

Japan's Macroeconomic Dilemmas:

The Implications of Demographics for Growth and Stability

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Abstract:

Japan's post-WWII baby boom and subsequent fertility drop resulted in a sharp demographic transition with large side effects. An aging workforce depressed economic growth in the 1990s to 1-2%, about actual performance; the 1987-91 "bubble" and poor monetary and fiscal policy were of secondary importance. The shifting population structure also affected savings and investment balances and the sectoral flow-of-funds. The resulting strategic dilemmas led to repeated policy blunders and to the 1990s banking crisis. Japan now has fiscal deficits of 7% of GDP and government debt of 170% of GDP. Restoring fiscal sustainability and covering commitments to retirees will require a net tax increase of 19% of GDP. With its working-age population in decline, accomplishing that will be a major political challenge and will inevitably hold growth below its 1% potential level during the coming decade.

Keywords:

Japan, China, aging, growth accounting, flow-of-funds, savings-investment balance, fiscal deficit

I. Introduction

Population growth is falling rapidly throughout Asia; Japan is in the vanguard. In its case, there was a baby boom in the late 1940s, followed by a baby bust. As a result, Japan's working-age population is now in decline, and from 2007 total population will begin falling. China, Korea, Taiwan and Thailand now also have birthrates below replacement level, and fertility in Indonesia and Vietnam is approaching the critical threshold of 2.1 children per woman (Gubhaju and Moriki-Durand, 2003; Eberstadt, 2004). All will, like Japan, soon face an aging population with a labor force that will no longer be expanding. It is important to think about the implications of this transition.

In Japan's case, its shifting population structure has had three effects. While Japan certainly suffered from poor macroeconomic policy and is still plagued by banking and structural problems, its economic performance during the 1990s was primarily due to demographics. The entry and subsequent accumulation of work experience of the large post-WWII cohort into the labor force bolstered growth from the 1970s into the 1980s. However, by 1990 the youngest of that generation had reached age 40. With much of their lifetime skill acquisition completed and few young workers taking their place, population dynamics exerted a drag on potential growth. China's labor force will peak around 2015 (Jackson and Howe, 2004). By then the aging of its workforce will already be a drag on the economy. Although farm-to-city migration can offset this, we need to exercise caution in thinking that rapid growth in China and other Asian economies can continue once labor force growth ceases.

Second, a demographic transition had a major impact on macroeconomic savings-investment balances and through that on the sectoral flow-of-funds. Saving rates rose with growth, as earnings set aside while workers were poorer were inadequate to maintain an increasingly higher standard of living into retirement. Hence at the same time that the expansion of the labor force slowed the age structure of the population placed the bulk of workers in the peak saving portion of their life cycle. As growth slowed, however, so did investment and the need to finance it. The net result was be a savings surplus that in large economies such as Japan cannot all be redirected to foreign investment. Governments will be pressured to resort to monetary and fiscal policy to stave off the recessionary impact of this "paradox of thrift;" certainly Japan's was. Its economy had a hard time growing consistently in this environment,

despite easy money and loose fiscal policy. Furthermore, those policies had negative short-term and long-term side effects, traced below.

A short-term one is financial system distress. Developing countries have bank-centered financial systems, and in Japan that persisted into the 1980s. As investment slowed, the underlying demand for loans among traditional customers shrank, while inflows of deposits continued unabated. Expanding lending to new sorts of customers is costly and prone to mistakes. Those mistakes were exacerbated by low interest rates, a side effect of policies to stimulate investment. As a result, the financial system was prone to instability. That was the underlying source of Japan's late 1980s "bubble," rather than poor governance or bungled deregulation. Furthermore, the faster an economy grows, the greater the magnitude of such funding shifts. That, at any rate, was the case for Japan where banks rushed into real estate, small business and international lending to adapt to the sudden disappearance of their large corporate borrowers. In sum, both repeated recessions and the late 1980s "bubble" and the non-performing loans that accompanied its burst are ultimately the result of the shifting age structure of the population. Asia will remain vulnerable to banking crises and bubbles as the population ages.

