

Japan's national saving rate once ranked among the world's highest. Over the last four decades of the twentieth century Japan's (net) national saving rate fluctuated between 20 and 30 percent of national income; by way of comparison that of the USA ranged between 5 and 10 percent over the same interval. Japan's high saving rate accelerated its recovery from the war's devastations and transformed Japan into a major international creditor, a country that exports more than it imports. In this sense, Japan's high saving propensity indirectly contributed to its trade friction with other nations. Indeed, saving underlies many important facets of Japan's economic development and integration with the world economy. In the first decade of the current century Japan's saving rate has plummeted. This too will have profound effects on Japan's place in the world.

A high national saving rate was characteristic of Japan's postwar era, not its prewar one. This exemplifies the correspondence between a high rate of macroeconomic growth and a high national saving rate that is implied by the life-cycle model of saving, developed by Nobel laureates Franco Modigliani and Milton Friedman. The life-cycle model also implied that as retirees became more numerous Japan's national saving rate would fall and this has now actually occurred. This chapter considers the life-cycle model, and shows how it applies to Japan. It also dissects the leading alternative theory of saving known as the Ricardian theory. The Ricardian theory focuses on the desire to leave a bequest for one's heirs as an important

motivation for saving. If the Ricardian theory is true, then adjustments in taxes and government transfers including social security benefits have little effect upon private consumption or national saving.

### Measurement of saving

First, some basic definitions. *Wealth* is the present value of owned assets, and *income* is the value of goods and services that, if consumed in a year, would leave wealth unchanged from its level in the previous year. *Consumption* is the portion of one's wealth devoted to the satisfaction of wants over the current year, and *saving* is the increase in wealth from one year to the next. According to these definitions, saving equals income less consumption.

*National saving* is the sum of private saving and government saving, the accumulation of private wealth and public wealth, respectively.<sup>1</sup> In the national income and product accounts, national saving is computed by subtracting government and private consumption expenditures from national income. *National income at market prices* (sometimes

<sup>1</sup> Often, private saving is partitioned into personal saving and business saving, the latter defined as profits not distributed as dividends. This partitioning is chimerical: any wealth accumulated as business assets is in fact owned by individuals, and is perfectly fungible with other components of their personal wealth. In this sense, all private saving should be regarded as "personal" saving.

referred to as *net national product* or NNP<sup>2</sup>) is gross national product less depreciation, plus unilateral transfers from foreigners. *Depreciation* is the wearing out of machinery, buildings, and tools, an ineluctable reduction in wealth that must be made up out of current production before any net increase in national wealth may be judged as having occurred. Unilateral transfers from foreigners of course add to national wealth directly.

Before proceeding further, we should recognize that much national wealth reposes in the knowledge and skills of workers but that the measures of saving based on national income and product accounts reflect increases in physical wealth only, not human wealth.<sup>3</sup> Changes in the value of human capital, the present value of future services of the labor force, are excluded from the measures of saving only because of the difficulty of measuring them. The difficulty arises because much accumulation of human capital is the result of implicit acts of saving. The earnings of students are typically less than their incomes, as incomes are defined above, i.e. the maximum one could consume in a year without depleting wealth. By attending school instead of working at a job, a student is implicitly diverting a portion of his income from consumption to saving. Students forgo earnings now, hoping that the knowledge they acquire will enable them to achieve greater future earnings. Much wealth is in the form of human capital,<sup>4</sup> and much accumulation of human capital entails implicit acts of saving of this sort, unrecorded in the national income and product accounts.

Even changes in the value of physical wealth are imperfectly reflected in the national income and product accounts. The value of physical wealth is in principle detectable from the market prices of assets, but many assets are traded only infrequently so their market prices are not fully revealed. For this reason, the general approach taken in the national income and product accounts is to measure the income associated with ownership of assets by observing the current rental payments for the use of the assets, rather than to measure changes in the market value of such assets. For example, the dramatic rise in land prices in Japan in the 1980s "bubble economy" is reflected in estimates of Japan's national income—but only to the

extent that current payments for the use of land were enlarged. Such phenomena probably induce errors in the measures of saving.

Further measurement errors arise because in the national income and product accounts some expenditures labeled consumption are in fact saving. The purchase of an appliance one expects to use in future years, or the purchase of dental services that will enable one to maintain a bright smile or a strong bite in future years, add to one's future consumption possibilities, that is to one's wealth. In the national income and product accounts these expenditures are typically included in the aggregate labeled "consumption," though they should in large part be counted as saving. Several scholars over the years have attempted to correct this bias in the measurement of consumption. Hayashi F(umio) has developed indirect techniques for inferring which personal expenditures should be regarded as saving rather than consumption and applied the techniques to Japanese panel data.<sup>5</sup> He concludes that only expenditures on food are purely consumption. Even expenditures on entertainment have a component of saving. Individuals act as though the future recall of the experience is at least even the partial motivation for attending a movie. (That is, they are likely to expend on such entertainment a temporary windfall, which implies that they regard this as a way of spreading the enjoyment of the windfall over the remainder of their lives.) But the

<sup>2</sup> National income at factor prices is NNP less indirect taxes. Indirect taxes impose a wedge between the amount spent (at market prices) and the amount received as after-tax (factor) income. "Factors" are productive inputs including labor services.

<sup>3</sup> To regard physical wealth per se as an object of economic optimization, one must presume that accumulation of wealth in the form of human capital is an exogenous process, one removed altogether from the domain of choice. For instance, this is very much the spirit of the Solow growth model examined in the last chapter, in which technological advance was viewed as an exogenous and continuous expansion of the effective labor force and national saving was viewed as accumulation of machinery, buildings, and tools (physical capital inputs) only.

<sup>4</sup> In contemporary Japan, as much as 3/4 of national income is paid as wages. The value of human capital probably comprises a similar fraction of total wealth.

<sup>5</sup> Fumio Hayashi, "The Permanent Income Hypothesis and Consumption Durability: Analysis based on Japanese Panel Data," *Quarterly Journal of Economics*, vol. 100, no. 4 (November 1985), pp. 1083–1114.

