworth, Barry, Gary Burtless, and John Sabelhaus. 1991. The decline in saving: Evidence from household surveys. *Brookings Papers on Economic Activity* 1:183–256.

Hatsopoulos, George N., Paul R. Krugman, and James M. Poterba. 1989. Overconsumption: The challenge to U.S. economic policy. Working Paper. Washington, D.C.: American Business Council, March.

Hendershott, Patric, and Joe Peek. 1989. Aggregate U.S. private saving: Conceptual measures and empirical tests. In *The measurement of saving, investment, and wealth*, ed. R. E. Lipsey and H. S. Tice. Chicago: University of Chicago Press.

Kotlikoff, Laurence, and Lawrence Summers. 1981. The role of intergenerational transfers in aggregate capital accumulation. *Journal of Political Economy* 89 (August): 706–732.

Skinner, Jonathan, and Daniel Feenberg. 1990. The impact of the 1986 tax reform act on personal saving. In *Do taxes matter? The impact of the tax reform act of 1986*, ed. J. Slemrod. Cambridge: MIT Press.

Slemrod, Joel. 1986. Saving and the fear of nuclear war. *Journal of Conflict Resolution* 30:403–19.

U.S. Congress, Joint Committee on Taxation. 1991. *Tax policy and the macroeconomy: Stabilization, growth, and income distribution.* Washington, D.C.: Government Printing Office, December.

Comment on Chapters 4 and 5

B. Douglas Bernheim

The fact that the United States saves so little, both by historical standards and in comparison to other countries (particularly Japan), has puzzled economists for many years. The literature is littered with possible explanations for this

phenomenon, none of which are completely satisfying. Lazear is inclined to attribute international differences to "tastes," and to some extent he also seems to endorse the view that differences in rates of saving over time probably reflect "cohort effects," which he equates with tastes. Since economists are not usually inclined to pass judgment on tastes, Lazear concludes that the welfare implications of low saving are ambiguous.

Although I am inclined to agree with Lazear about the importance of tastes, I would emphasize a somewhat different point: tastes apparently change quite a lot. Rates of saving in Japan have varied enormously over the last 50 years. During the interwar period, as well as in the years immediately following World War II, the Japanese saved less than Americans. Similarly, Korea, Taiwan, and Singapore saved very little as recently as 1960 and have only lately earned reputations as countries with high rates of saving. It certainly appears, if tastes are the chief determinants of saving, that tastes can change dramatically within a very short period of time. Moreover, at least in the case of Japan, there is reason to believe that the government actively and successfully intervened in a manner designed to shape tastes (see Central Council for Savings Promotion 1981). These observations suggest that we, as economists, should focus on the following kinds of questions: Why do tastes for saving change? Can (and should) public policy affect the evolution of tastes?

The need to think seriously about the evolution of tastes becomes particularly serious once one steps outside the narrow confines of the life-cycle hypothesis. Dissatisfaction with the performance of this theory has led a growing number of economists, myself included, to ponder "behavioral" alternatives (see, e.g., Shefrin and Thaler 1988). Some have argued for abandoning the view that individuals act as if they maximize an intertemporal utility function and have instead emphasized the importance of habit, mental accounting, self-discipline, and so forth. In many contexts, one can argue that, through trial and error, an individual eventually learns to behave in a way that is consistent with utility maximization. However, this argument is not applicable to life-cycle saving. Each individual accumulates resources for retirement only once; there is no opportunity to learn from one's mistakes. Moreover, the life-cycle saving decision is extraordinarily complex, in that it requires an individual to contemplate labor earnings, investment strategies, macroeconomic trends, and a vast assortment of risks, all over a very long time frame. It would be astonishing if the average individual, with no practice and little or no training, could on his first try act as if he was a perfectly rational, farsighted utility maximizer.

By studying behavioral theories of household saving, it may be possible to understand differences in rates of saving both across countries and over time (for a more detailed discussion, see Bernheim 1991). Japanese households may

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have acquired frugal habits out of necessity during the process of postwar reconstruction, and these habits may have been cultivated and preserved through government intervention. Higher rates of saving among U.S. citizens who lived through the Great Depression may reflect the effects of experiencing deprivation first hand. Another factor contributing to the recent decline in U.S. saving could be the rise in the fraction of private income that is received in "spendable" forms (see Hatsopoulos, Krugman, and Poterba 1989). It is also possible that the longest peacetime expansion on record contributed to a false sense of economic prosperity and stability. Alternatively, Americans may simply have become accustomed to rising consumption profiles, which, out of habit and myopia, they attempted to maintain ever after the productivity slowdown.