This process has long-term effects, as eliminating budget deficits and paying for retirement benefits places fiscal systems under pressure. In Japan's case, the government, national and local, has accumulated 170% of GDP in debt and is currently running a budget deficit of 7% of GDP. Such deficits are not sustainable. Restoring fiscal balance while raising the revenues needed to finance pensions and health care for an aging population will require a tax increase of 19% of GDP. A hike of that magnitude is certainly feasible; it would merely serve to move Japan from the low end towards the high end of the OECD countries in terms of its levels of taxation. It will also undoubtedly be partially offset by cuts in old-age benefits and in other government expenditures. We do not yet know what Japan's experience will be with the political challenges this will entail, and there is of course danger in failing to implement changes in a timely manner. It will be important to observe and learn from that in the hopes of better handling similar problems elsewhere in Asia.

Finally, for those interested in the Japanese market, the combination of a shrinking labor force and increases in tax levels will repress growth for the foreseeable future, to 1% *per annum* or below. This, however, is not a crisis: with a population that is falling, even very slow growth will produce rising average incomes. There will remain many opportunities in healthcare, in

financial services and in other areas where international businesses have strengths. Likewise, “hollowing out” will be a necessary and desirable accompaniment to changes in the labor force; that will also provide opportunities for Asian exporters. In the short run, even strong growth is possible, as unemployed workers and excess capacity are pulled back into use. Japan’s growth in the 1960s used to be thought of as a miracle, though other countries have now equaled its performance, so that it no longer seems so exceptional. It *will* take a miracle, however, for the Japanese economy to grow rapidly in the future.

II. Demography and Japan’s 1990s Doldrums: Growth Accounting

An economy’s potential growth is governed by increases in inputs of labor and capital and improving productivity, from better technology and structural transformation. Changes in Japan’s population structure sharply lowered potential long-run growth around 1990 to 2% and now to 1%. However, economists and businessmen have implicitly extrapolated past performance as indicative of potential growth. As a result, analysts of Japan’s economy during the 1990s looked for a “smoking gun” to explain its apparently poor performance. That there were problems with the conduct of monetary and fiscal policy, with the process of financial deregulation, and with structural forces that kept excess resources in low-productivity sectors is not open to dispute. However, neither better macroeconomic policy nor a resolution to problems in the financial system will restore past performance: the underlying problem is that Japan’s economy has entered an era of fundamentally slow growth. Structural reforms can help, though that is a one-time process. However, the prospective gain from transferring resources from low- to high-productivity sectors is much smaller than with the migration from farm to factory, and due to the age structure of the population even that smaller benefit will be difficult to achieve.

During the 1990s Japan suffered from two recessions and real GDP growth fell to an average of 1.5% from the 3.7% level of the 1980s. (See Figure 1.) Explanations abound, but none are compelling (Smitka, 2004). For example, other economies have suffered from bubbles, without apparent long-term effects (Posen, 2004). Again, looking backward it is not clear that the 1990s represent a discontinuity, as in the typology of structuralists such as Katz (2002). Hayashi and Prescott (2002) and Harada and Nakata (2003) are likewise reduced to arguing for an unexplained slowdown in productivity. The business cycle of the 1990s does not look unusual, either, given the high variance since WWII in Japan’s growth rate. Attempts to find a smoking

gun from macroeconomic policy have not been successful; Bayoumi (2000) is representative of such efforts and of their inability to reach a clear conclusion. Even Adam Posen, a staunch critic of macroeconomic and particularly monetary policy notes that in a low growth environment discerning whether policy is “tight” or “loose” is difficult (Posen and Kuttner, 2004). This is not to deny that Japan has structural issues, as highlighted in the last two OECD *Economic Surveys* (OECD, 2003; 2004) and Japan’s 2003 *Economic White Paper* (Japan Cabinet Office, 2003). However, they are a source of the lower level of income of Japan relative to the US, not a cause of slower growth.

[insert Figure 1 about here]

In contrast, applying long-run “growth accounting” models to Japan leads to a simple conclusion: growth in the 1990s would have slowed independent of the “bubble,” or policy mistakes, or productivity shocks or a political system ill-suited to handle the policy challenge of a low-growth environment. The basic framework of growth accounting shows that the growth rate of output is a weighted average of the growth rate of inputs of labor and capital plus that of total factor productivity (Solow, 2000). During the 1960s investment provided workers with both more and better equipment, office buildings, and housing. Likewise, formal education and skills acquired on the job made workers more productive. Finally, seminal research on Japan highlighted one-time factors that increased output (Denison and Chung, 1976). These include the catch-up process of introducing new technology from overseas and the migration of workers from low-productivity farming to high-productivity factories.