## Saving

bias that results when consumption is proxied by expenditures may not be so large, at least for Japan in recent years. Large expenditures on durable appliances by a household in one year are apt to be followed by low expenditures in the next year. Aggregation of expenditures over all households tends to average out these opposing biases and produces a reasonable approximation of true consumption. In another article, Hayashi imputes a service flow to household durables in Japan's national income and product accounts (based on measures of the stock of such durables and presumptions about the depreciation rate), and confirms that the service flow matches aggregate expenditures on durables fairly closely.<sup>6</sup> The bias in measuring saving that results from treating all household expenditures as consumption is perhaps not large enough to pose serious problems for those who use unadjusted national income and product accounts data to gauge the accumulation of physical wealth.

Finally, a problem arises from the discrepancy between accounting measures of depreciation of business assets and the true economic depreciation. For instance, in Japan's national income and product accounts depreciation is based on historical costs, which grossly understate economic depreciation in the event of a rising inflation rate, as experienced by Japan in the years 1973–4. Again, the problem, though troublesome, probably results in only a small error in the measurement of income for most years.

### Trends and fluctuations in Japanese national saving

Figure 5.1 charts national saving of Japan as a percentage of national income over 1885–2010. Japan's national saving rate fluctuated between 0 and 20 percent before the Pacific war, and fluctuated between 20 and 30 percent in the years after the war ended. Many of the fluctuations in Japan's national savings rate correspond to windfall gains and losses in national wealth. For instance in 1897, two years after the Sino-Japanese War, Japan received a sizable indemnity from China (payable in British pounds equivalent to 362 million yen, 20 percent of Japan's 1897 national income), a

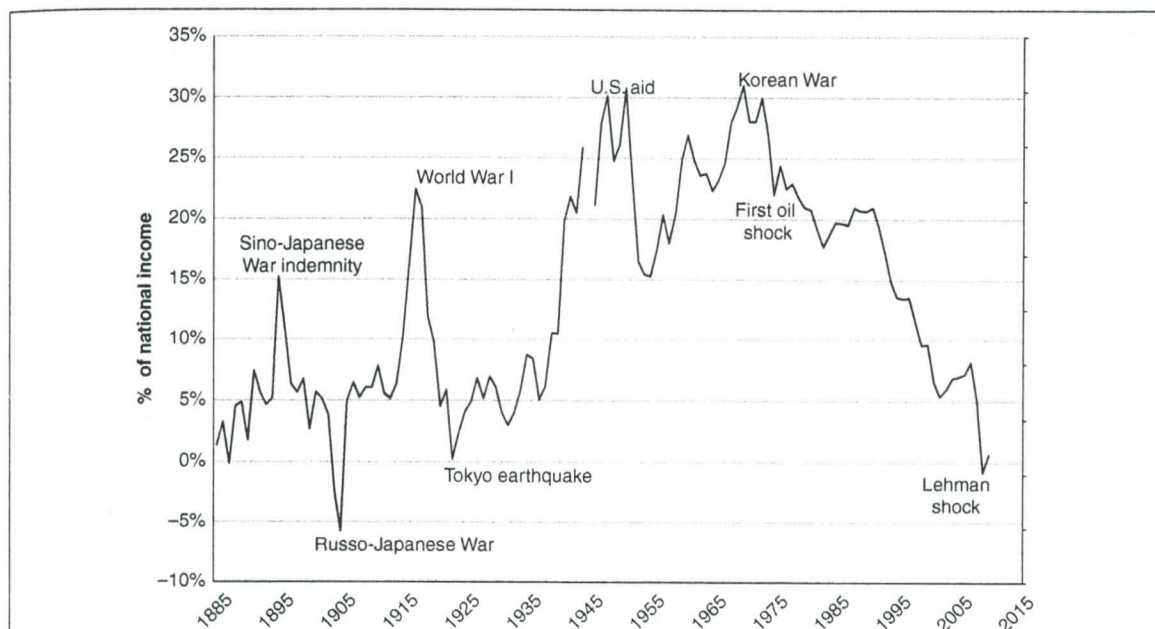
unilateral transfer and a significant increase in national wealth that accounts for the jump in national saving in that year.

In 1905 Japan dipped into its national wealth to wage the Russo-Japanese War, which accounts for the fall in national saving in that year. During the World War I years Japan experienced a prolonged boom which enabled it rapidly to accumulate foreign wealth, a windfall gain, much of which went into national saving. The windfall losses arising from the 1923 Tokyo earthquake precipitated a depletion of Japan's foreign assets. This shows up as a sharp decrease in national saving. The years immediately before and during the Pacific war are marked by the persistent government accumulation of military assets.

Japan's national saving rate following the war was dramatically higher than before it. Not only this, but Japan's national saving rate in the postwar era dramatically exceeded the national saving rates of other countries. Many explanations for postwar Japan's high national saving rate have been offered and we shall review some of them. For the moment, setting aside the question of the average level of postwar Japan's national saving rate, the postwar fluctuations in national saving rate have continued to reflect windfall gains and losses in national wealth. For example, the peaks in saving rate in 1948 and 1952 correspond respectively to the receipt of American foreign assistance and American procurement spending during the Korean War, each of which was a windfall gain for Japan, sizable relative to Japan's substantially depleted national wealth in the aftermath of the Pacific war.

The subsequent peaks and troughs in national saving mirror the business cycle. A major recession in 1965, for instance, depressed the saving rate, and a prolonged boom from then until the mid-1970s fueled by inflation-induced US demand for Japanese goods, precipitated heightened Japanese national saving rates. The 1973 Arab oil embargo and the ensuing increase in world oil prices brought an economic recession to Japan, a major importer

<sup>6</sup> Fumio Hayashi, "Why Is Japan's Saving Rate So Apparently High?" *NBER Macroeconomics Annual 1986*, Cambridge, Mass.: MIT Press, pp.147–210; see fig. 2, p. 154, and discussion on p. 155 on imputation of service flow to household durables.