Within the context of a behavioral theory, one can give content to statements about welfare, such as "Americans do not save enough." Individuals may well regret their bad habits and lack of foresight after the fact. Moreover, the behavioral framework suggests some well-defined roles for public policy. First, and perhaps foremost, the government may be in a position to provide information and training, thereby helping individuals to further their own objectives through the design of more coherent and effective long-range financial plans. During much of the postwar period, the Japanese government assumed precisely this role. Second, it may also be desirable to encourage the acquisition of beneficial habits by subsidizing saving. In much the same way, the government discourages the consumption of cigarettes through education and taxation.

Even if one insists on adhering to the life-cycle framework, I would not agree that the welfare effect of low saving is ambiguous. On the contrary, there are at least seven good neoclassical reasons to believe that saving is too low.

1. Capital income is taxed, both explicitly and implicitly (e.g., through college scholarships). Lazear dismisses this argument, on the grounds that the interest elasticity of saving is very low. Although this strikes me as a fair characterization of the evidence, it is at odds with more direct evidence on the effect of taxes (e.g., Venti and Wise 1990). To infer tax effects from estimates of the interest elasticity, one must subscribe to an important unstated assumption: the effect of a change in the after-tax rate of return induced by a movement of the before-tax rate of return is the same as the effect of a change in the after-tax rate of return attributable to a movement of the effective tax rate. In the context of investment, other authors (e.g., Hall and Jorgenson 1967) have been roundly criticized for making precisely this assumption. One can easily imagine a number of reasons for questioning its validity. For example, if the stochastic processes governing gross interest rates and taxes differ, one would hardly expect investors to respond similarly to changes in these variables. Another possibility is suggested by my work with John Shoven. Several years ago (Bernheim and Shoven 1987), we pointed out that the interest elasticity of contributions to pension funds is large and negative. This may dampen the response of aggregate saving to a change in the gross rate of interest. How-

ever, it does *not* dampen the response of saving to a change in the tax rate. Hence, a low estimate of the interest elasticity of saving is consistent with a high tax elasticity.

2. The nature of intergenerational equilibria can create a bias against saving. Lazear adopts the formulation of intergenerational preferences popularized by Becker (1974) and Barro (1974). In particular, the preferences of generation t are summarized by a utility index U_t, where

$$U_t = U(c_t, U_{t+1}) = v(c_t) + \beta U_{t+1}.$$

In this equation, c_t represents generations t's consumption, and U_{t+1} denotes the utility index for generation t's successor generation. Implicitly, each generation has only one successor and one predecessor. When this formulation of preferences is used, authors typically focus attention on a class of equilibria that correspond to the solution of a standard dynamic programming problem, where the objective function is the present discounted value (discounting at the rate β) of the stream $v(c_t)$. This approach to intergenerational equilibria is extremely special. There are many plausible ways to deviate from it.

First, one could adopt an alternative formulation of preferences. Suppose, for example, that parents care about the felicity ($v(c_{t+1})$) of their children, rather than utility (U_{t+1}). Mathematically,

$$U_t = v(c_t) + v(c_{t+1}).$$

This formulation has a straightforward economic interpretation: parents receive pleasure from their children's consumption, but regard bequests to later generations as wasteful. While somewhat extreme, it captures a plausible situation: generation $t + 1$ cares more about the consumption of generations after $t + 1$ (relative to the consumption of generation $t + 1$) than does generation t. A number of authors have studied intergenerational equilibria with preferences of this form. The problem is complex, since the preference of successive generations are not dynamically consistent, and game-theoretic tools must be employed. However, it is known that Markov-perfect equilibria are *never* Pareto optimal. Moreover, one Pareto improves the equilibrium allocation by *increasing* saving (see Bernheim and Ray 1987).