Investment, of course, exhibits diminishing returns. Technological catch-up and the end of rural-urban migration both lowered profits, the latter via decreased demand for housing and durables (Yoshikawa, 1995). The expansion of the capital stock slowed from 1970 and with it overall growth. However, the labor force continued to expand as baby boomers matured and the quality of the labor force improved with education and experience. During the 1980s Japan still outperformed the remainder of the OECD.

Unfortunately existing models do not directly incorporate demographic elements beyond changes in average hours and education. They thus underpredict the slowdown of the 1990s. Over a worker’s career, wages increase in a stable manner, rising rapidly upon entry into the labor force, then slowing over time to peak around age 40. Incorporating this effect would help explain the continuation of Japan’s growth in the 1970s, as the baby boom generation first

entered the labor force and then accumulated experience (Lindh, 2004). By the late 1980s, however, the boost to growth from the increasing tenure of the work force peaked. Simultaneously the rapid decline in fertility meant that the entry of new workers decreased steadily over time, while the rise in education halted with 40% of youth continuing past high school. In addition, total hours worked fell. Leisure is a strongly normal good, dominating the substitution effect of higher wages. Hence, as incomes rise the work-week shortens. Similarly, retirement becomes an option and the labor force participation rates of older workers decline (Costa, 1998). Again, these are elements that standard models do not incorporate.

In sum, by the 1990s, neither capital nor labor remained capable of propelling growth, as recent attempts to calculate potential GDP demonstrate. The slowdown is particularly apparent in the multisector growth models used in research on productivity such as Fukao *et al.* (2003). (See Table 1.) However, their study focuses on industry-level productivity and interindustry shifts, and ignores the other one-time factors emphasized by Denison and Chung (1976) and the mismeasurement of the capital stock emphasized by Jorgenson and Motohashi (2004). Above all, it fails to reflect the shifting age composition of the labor force. Nevertheless, it underscores that potential growth declined markedly from the 1980s into the 1990s.

[insert Table 1 about here]

The absolute size of the labor force is also now shrinking, and there is no way around this. Immigration might seem a solution, but the latest *Economic White Paper* calculates a need for 640,000 immigrants a year merely to offset the gross decline in the labor force. Immigrants have lower than average productivity, hence the number required to prevent an effective shrinking of the workforce is in fact higher. Incorporating such considerations, Feldman (2004) calculates that Japan would require a total 7.4 million immigrants by 2012, including 2.5 million dependents. (See also Fehr *et al.*, 2003.) While immigration will also certainly increase, as it had *circa* the peak of the “bubble” in 1991, an inflow on this scale seems unlikely. Similarly, female labor force participation is already too high for a greater role of women in the workforce to fill the gap (Feldman, 1996). There is no feasible way around a demographic-driven drop in the size of the labor force.

In the short run, growth is likely. Capacity utilization is low and unemployment high; the economy can rebound for a year or two merely by putting people back to work. Productivity will also improve. In parallel with the earlier shift from farm to factory, there is now a shift from

factory to services, and because of improving productivity pulling out workers reduces output but little. There are likewise many unproductive employees in construction (perhaps 3% of the labor force) and among small retailers. Any output they provide in other sectors thus boosts GDP. However, the average age of the work force in construction and small-scaling retailing is high. If such sectors shrink through retirement rather than the transfer of “surplus” workers into healthcare and other expanding sectors, then reallocation will provide little boost to output. Similarly, manufacturing now employs only 16% of the workforce (*versus* 11% in the US). While further “hollowing out” is both inevitable and desirable, most of the gain has already been achieved. Further shifts will be slow and suffer from diminishing returns. In sum, structural reform will not proceed at the pace of the earlier move out of agriculture, so that a realistic scenario is one of only slow productivity improvement. In contrast, China’s aging process will take place while still having a large agricultural sector, so its growth may continue longer.