**Figure 5.1.** Net national saving relative to national income at market prices, Japan, 1885–2010

Sources: *National Income at market prices: 1885–1954*: Kazushi Ohkawa and Miyohei Shinohara (eds.), *Patterns of Japanese Economic Development*, Yale University Press, 1979, table A7, pp. 266–8, and table A8, pp. 269–70; 1955–89: Economic Planning Agency, *Report on National Accounts from 1955–1989*, pp. 102–9; 1980–2010: Cabinet Office, *Report on National Accounts, 2012*. *Net national saving: 1885–1954*: *Patterns*, table A5, series A, pp. 261–3, and table A6, pp. 264–5; 1955–2010: National Income at market prices, minus private final consumption expenditures and government final consumption expenditures from Cabinet Office, *Report on National Accounts*.

of oil, imposing on Japan a windfall loss. As already mentioned, Hayashi has argued that in the immediate aftermath of this event Japan's national income and product accounts significantly overstate national saving by failing to adjust depreciation expenses for inflation. Perhaps the actual dip in the national saving rate at the time of the first oil shock was greater than the figure indicates. The sharp recession following the 2008 Lehman shock led to a further sharp downturn in Japanese saving.

### Government saving

Our analysis of the fluctuations in Japan's national saving implicitly accepted that individuals regard the public wealth (i.e. government owned assets) and their private wealth as interchangeable. Many contentious issues in macroeconomics revolve around whether that is indeed so. If it is not, then public wealth accumulation and private wealth

accumulation need to be examined separately rather than lumped together. Government saving is the name for the portion of national saving that is the accumulation of public wealth.

Government saving may be calculated as government income minus government consumption. *Government consumption* is government spending for final goods and services used up during the current year. *Government income* consists of (1) tax receipts net of government transfer payments (which include interest payments, social security payments,<sup>7</sup> and subsidies), *plus* (2) profits from government enterprises, *plus* (3) increases in the amount of cur-

<sup>7</sup> Not only the current year's social security payments but also any increase in the present value of promised future social security payments diminish the current year's government income. But the "promised" future social security benefits are sufficiently nebulous in Japan, as elsewhere, that changes in them may not be accurately computed and are generally ignored in constructing estimates of government income and saving.

## Saving

rency held by the public and by commercial banks, *plus* (4) any inflation-induced diminution in the value of previously issued government debt, *minus* (5) depreciation of government-owned physical assets. The first, second, and fifth items require no immediate comment. The third item is also straightforward: the stock of currency held by the public or by commercial banks is sometimes called "high-powered money" or "base money" (as distinct from "deposit money," which consists of deposits at commercial banks). Issuing high-powered money enables the government to acquire goods directly without collecting tax revenues or issuing debt. For this reason, additions to the stock of high-powered money augment government income.

The fourth item in computing government income involves some minor subtleties. Notice that government saving is related to the government's fiscal surplus (the opposite of fiscal deficit). In the absence of inflation, depreciation, or government investment, the government budget deficit equals government dissaving. That is, to the extent that government consumption expenditures outstrip tax receipts, the government accumulates debt; it amasses liabilities against whatever stock of assets it owns, reducing government wealth. But inflation, depreciation, and investment break the close link between the fiscal deficit and government dissaving. Consider the effects of inflation. In years of high inflation, even though government spending may exceed tax receipts, necessitating new debt issuance, the diminution in the real value (i.e. value reckoned in terms of goods) of previously issued monetary debt may more than offset the new debt issuance. In this event, all else the same, though the government issues new debt, its outstanding debt (in nominal and real terms) is lower than in the previous year, not higher!

The nominal increase in year  $t$  in privately held government debt, net of inflation-induced diminution of the value of previously issued debt (in other words, the nominal government deficit) is

$$B_t - B_{t-1} - B_{t-1} (P_t - P_{t-1})/P_{t-1}$$

where  $B_t$  is the nominal amount of outstanding debt at the end of year  $t$ , and  $P_t$  is the price level in year  $t$ . The third term comprises the inflation adjustment, the inflation-induced diminution in real value of previously issued debt, expressed in mon-

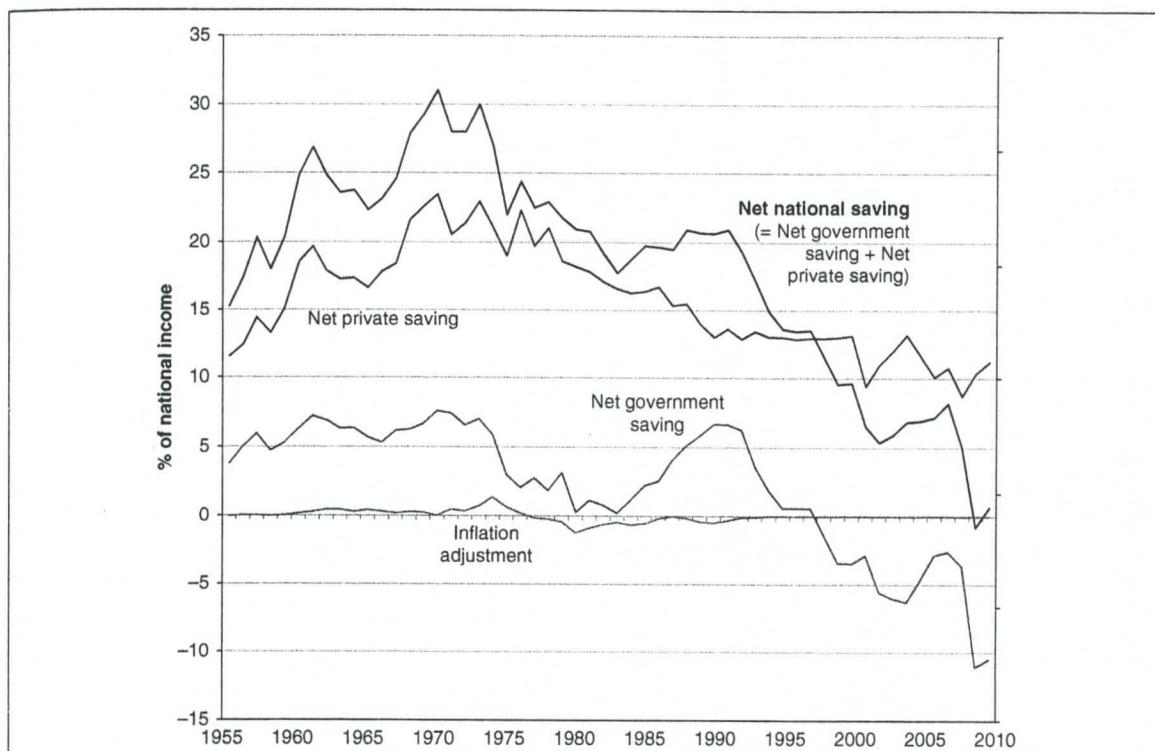
etary equivalent units at current prices in year  $t$ . The peculiar phenomenon described in the previous paragraph, of the government issuing new debt but experiencing a reduction in the amount of debt outstanding, resides in the fact that the inflation adjustment term can oppose and more than offset the other two terms. The inflation-adjusted nominal increase in government debt may also be expressed as