Second, one could relax the counterfactual assumption that each generation has only a single successor and predecessor. It is well-known that this assumption is pernicious (see Bernheim and Bagwell 1988). Its importance in the current context stems from the fact that children marry other children from different families, so that each married household has two distinct predecessors. From the point of view of these two parent households, the consumption of the common child household is a public good. As a result, it is usually possible to improve on equilibrium allocations by increasing the intergenerational transfer of resources. This entails greater saving.

Third, even within the Barro-Becker framework, there is a vast multiplicity

of equilibria, and there is no particular reason to believe that the economy will settle on an efficient one (see Gale 1985).

3. The government operates a large number of social insurance programs, including Social Security, Medicare, Medicaid, unemployment insurance, and so forth. These programs reduce precautionary motives for saving. Indeed, the fact that, until recently, Japan's social insurance system was underdeveloped has often been offered as a partial explanation for differences between the saving rates of Japan and the United States. Indeed, as Japan has improved its social insurance system, its rate of saving has fallen.

When insurance is provided by an efficient market, any depressive effects on saving are first-best. However, social insurance programs generally arise in response to market failures. There is no particular reason to believe that current social insurance programs lead to a second-best level of saving.[1]

4. Lazear describes an intertemporal incentive problem commonly known as the "Samaritan's dilemma" (see, e.g., Buchanan 1975; Bernheim and Stark 1988). The general statement of this problem is as follows. There are two parties, A and B. A cares about B, but B does not care about A. These parties interact over time; for simplicity, we assume that there are two periods. B will tend to save less in the first period than he would if A were selfish, because he knows that, in the second period, an altruistic A will bail him out.

Lazear describes a particular version of this problem, in which A is a child and B is a parent. The story is also often told the other way around (with A as the parent and B as the child), in order to explain why the children of wealthy parents save so little. A similar problem can arise between spouses, or even between unrelated individuals. Lazear is therefore correct in asserting that this is not inherently an intergenerational issue. However, this should not obscure the fact that it is an intertemporal issue and that it inherently involves saving. Moreover, when Lazear asserts that B is better off with low saving, this is misleading—in the presence of the Samaritan's dilemma, one can always Pareto improve the equilibrium allocation, and this improvement is achieved (in part) by increasing saving.

5. In a closed economy, saving necessarily equals investment. Consequently, if there are important external economies associated with investment, the levels of both saving and investment will tend to be low relative to the optimum. Externalities of this sort have featured prominently in the recent literature on endogenous growth.

Of course, the U.S. economy is not closed. Nevertheless, there appears to be some long-run tendency toward balanced current and capital accounts. As a result, the level of saving probably does have a significant impact on investment; with external economies, households will save too little.

1. It is worth mentioning, however, that second-best social insurance might entail provisions to reduce the level of saving. See Diamond and Mirrlees (1978).

6. Lazear mentions the possibility that there may be positive externalities associated with investments in children, but does not present this theory in its most favorable light. I believe that there are important externalities of this sort, but they are local, rather than national, in scope. For a variety of reasons, it is more enjoyable to live in communities where other people's children are well-educated and well provided for. This is not the result of nationalistic sentiment (Lazear's characterization), but rather a consequence of pragmatism.

7. It is also arguable that saving is too low from the standpoint of equity. To illustrate, consider once again the Becker-Barro "dynastic" equilibrium discussed under point 2 above. This equilibrium maximizes the utility of the first generation. It corresponds to the Pareto optimum found by assigning a weight of unity to the utility of the first generation and a weight of zero to all subsequent generations. If the planner attaches any positive weight to any subsequent generation, equilibrium saving will be suboptimal. Lazear touches on this point; for a more detailed discussion, see Bernheim (1989).

Lazear tends to discount this argument, on the grounds that children may also care about their parents. If altruism toward parents is sufficiently strong, then the preferences of subsequent generations will coincide with those of the first generation, and the equilibrium allocation will be equally beneficial for everyone. Aside from being a knife-edge case, this suggestion is also empirically implausible. Because of economic growth, children tend to be lifetime wealthier than parents. Despite this, transfers mostly flow from parents to children, and not from children to parents. This strongly suggests that parents are generally more altruistic toward children than children are toward parents.