III. The Demographic Slowdown: Financial Implications

While Japan’s high growth slowed in the 1970s, because of demographics saving did not. This served as a drag on growth, a classic example of the “paradox of thrift.” On one hand, it led to two decades of fumbling and ultimately unsuccessful attempts to use fiscal and monetary stimulus to offset its impact. On the other hand, the drop in investment resulted in a commensurate swing in the flow of funds through the financial system. Markets proved unable to handle shifts of this magnitude, producing the “bubble” of the late 1980s and subsequent non-performing loans and continued excess capacity in banking (Hoshi and Kashyap, 1999). In retrospect, it should neither be surprising that Japan today has accumulated the largest stock of debt in the OECD, nor that a financial crisis occurred. Both are intrinsic to high-growth economies, and are a likely side effect of the demographic transition that Asia is facing.

Shifts in Savings and Investment

During the high-growth era of 1955-1970, domestic demand expanded just under 10% *per annum*, feeding and in turn fed by investment demand. Initially domestic savings were insufficient to finance it, and Japan ran into periodic balance-of-payments problems, making a trip to the IMF in 1961. However, by the late 1960s, savings rose sufficiently to cover domestic needs. (See Figure 2.) Personal saving is determined with a long time horizon, as individuals

plan for children's education and especially for retirement. Japan also started out poor. In the 1970s, older workers, now with an empty nest, had to make up for the paltry amounts set aside earlier, a general side effect of rapid growth (Modigliani and Cao, 2004). From a macroeconomic standpoint, the flip side of a high savings rate is a low share of consumption in income. The decline in investment in the 1970s was thus not offset by a rise in spending by the household sector, due to a rational desire to save rather than a structural inability to consume (*cf.* Fukao, 2001; Katz, 2002).

[insert Figure 2 about here]

The magnitude of the swing is quite stark. In 1970, corporate investment was 27.5% of GDP; by 1975, it was 17.9% and falling. While partially offset by a decline in corporate profitability, as traced in Table 2, this was nevertheless a huge change. In contrast, in the 1970s net household savings actually climbed from 8% to 11% of GDP. The trend towards surplus private sector savings was already apparent before the "Tanaka" boom that began in 1972, prior to the first oil crisis and the level of net private savings rose rapidly once the 1974 recession hit. For the next two decades the economy was awash in savings, and remains so today.

[insert Table 2 about here]

In the late 1970s savings initially went to the government, which ran large deficits; when these were reined in growth slowed markedly (Lincoln, 1988). US consumers then came to the rescue: 1979-1986 was the only extended time period since the Korean War when growth was export led. Unfortunately, for an economy of Japan's size, exports can serve as no more than a temporary salve, since to provide stimulus they must expand faster than the rest of the economy. Trade friction throughout the 1980s suggests such an expansion could not have continued. More generally, as noted by Feldstein and Horioka (1980) and reiterated in the latest *Economic White Paper* (Japan Cabinet Office, 2003: 197, 274), international capital flows are insufficient to smooth domestic income and consumption. In any case, with the dollar depreciation that followed the 1986 Plaza Accord, foreign demand was no longer a palliative.

The gradual expansion of the "bubble" economy from 1987 kept the economy out of recession. Asset prices quadrupled, and investment climbed; consumption also rose, with incomes boosted by heavy overtime, fat bonuses, and profits in the stock market. Amplifying this was a general euphoria that Japanese firms would drive the global auto industry and Japanese banks would dominate world finance. With hindsight, this exuberance was irrational. However,

the combination buoyed the economy, compensating for the shift to fiscal restraint. The bubble collapsed, however, and after 1991 neither foreign demand nor deficits could soak up the surplus consistently. Economic growth was consequently bumpy but, by growth accounting standards, not poor.

Eventually this savings imbalance will disappear. Over the next decade the share of retirees, who are in the dissaving portion of their life cycles, will expand and net savings decline. Indeed, Table 3 shows a sharp drop in household savings in 2000 and 2001. However, the overhang of the bubble remains a drag on the corporate sector, which has on average been a net saver since 1995 and in 2002 was generating a cash flow of 6% of GDP, net of investment. Until restructuring progresses further, firms will continue paying down debt rather than soaking up private savings. This will likely last until the latter half of the decade; for more detail see Tanaka (2003), Sato (2003) and especially Tsunoda (2003). Only then might Japan exit from the paradox of thrift. However, as both Section II and Section IV argue, by that time other effects of the aging population will depress growth.