$$(B_t/P_t - B_{t-1}/P_{t-1})P_t$$

i.e. as the difference in real value of outstanding debt between this year and the previous, multiplied by this year's price level. Quite intuitively, the increase in outstanding government debt measured in current prices is the change in value of outstanding debt in terms of real goods, times the current monetary price of a unit of real goods.

Figure 5.2 depicts movements in the government saving rate as a percentage of national income in Japan from 1955 to 2010. In the chart, the government sector includes central and local government but not the Bank of Japan (BOJ) or government financial intermediaries. (The latter consist of the Postal Savings System, Japan Development, the Export-Import Bank of Japan, and other public intermediaries of the Fiscal Investment and Loan Program.) In other words, the annual change in stock of high-powered money is not here included in the disposable income of the government (though it should be included). And annual interest payments on BOJ holdings of government bonds are subtracted from the disposable income of the government (though these should not be subtracted). These errors, we presume, are approximately offsetting. The precise implications of consolidating the accounts of the public financial intermediaries with the other components of the government sector are harder to fathom. In any case, we ignore those implications here.

The government saving ratio of the figure is adjusted for the effects of inflation on the net financial liabilities of the government as described in the previous paragraphs. The size of this inflation adjustment is also represented in the figure. As a practical matter, the inflation adjustment is relatively small. Before 1965 the stock of outstanding government debt was virtually zero, and it became substantial only after 1974. But except for 1974, in



**Figure 5.2.** Net national saving and net government saving relative to national income at market prices, Japan, 1955–2010

In this chart, the government sector comprises central and local government but not the Bank of Japan or government financial intermediaries.

Sources: Government saving gross of inflation adjustment: 1955–69: Economic Planning Agency, *Report on National Accounts* from 1955–1969, pp. 86–87; 1970–1979: Economic Planning Agency, *Report on National Accounts*, 1985; 1980–2010: Cabinet Office, *Report on National Accounts*, 2012; Inflation adjustment (amount subtracted from gross government saving) = financial assets of general government minus liabilities of general government, times percentage increase in consumer price index from previous year: 1955–1969: Economic Planning Agency, *Report on National Accounts* from 1955–1969, pp. 446–449; 1970–1993: Economic planning Agency, *Report on National Accounts*, 1995, pp. 340–351; 1994–2010: Set equal to zero. (Consumer price index: Management and Coordination Agency, widely available from many sources.); Net national saving: same as Figure 5.1.

which the CPI grew by about 23 percent, inflation rates have remained fairly low in Japan, so the inflation adjustment in computing government saving is still relatively small. The most noticeable features of the figure are the sharp drop in government saving around 1974 and gradual rise until 1991, after which government saving again declines. The revenues of the government of Japan were insufficient to cover the substantial increase in social security and health benefits beginning in 1974. The increase in government transfer payments were financed with new debt issue rather than taxes. In part, this was a calculated policy. But

the necessity of resorting to debt finance was enlarged by the unanticipated 1974 recession, which greatly reduced tax receipts of the government.<sup>8</sup>

The decline in net government saving after 1991 reflects the fiscal deficits of the Japanese government that have attended the decline in tax receipts since the 1991–3 recession, and the enactment of fiscal stimulus measures (tax cuts and government spending increases) to address the recession.

<sup>8</sup> Yukio Noguchi, "Public Finance," in Kozo Yamamura and Yasukichi Yasuba (eds.), *The Political Economy of Japan, i, The Domestic Transformation*, Stanford University Press, 1987, pp. 186–222.

## Saving

In spite of the fact that the government was in a state of fiscal deficit from the late 1970s through the 1980s, and again in the 1990s, government saving remained positive. This is because a significant component of government spending was devoted to investment rather than consumption. The government's net borrowing was less than its net investment in all years; consequently there was a continual net accumulation of public wealth.

### Saving rates of Japan versus other countries

In the last fifty years the net national saving rate of the United States has varied between 5 and 10 percent, which until recently was far lower than the net national saving rate of Japan. In fact, the national saving rates of most developed countries have been closer to that of the USA than that of Japan. The data in Table 5.1 are illustrative.

The high national saving rate of Japan transformed it into one of the world's largest creditors, which is the real meaning of Japan's overall trade imbalances of the 1980s and 1990s. Japan's high saving rate attracted more attention from academic specialists over the years than any other single aspect of its economy. Many of those same specialists correctly predicted the recent collapse of Japan's saving rate. Before describing this literature, we need first to sketch the most important economic theories of saving. Theories of saving belong to either the life-cycle, the Ricardian, or the Keynesian paradigms.

## Theories of saving

### Life-cycle paradigm

The life-cycle paradigm, developed by Nobel laureate Franco Modigliani, envisions individuals as arranging their lifetime patterns of consumption so as to completely exhaust their available wealth.<sup>9</sup> So if for instance, as might be typical, individuals earn labor income while young but retire upon becoming aged, then under the life-cycle hypothesis they would choose to save while young and dissave after retirement, so that they could enjoy balanced consumption throughout life and leave nothing to their heirs.