In summary, Lazear and I agree that we cannot yet adequately explain the decline of saving in the United States, or the differences in rates of saving between the United States and other countries. However, I do not agree that the welfare consequences of low saving are ambiguous. There are good theoretical and empirical reasons to believe that Americans save too little. Lazear's skepticism should not discourage us from vigorously pursuing policies designed to stimulate the rate of saving.

One such policy permits households to receive tax-favored treatment on resources contributed to 401(k) plans. The paper by Poterba, Venti, and Wise (chap. 4) provides some useful background information on 401(k)s, as well as a preliminary analysis of the effect of these plans on household saving. This analysis suggests that contributions to 401(k)s represent new saving. If this conclusion is correct, then 401(k)s provide an extremely powerful policy tool.

Unfortunately, it is very difficult to measure the impact of tax-favored accounts on household saving. Poterba, Venti, and Wise have adopted an empirical strategy similar in spirit to that used by Venti and Wise in a series of earlier papers on Individual Retirement Accounts (IRAs). Although this methodology goes some distance toward producing believable results, it falls short of providing a completely convincing solution to problems arising from population heterogeneity and sample selection.

The Poterba-Venti-Wise methodology represents an attempt to statistically mimic a controlled experiment in which households are randomly assigned to two groups, one of which is eligible for 401(k)s and one of which is not. A comparison of average saving across these groups would presumably provide us with an estimate of the effect of 401(k) eligibility on saving.

The simplest approach would be to ignore the endogeneity of the decision to contribute to a 401(k) and to compare average saving across contributors and noncontributors. Unfortunately, we are not likely to learn very much from this calculation. Some households save a lot, while some save a little. This is presumably attributable to differences in preferences. One should not be surprised to discover that those who contribute to 401(k) accounts also save more in other forms; through self-selection, this group probably consists of households with strong preferences for saving.

In their work on IRAs, Venti and Wise refine this simple comparison by controlling for initial wealth. This variable is intended to capture the effects of heterogeneity along the dimension of preferences toward saving—households with strong preferences for saving will also have higher initial wealth. Even so, one should not be too surprised to discover that, controlling for initial wealth, IRA (or 401(k)) contributors saved more in other forms. It would be extreme to suggest that the disposition to save remains constant over an individual's life. Many people may pass through periods when they save a lot, as well as periods when they save a little. This could arise quite naturally from a variety of considerations. For example, some people may start saving for retirement only after achieving some specific age or stage of life (e.g., completion of child rearing). Alternatively, individuals may experience shocks to income that persist for several years before dissipating. When passing through a period of temporarily high income, such an individual will tend to save more.

It seems to me that these forms of population heterogeneity are not only plausible, but that they could well account for a positive correlation between contributions to tax-favored accounts and other forms of saving, even controlling for initial wealth. To emphasize this point, I will suggest a hypothetical calculation (which one could, in principle, perform): compute the correlation between wealth accumulation in the form of stocks and wealth accumulation in the form of bonds, controlling for initial wealth. My guess is that one would find a significant positive correlation. This would not prove that the availability of stocks causes people to save in the form of bonds. Rather, it would simply show that those who decide to save during any given period allocate their resources across a variety of asset classes.

The current paper improves on previous efforts to measure the effect of tax-favored accounts on saving by performing two additional calculations. First, it compares the assets of a group of households in 1984 with the assets of another group of households in 1987. These groups are selected to be as similar as possible. According to Poterba, Venti, and Wise, the important difference between these groups is that the 1987 sample had three more years of 401(k)

eligibility than the 1984 sample. As it turns out, the 1987 sample had accumulated more assets.

I am not convinced that this procedure eliminates the problem of sample selection. The 1984 and 1987 samples only include 401(k) *contributors*. Thus, the sample selection criteria are different: in 1984, the authors study a group of households that still contributed to 401(k)s after (typically) not more than three years of eligibility; in 1987, they study a group that still contributed to 401(k)s after (typically) not more than six years of eligibility. What happens when one conditions sample selection on the continuation of contributions after N years of eligibility? Presumably, as N rises, one isolates the "die hard" households that are completely dedicated to saving. (Analogously, lapse rates for life insurance are highest during the first few years of a policy.) Consequently, one should not be surprised if total assets rise when the selection criteria is based on a larger value of N.