[insert Table 3 about here]

Shifts in the Flow of Funds

Swings in macroeconomic savings and investment also induced shifts in the flow-of-funds. Since firms were no longer investing, savings had to flow elsewhere. Other changes amplified this; with financial liberalization firms could raise funds from stocks and bonds more cheaply than from banks. The combined effect was that large banks lost their traditional customers, and were forced to find new ones. That process did not go smoothly.

Indeed, the shifting flow-of-funds itself forced financial liberalization. Beginning with the US Occupation-imposed Dodge Plan of 1949 the government ran budget surpluses. As a result, there were no government bonds, while private issues were restricted to select borrowers, primarily electric utilities. Equities were initially important, but in 1963 Japan's largest brokerage failed and the stock market was thereafter not a major source of funds. By the mid-1960s firms thus had no direct financing options; unable to issue either stocks or bonds, their only sources of outside funds were the banking system and, for long-term loans, insurance companies. Individual savers likewise had no option but to place their money in banks and life insurance. This of course suited officials at the Ministry of Finance, since the financial institutions they monitored thus faced less competition. But by 1979 regulators had to allow the

development of a bond market to permit the financing of fiscal deficits, opening holes in the dikes that segmented the financial system (Lincoln, 1988; Hoshi and Kashyap, 1999). This was accentuated by the growth of funding activities of Japanese multinational corporations in New York and London, vetted by formal deregulation of the international sector in 1980. Between these twin forces the holes expanded and the dikes were breached. Direct finance became possible, and through this disintermediation the banking system lost its monopoly over the supply of funds.

Banks' responses led to financial crisis. To see this it is fruitful to ask why financial distress does not arise more frequently, rather than trying to identify shocks and how they were transmitted. Two factors stand out when phrased this way. First, bankers develop experience in managing risk, encapsulated in organizational structures and operating rules-of-thumb. In the case of the 13 "city" banks that dominated the Japanese financial system, these included lending against collateral, primarily real estate, and serving as the "main bank" to a set of large firms. High growth facilitated workouts of problem loans, while real estate prices rose steadily so that collateral provided a reliable cushion; there was no need for careful credit analysis of a borrower's ability to repay. By 1980, banks had already had a stable set of customers for 20 or more years, and the rules-of-thumb had proved sufficient to prevent bank failures for over 40 years.

Regulation complemented bankers' rules-of-thumb. Following the example of the US, Japanese authorities tried to watch both the asset and the liability side of the system. They limited the opening of new branches and otherwise stunted competition among banks, insured depositors against losses and prohibited banks from offering higher deposit interest rates than their peers. With competition muted, banks tended not to have problems and bank inspections could be lax. They also did not have to watch costs carefully, and indeed faced incentives that encouraged inefficiency: labor-intensive services, entertainment, and the purchase of their clients' stock issues were the chief strategies they could employ to capture market share from rivals and keep their loan portfolio from being poached by other institutions.

Unfortunately, the rapid shift in the flow-of-funds undermined both internal and external checks. Strategically, if banks couldn't lend to large firms, they needed to try lending to small firms or internationally for project finance. However, this was not compatible with prevailing management practices. Banks entered the 1980s unused to credit analysis and without

administrative structures and information systems that could support the granting of large numbers of small loans to borrowers with whom they were unfamiliar. Most banks also had scant experience in international markets, and regulators shared these weaknesses. Neither banks nor regulators, then, were prepared for entry into such new business lines, a story familiar to those who watched the S&L crisis in the US.

It is not that banks did not try.¹ However, creditworthy small firms were already served by trading companies, mutual savings associations, and credit cooperatives. To garner new business required new entrants to pick up less desirable customers, or to offer loans at prices that, given their cost structure, were not profitable. In practice Japanese banks seem to have done both. The use of land as collateral allowed both banks and regulators to fool themselves as to the safety of their lending to small firms: once money started flowing, land prices began to climb, so collateral seemed to cover potential defaults. There (mistakenly) seemed to be no need to rethink historic rules-of-thumb on the part of either banks or regulators. The same process took place in international markets, as Japanese banks followed the lead of major American banks in eurodollar lending to Latin America.² In the end, everything large Japanese banks tried tended to go sour.