The essence of the life-cycle paradigm is that each individual consumes the entirety of her own wealth herself, at the end of life having saved nothing. However, paradoxical as it may seem, a nation of such individuals will, in the aggregate, save in each year if the nation's economy is growing. For instance, in the event of population growth, the young who are saving to support their own later consumption will perpetually outnumber the aged who are dissaving. The savers outnumber the dissavers, so in aggregate there is net saving. In the case of technological advance, the young will perpetually be wealthier than the aged and will save more to support their own

<sup>9</sup> Albert Ando and Franco Modigliani, "The Life Cycle Hypothesis of Saving: Aggregate Implications and Tests," *American Economic Review*, vol. 53 (March 1963), pp. 55–84.

Table 5.1. Net national saving rates of Japan and selected other nations, 1960–2010

	Net national saving (% of national income at market prices)						
	1960–73	1974–79	1980–89	1990–2000	2001–2010	1970–2010	2010
Canada	11.7	12.5	9.7	5.7	9.9	9.4	5.0
France	19.5	13.2	6.7	7.3	7.4	9.1	3.8
Germany	17.6	11.3	10.0	8.8	9.2	10.3	9.3
Italy	19.2	14.7	10.8	8.6	4.0	9.7	-1.3
Japan	26.3	22.7	20.4	16.0	5.2	16.7	0.4
United Kingdom	11.1	8.2	5.1	4.2	3.6	5.7	0.2
United States	12.1	9.7	6.6	5.7	2.0	6.0	-0.7

Source: computed from "gross saving as percentage of GDP" and "net saving as a percentage of GDP" in *OECD Historic Statistics 1960–1997*, table 6.16, p. 77 and table 6.17, p. 78; *OECD Historic Statistics 1970–2000*, table 6.15, p. 73 and table 6.16, p. 73; *OECD National Accounts at a Glance 2011* ("Saving"); and *OECD Economic Outlook*, vol. 91, table a24.

relatively lavish future consumption than the currently old, who enjoy only modest consumption, will be dissaving. Again, aggregate saving outweighs aggregate dissaving. Japan's high saving rates, high growth, and youthful demographic profile in the postwar years have frequently been offered as evidence in support of the basic tenets of the life-cycle paradigm.

The permanent income hypothesis of Milton Friedman, yet another Nobel laureate, also belongs to the life-cycle paradigm.<sup>10</sup> The essence of the permanent income hypothesis is that individuals desire to arrange their lifetime patterns of consumption as the life-cycle paradigm maintains, but can do so only imperfectly because of their limited ability to foresee the extent of their own lifetime wealth. Friedman argued that a best estimator of wealth was the present value of a lifetime stream of income following a trend extrapolated from past years' incomes, plus any projected increase in physical wealth arising from the current period's saving. Corresponding to this wealth estimator is an expectation of the next period's income, which Friedman labeled "permanent income." A deviation from the permanent income would be regarded as transitory, either a windfall gain or windfall loss—a random, one-time change in wealth. For this reason, a deviation from permanent income would precipitate a revision of the lifetime consumption plan: to consume slightly more than had previously been planned throughout the remaining years of life if the deviation were a windfall gain, slightly less if a windfall loss.

#### Ricardian paradigm

The Ricardian paradigm highlights the desire to leave a bequest for one's heirs as a motivation for saving. Conspicuously absent from the life-cycle paradigm is any sense that individuals might behave altruistically toward their own children. If such an impulse is present, and few parents would deny it, then parents will share their wealth with their own children and will not selfishly exhaust it on their own consumption. This seemingly innocuous presumption has some startling implications. First, the planning horizon is essentially infinite. If parents care about their own children,

who in turn care about their children, and so on, then indirectly they must care about all of their descendants. Second, government programs that transfer private wealth across generations could precipitate offsetting voluntary transfers within families, and therefore be largely ineffectual. Such programs include social security and the issuance and retirement of government debt. Social security is the name for government programs that transfer income to retired persons, financed largely by taxes on wages. Social security policies have been adopted by nearly all the developed countries, including Japan. In Japan as elsewhere, taxes and benefits have been adjusted so that each successive cohort has derived a net benefit from participation. That is, the present value of lifetime wage taxes is less than the value of post-retirement benefits. This can be true for each successive cohort if the economy is growing and the distorting effects of the wage taxes are sufficiently small, which may account for the wide political support social security has elicited throughout the world's developed countries. Social security amounts to a government-administered transfer of private wealth from succeeding generations to current ones. Because the establishment of a social security system raises the private wealth of those currently living, the life-cycle thesis holds that they will increase their lifetime consumption, on net reducing the aggregate savings that the life-cycle theory predicts will exist in a growing economy. The Ricardian paradigm, however, indicates that individuals might not adjust their consumption if a social security system is established, but instead might return the social security windfall to their descendants by adding it to their bequests.

Though Japan has had some form of social security system since 1941, pension benefits were rather modest until 1973. In that year benefits were raised to levels commensurate with those of the social security system of the USA, a dramatic windfall for those in Japan already retired or near retirement.

The issuance and retirement of government debt, like social security, represents a government-administered transfer of wealth across generations. For example, if the government sells bonds to

<sup>10</sup> Milton Friedman, *A Theory of the Consumption Function*, Princeton University Press, 1957.

## Saving

finance lump-sum transfers to those currently living, it incurs an obligation to levy taxes in the future either to pay the interest on the debt or to retire it. However, if individuals have essentially infinite planning horizons, as the Ricardian paradigm presumes, then the incipient tax liabilities offset the lump-sum transfers and people will not alter their own consumption. If the future taxes are to be paid by the descendants of those now living, they will merely add the lump-sum transfers to their bequests, returning the expected net wealth of succeeding generations to the level they had originally chosen. In the life-cycle paradigm, in contrast, people disregard any future taxes likely to fall on their descendants (they do not disregard future taxes likely to fall on themselves!); they consider a lump-sum transfer financed by the issuance of government debt a windfall, and use it to finance greater lifetime consumption.