Poterba, Venti, and Wise also implement a second methodological innovation: they compare the assets of households that are eligible to make 401(k) contributions with the assets of ineligible households (controlling for income class). Since eligibility is determined by employers, the authors believe that cross-sectional variation in eligibility status provides an exogenous natural experiment. In effect, 401(k) eligibility is used as an instrument.

Unfortunately, there is probably a systematic relationship between 401(k) eligibility and other factors that influence saving. In many companies, benefits are influenced by the opinions of workers and, in some cases, are based on surveys of worker preferences. To some extent, workers self-select over jobs; those who care more about saving for retirement may be more likely to accept positions with firms that offer 401(k)s. Finally, eligibility for a 401(k) is correlated with other job characteristics (better jobs are more likely to provide 401(k) options).

The paper itself convincingly documents the endogeneity of 401(k)s. Refer in particular in table 4.13. For the moment, focus on the summary statistics provided for households with incomes between $50,000 and $75,000 in 1987. The median assets of households eligible for 401(k)s exceeded the median assets of ineligible households by $9,693 ($25,343 − $14,650). And yet median 401(k) balances for the eligible group were only $1,500. I doubt very much whether the authors would claim that 401(k)s crowd in other saving by a factor of six. Rather, something else is creating a correlation between assets and 401(k) eligibility. A similar conclusion follows for every other income class.

Overall, I found the authors' analysis interesting, and I am sympathetic to their conclusions. Their work continues to move my posterior beliefs in the direction suggested by their conclusions. However, the jury is still out, and further work is clearly warranted.

References

Barro, Robert J. 1974. Are government bonds net wealth? *Journal of Political Economy* 82 (November/December): 1095–1117.

Becker, Gary S. 1974. A theory of social interactions. *Journal of Political Economy* 82 (November/December): 1061–93.

Bernheim, B. Douglas. 1989. Intergenerational altruism, dynastic equilibria and social welfare. *Review of Economic Studies* 56 (January): 119–28.

———. 1991. *The vanishing nest egg: Reflections on saving in America.* New York: Priority Press.

Bernheim, B. Douglas, and Kyle Bagwell. 1988. Is everything neutral? *Journal of Political Economy* 96, no. 2 (April): 308–38.

Bernheim, B. Douglas, and Debraj Ray. 1987. Economic growth with intergenerational altruism. *Review of Economic Studies* 54, no. 2 (April): 227–42.

Bernheim, B. Douglas, and John B. Shoven. 1987. Pension funding and saving. In *Pensions in the U.S. economy,* ed. S. Bodie, J. Shoven, and D. Wise, 85–111. Chicago: University of Chicago Press.

Bernheim, B. Douglas, and Oded Stark. 1988. Altruism within the family reconsidered: Do nice guys finish last? *American Economic Review* 78, no. 5 (December): 1034–45.

Buchanan, James M. 1975. The Samaritan's dilemma. In *Altruism, morality and economic theory,* ed. Edmund S. Phelps, 71–85. New York: Russell Sage Foundation.

Central Council for Savings Promotion. 1981. *Savings and savings promotion movement in Japan.* Tokyo: Toppan Printing.

Diamond, P. A., and J. A. Mirrlees. 1978. A model of social insurance with variable retirement. *Journal of Public Economics* 10:295–336.

Gale, Douglas. 1985. The strategic analysis of bequest behavior: A critique of the Ricardian equivalence theorem. Center for Analytical Research in Economics and the Social Sciences, Department of Economics, University of Pennsylvania. Mimeograph.

Hall, Robert E., and Dale W. Jorgenson. 1967. Tax policy and investment behavior. *American Economic Review* 57:391–414.

Hatsopoulos, George N., Paul R. Krugman, and James M. Poterba. 1989. Overconsumption: The challenge to U.S. policy. Paper prepared for the American Business Conference. Washington, D.C.: American Business Council.

Shefrin, Hersh M., and Richard H. Thaler. 1988. The behavioral life-cycle hypothesis. *Economic Inquiry* 24 (October): 609–43.

Venti, Steven F., and David A. Wise. 1990. Have IRAs increased U.S. saving? Evidence from consumer expenditure surveys. *Quarterly Journal of Economics* 105 (August): 661–98.

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