## Keynesian views on saving

The Keynesian paradigm views individuals as "liquidity-constrained" so that their consumption is tied to their own current income, rather than to lifetime or permanent income. If enough individuals are so constrained, then changes in aggregate spending have "multiplier effects," which arise because consumption spending by one person is income for another. Changes in spending beget changes in income which beget still more changes in spending, and so on, ad infinitum. An autonomous increase in spending thus ultimately precipitates an increase in income that is a multiple of the original increase in spending.<sup>11</sup>

Estimates of the aggregate income of households in Japan that act as though liquidity-constrained, as a percentage of all personal income in Japan, range from 16 percent (Hayashi<sup>12</sup>) to 30 percent (Takenaka<sup>13</sup>), greatest during recession, lowest during booms. Similar estimates for the United States generally lie above this.

The Keynesian theory is by itself an incomplete model of saving, for it begs the question of what determines the saving behavior of the individuals who are not liquidity-constrained. In this sense, it is perhaps better to regard it as an addendum to the other two paradigms of saving, rather than as a third paradigm.

## Analysis of Japanese saving patterns

Analysts of Japanese saving patterns have been largely preoccupied with explaining why postwar Japan's private saving rate substantially exceeded the private saving rates of other countries. In a survey of the vast literature on this topic, Charles Horioka identified no less than thirty-five different hypotheses for explaining postwar Japan's high rate of private saving.<sup>14</sup> Many of these hypotheses can be placed within either the life-cycle or the Ricardian paradigm.

In the life-cycle paradigm, individuals save while young and dissave when old. Societal savings arise because the young either outnumber the old or else perceive themselves as wealthier than the currently old did while they were young. Within this paradigm, postwar Japan's high growth rate<sup>15</sup> would seem to contribute to its high saving rate, as would the youthful demographic profile<sup>16</sup> of Japan; for throughout the last half of the twentieth century the percentage of Japanese who were relatively young was less than would be true in a steady state. Japan's surfeit of young per-

<sup>11</sup> Denote the marginal propensity to consume out of income as  $b$ . In equilibrium, income  $y$  equals expenditures  $c_0 + by$ , and so  $y = c_0 / (1 - b)$ . An autonomous increase in expenditures  $\Delta c_0$  ultimately precipitates an increase in income  $\Delta y / \Delta c_0 = 1 / (1 - b)$ , and  $1 / (1 - b)$  is called "the multiplier."

<sup>12</sup> Fumio Hayashi, "The Effects of Liquidity Constraints on Consumption: A Cross-Sectional Analysis," *Quarterly Journal of Economics*, vol. 100, no. 1 (November 1985), pp. 183-206.

<sup>13</sup> Heizo Takenaka, *Contemporary Japanese Economy and Japanese Economic Policy*, University of Michigan Press, 1991, p. 51.

<sup>14</sup> Charles Yuji Horioka, "Why Is Japan's Household Saving Rate So High? A Literature Survey," *Journal of the Japanese and International Economies*, vol. 4 (1990), pp. 49-92.

<sup>15</sup> Franco Modigliani and A. Sterling, "Determinates of Private Saving with Special Reference to the Role of Social Security," in F. Modigliani and R. Hemming (eds.), *The Determinates of National Saving and Wealth*, London: Macmillan, 1983, pp. 24-55; Martin Feldstein, "International Differences in Social Security and Saving," *Journal of Public Economics*, vol. 14 (1980), pp. 225-44.

<sup>16</sup> Charles Yuji Horioka, "The Determinates of Japan's Saving Rate: The Impact of the Age Structure of the Population and Other Factors," *Economic Studies Quarterly*, vol. 42, no. 3 (September 1991), pp. 237-53; Franco Modigliani, "The Life Cycle Hypothesis of Saving and Intercountry Differences in the Saving Ratio," in W. A. Eltis, M. F. G. Scott, and J. N. Wolfe (eds.), *Induction, Growth and Trade: Essays in Honor of Sir Roy Harrod*, Oxford University Press, 1970, pp. 197-225.

sons in the postwar decades was the combined result of a postwar baby boom and the delayed but rapid adoption in Japan of modern nutrition and scientific medicine, too late to greatly prolong the lives of those already beyond youth in the 1950s.

Also within the life-cycle paradigm, factors that exaggerate the tendency to save while young or dissave when old would exaggerate the effect on the societal saving rate of Japan's high growth rate and peculiar demographic profile. These factors include the high cost of housing, land, and (children's) weddings,<sup>17</sup> the early average age of retirement,<sup>18</sup> and the long life expectancy<sup>19</sup> of Japanese people. Before 1974 Japan's relative paucity of social security benefits<sup>20</sup> meant that, within the life-cycle paradigm, the Japanese consumed less and saved more than other nations because less private wealth was shifted from future generations than was true of nations with generous social security benefits.

The Ricardian paradigm focuses attention on bequests as a motivation for saving. Within it, factors that tend to increase a nation's saving rate include individuals' heightened degree of altruism toward their children and the fact that their current familial wealth is low relative to some steady-state target value. The relatively large extent of bequests<sup>21</sup> in Japan might indicate the strength of familial altruism as a motivation for saving. Additionally, the relative ubiquity in Japan of extended families living together<sup>22</sup> might further evidence a heightened sense of familial altruism. Of course, the extended family is not a new aspect of life in Japan, and so its significance for explaining higher national saving rates in Japan only in the postwar era and not before is rather diminished. Not only this, but bequests might arise for other than altruistic reasons, perfectly consistent with the life-cycle paradigm. First, "accidental bequests" might arise because mortality is unpredictable.<sup>23</sup> Second, the promise of a bequest can be a means of inducing favors from children. Such a "strategic bequest" is granted for selfish reasons; it really amounts to a form of consumption expenditure.<sup>24</sup> Evidence for Japan is mixed. If the first explanation for bequests is the main one, then those with fewer children ought to have as large bequests as those with more children. In fact, this

appears to be so for Japan.<sup>25</sup> However, except for bequests of the childless, this same evidence could also reflect the incidence of strategic bequests in Japan.

Proponents of the Ricardian paradigm argue that the devastations of the war reduced the wealth of Japanese families significantly below target levels,<sup>26</sup> which precipitated a temporarily high propensity to save. In a different interpretation, also falling within the Ricardian logic, the higher rate of technological advance after the war than before resulted in windfalls that forward-looking Japanese households largely added to their wealth rather

<sup>17</sup> T. Ishikawa, "Chochiku: kakei chochiku no kōzō yōin to kinyū zeisei" (Saving: structural determinates of household saving and the financial and tax systems), in K. Hamada, M. Kuroda, and A. Horiuchi (eds.), *Nihon keizai no makuro bunseki* (Macroeconomic analysis of the Japanese economy), Tokyo: Tokyo Daigaku Shuppan-kai, 1987, pp. 177-210; Charles Yuji Horioka, "The Cost of Marriages and Marriage-Related Saving in Japan," *Kyoto University Economic Review*, vol. 57 (1987), pp. 47-58.

<sup>18</sup> Michael J. Boskin, "Issues in the Measurement and Interpretation of Saving and Wealth," in Ernst R. Berndt and Jack E. Triplett (eds.), *Fifty Years of Economic Measurement: The Jubilee of the Conference on Research in Income and Wealth*, NBER Studies in Income and Wealth, vol. 54, University of Chicago Press, 1990, pp. 159-93.

<sup>19</sup> Charles Yuji Horioka, "The Applicability of the Life-Cycle Hypothesis to Japan," *Kyoto University Economic Review*, vol. 54 (1984), pp. 31-56.

<sup>20</sup> Y(ukio) Noguchi, "Problems of Public Pensions in Japan," *Hitotsubashi Journal of Economics*, vol. 24 (1983), pp. 43-68; G. Kopits and P. Gotur, "The Influence of Social Security on Household Savings: A Cross-Country Investigation," *IMF Staff Papers*, vol. 27 (1960), pp. 161-90.

<sup>21</sup> F(umio) Hayashi, A. Ando, and R. Ferris, "Life Cycle and Bequest Savings: A Study of Japanese and US Households based on Data from the 1984 NSFIE and the 1983 Survey of Consumer Finances," *Journal of the Japanese and International Economics*, vol. 2 (1988), pp. 450-91.

<sup>22</sup> J. A. Lucken, "Consumption and Saving Behavior," *Kodansha Encyclopedia of Japan*, ii, Kodansha Ltd, 1983, pp. 18-19.

<sup>23</sup> Andrew B. Abel, "Precautionary Saving and Accidental Bequests," *American Economic Review*, vol. 75, no. 4 (September 1985), pp. 777-91.

<sup>24</sup> Douglas B. Blenheim, Andrei Shleifer, and Lawrence H. Summers, "The Strategic Bequest Motive," *Journal of Labor Economics*, vol. 4, no. 3 (July 1986), pp. s151-s182.

<sup>25</sup> Robert Dekle, "Do the Japanese Elderly Reduce their Total Wealth?" *Journal of the Japanese and International Economics*, vol. 4, no. 3 (September 1990), pp. 309-17.

<sup>26</sup> M. Shinohara, "The Determinants of Post-War Savings Behavior in Japan," in F. Modigliani and R. Hemming (eds.), *The Determinates of National Saving and Wealth*, London: Macmillan, 1983, pp. 201-18; Fumio Hayashi, "Why is Japan's Saving Rate so Apparently High?" *NBER Macroeconomics Annual 1986*, i, Cambridge, Mass.: MIT Press, 1986, pp. 147-210.

## Saving

than consuming.<sup>27</sup> Yet further, the relatively low expectation of nuclear war<sup>28</sup> for the Japanese, and the greater expectation of natural disasters<sup>29</sup> such as earthquakes have been cited as contributing toward their inclination to save for the bequest purposes.

Within both the Ricardian and the lifecycle paradigms for a growing economy, factors that increase the real return to saving tend to increase societal saving. The depleted stock of capital in the war's aftermath<sup>30</sup> might indicate a relatively high real return to saving in Japan. Also, aspects of the Japanese tax system, including effective tax exemption on personal interest income,<sup>31</sup> might result in a smaller tax wedge separating the rate of return on investment and that on saving.

Many have attempted to relate Japan's high private saving rate to the fact that a substantial portion of wage income in Japan is paid in the form of bonuses<sup>32</sup> twice yearly. This seems to be a confused notion. The sizes of the individual bonuses are not predetermined but nevertheless are somewhat predictable. It is not therefore correct to infer that because of these bonuses wage incomes are substantially less predictable in Japan than in other countries. If the bonuses were wholly transitory, then in the logic of the permanent income hypothesis those who receive them would devote them mainly to saving. Is this the source of the confusion—incorrectly regarding the bonuses as transitory income?

This is not an exhaustive list of explanations for Japan's high saving rate, but it does include most of the explanations that have been given serious consideration. The weight one attaches to each of them may depend on whether one judges the life-cycle paradigm or the Ricardian paradigm more convincing. Empirical investigation of the Ricardian versus life-cycle theories has spawned a vast but inconclusive literature exploring US data.<sup>33</sup>

M. Homma et al. apply some of the same methods to Japanese aggregate data.<sup>34</sup> The basis for these investigations is that in the Ricardian model private consumption is unrelated to government debt and taxation, whereas in the life-cycle model current private consumption is inversely related to taxes net of transfers and is positively related to public debt. To determine reliably whether private consumption is sensitive to the public finances requires that one control for all other things on which pri-

vate consumption might depend: wealth, the composition of private and publicly held assets, the distorting effects of the tax system, and so on. Homma et al. estimate aggregate private consumption functions for Japan over 1960–83, replicating the US study of Feldstein,<sup>35</sup> for Japan in 1952–82 replicating the US study of Kormendi,<sup>36</sup> and for Japan in 1957–82 replicating the US study of Seater and Mariano.<sup>37</sup> The sample periods include the years of significant accumulation of government debt in Japan that began with the expansion of social security benefits in 1974. The results are no more conclusive than the US studies on which they are based. For selected sub-periods, particularly before 1965, Homma et al. find significant inverse relationships between government taxes net of transfers and private consumption, which is consistent with the life-cycle model and contrary to the Ricardian one. However, for estimates based on the

<sup>27</sup> Kaiji Chen, Ayse Imrohoroglu, and Selahattin Imrohoroglu, "The Japanese Saving Rate," *The American Economic Review*, vol. 96, no. 5, December 2006, pp. 1850–1858.

<sup>28</sup> Joel Slemrod, "Fear of Nuclear War and Intercountry Differences in the Rate of Saving," *Economic Inquiry*, vol. 28, no. 4 (October 1990), pp. 647–57.

<sup>29</sup> Martin Bronfenbrenner and Y. Yasuba, "Economic Welfare," in Kozo Yamamura and Y. Yasuba (eds.), *The Political Economy of Japan, I, The Domestic Transformation*, Stanford University Press, 1987, pp. 93–136; at p. 121.

<sup>30</sup> L. Christiano, "Understanding Japan's Saving Rate: The Reconstruction Hypothesis," *Federal Reserve Bank of Minneapolis Quarterly Review* (Spring 1989), pp. 10–25.

<sup>31</sup> John B. Shoven and T. Tachibanaki, "The Taxation of Income from Capital in Japan," in John B. Shoven (ed.), *Government Policy towards Industry in the United States and Japan*, Cambridge University Press, 1988, pp. 51–96.

<sup>32</sup> T. Ishikawa and Kazuo Ueda, "The Bonus Payment System and Japanese Personal Saving" in M. Aoki (ed.), *The Economic Analysis of the Japanese Firm*, Amsterdam: North-Holland, 1984, pp. 133–92.

<sup>33</sup> For a recent review, see John J. Seater, "Ricardian Equivalence," *Journal of Economic Literature*, vol. 31, no. 1 (March 1993), pp. 142–90.

<sup>34</sup> M. Homma, Y. Mutoh, T. Ichori, A. Abe, M. Kandori, and M. Atoda, "Kōsai no chūritsusei meidai: riron to sono jissō bunseki" (The proposition of neutrality of public debt, theory and evidence), *Keizai bunseki* (February 1987), Tokyo: Economic Planning Agency, Government of Japan.

<sup>35</sup> Martin Feldstein, "Government Deficits and Aggregate Demand," *Journal of Monetary Economics*, vol. 9 (1982), pp. 1–20.

<sup>36</sup> Roger Kormendi, "Government Debt, Government Spending, and Private Sector Behavior," *American Economic Review*, vol. 73, no. 5 (1983), pp. 994–1010.

<sup>37</sup> John J. Seater and Robert S. Mariano, "New Tests of the Life Cycle and Tax Discounting Hypothesis," *Journal of Monetary Economics* (March 1985), pp. 195–215.

full time period they generally fail to discover statistically significant interdependencies between government finances and private consumption. And for none of the sub-periods do they identify a statistically significant interdependence between public debt and private consumption. On these grounds, the Homma et al. study may be viewed as failing to reject the Ricardian paradigm, but perhaps it represents only a weak test of it. The Homma et al. findings are not decisive.

In the most recent years Japan's national saving rate has declined. This is strong evidence supporting the life-cycle model of saving, for it is precisely as predicted by that model given the dramatic increase in the proportion of Japanese over 65 years old and retired, and given the recent decline in the Japanese economic growth rate.<sup>38</sup> Horioka argues that the micro-evidence also now strongly supports the life-cycle model of saving for it shows that retirees in Japan dissave, and that the extent of their dissaving is inversely related to their net social security benefits.<sup>39</sup> The Ricardian paradigm asserts that taxes and social security benefits have no effect on private consumption and so predicts that private saving would be positively, not inversely, related to net social security benefits.

## Conclusion

Much of the physical wealth of Japan was dissipated in the great obscenity known as World War II.

Since then, the nation of Japan has again diligently amassed a stock of private and public wealth. There are two interpretations of this process. The first, based on the life-cycle model of saving, emphasizes that societal saving is due to the saving of the young, who in postwar Japan have continually been both more numerous and more prosperous than their older contemporaries, the result of rapid economic growth and an aberrant national demographic profile. The second interpretation of Japan's high postwar saving, based on the Ricardian model, emphasizes the desire of Japanese living in the post-war era to raise the incomes of their descendants. The sharp decline in Japan's net national saving rate in the first years of the current century strongly confirms the life-cycle model. Japan's sizable national saving rate during the postwar era was not the result of government policy or social engineering. It was the aggregate result of individuals' choices about living and working in a market economy. The same is true of the recent decline in Japan's national saving rate.

<sup>38</sup> R. Anton Braun, Daisuke Ikeda, and Douglas H. Joines, "The Saving Rate In Japan: Why It Has Fallen And Why It Will Remain Low," *International Economic Review*, vol. 50(1), 2009, pages 291–321.

<sup>39</sup> Charles Yuji Horioka, "The (dis)saving behavior of the aged in Japan," *Japan and the World Economy*, vol. 22, 2010, pp. 151–8.

## FURTHER READING

- Fumio Hayashi, *Understanding Savings: Evidence from the United States and Japan*, Cambridge, MA: MIT Press, 1997. Argues that the Ricardian, altruistic bequest motive is a major factor contributing to Japan's national saving.
- Charles Yuji Horioka, "Saving in Japan," in Arnold Heertje (ed.), *World Savings: An International Survey*, Oxford: Blackwell, 1993, ch. 7, pp. 238–78. Argues that the life-cycle model explains Japan's high postwar saving rate better than the Ricardian model.
- Charles Yuji Horioka, "Why is Japan's Household Saving Rate so High?" *Journal of the Japanese and International Economies*, vol. 4 (1990), pp. 49–92. Surveys the vast literature on private saving in Japan.
- David W. Campbell, "Explaining Japan's Saving Rate," *Journal of Asian Economics*, vol. 15, 2004, pp. 797–815. Surveys recent empirical findings on Japanese saving.