Even in the best of times organizations find change difficult, the core observation of the population ecology literature. Change is both expensive and risky, and the appropriate strategic direction is hard to diagnose; as a result, firms are quite rational to resist. The temporary boom of 1996, ahead of the 1997 hike in the consumption tax, played into the hand of the procrastinators within large firms and regulatory agencies. Banks put off foreclosing on bad loans and trimming branch networks and lending staff; weak borrowers stopped their restructuring efforts. That is not unusual; Japan was merely unlucky in that its problems occurred going into a period of permanently slower growth. It has not, and will not, outgrow its banking problems, particularly since the savings-investment shifts traced above imply permanently lower loan demand, a point also stressed by Hoshi and Kashyap (1999).

¹ As part of this process, for example, large banks seconded staff to the Small and Medium Enterprise Agency (author's observation as an SMEA intern, 1982).

² International lending also required new analytic skills that, as it turned out, no one had. Major Japanese and American banks traded information on their exposure to Brazil. As long as Citibank was still lending, Japanese banks felt reassured, and vice-versa. With hindsight, by the time banks started asking such questions it was already too late, as billions in bad loans had already been made (author's experience as a banker, New York, 1980).

Summary

The thrift that accompanies the aging of the population in a high-growth economy imposed a large cost on the Japanese economy. The rise in savings even as growth slowed faced those in charge of macroeconomic policy with an impossible challenge, as demand chronically lagged the supply potential of the economy. Many analysts stress mistakes in monetary and fiscal policy; Posen (2004) and Grimes (2001) are but two such. However, the above analysis suggests that no policy mix would have been adequate to offset the large savings-investment gap.

This overall process also meant that the flow-of-funds shifted, and financial institutions proved unable to adjust to this. The “bubble” was thus but one symptom of this more fundamental set of problems. The bank-centered financial structure was not central to this; stock markets are just as susceptible to an influx of money in an environment of low demand for new funds, and in Japan asset markets in general were affected. Given the shocks suffered by Japan, not even a robust, American-style financial system could have survived unscathed.³

Such problems will not be unique. Rapid growth in other Asian economies has already produced shifts in the flow-of-funds that undermined tried-and-true rules of controlling leverage, leading to so far fleeting but nevertheless costly financial crises; cross-border lending in Thailand leading up to the 1997 Asian financial crisis is a good example. Of course there were problems in Japan in governance and in financial structure and regulation. However, it was the shift in the flow-of-funds that made that pertinent. More is yet to come. As these economies see their population age, and investment fall, they too will face the paradox that plagues Japan today. China will be the most vulnerable; its investment and savings levels are even higher than Japan’s were, and it has yet to fully convert the “banks” that balanced the accounts of the command economy into true lending institutions. With a weak tax system it is also running budget deficits. China will thus enter a period of rapid structural change with a financial system already burdened with bad assets, and a government with limited financial maneuvering room.

³ A hypothesis based on this section is that the “dot.com” bubble reflected the adjustment of markets to the swing in the US flow-of-funds resulting from the elimination of the Federal budget deficit in the late 1990s.

IV. The Long-run Fiscal Implications of an Aging Society

Japan will be the first nation in human history to experience a population decline due to low fertility rather than high mortality. This will result in a society where 40% of all adults will be over age 65, also a first. (See Figure 3.) Japan's birthrate has declined and longevity has increased monotonically for over 50 years. Immigration aside, such projections are robust even 30 or 40 years hence. After all, today's toddlers, whose numbers we know, will be the mothers of the children to be born in 2030.

What will be the impact? The growth accounting methodology of Section II provides one framework: while output per worker will continue to rise, a falling labor force potentially leads to declining aggregate output, with little change in per capita income. The current *Economic White Paper*, for example, projects GDP growth of under 0.5% per annum and per capita income growth of 1% per annum for 2011-2020, albeit under a "no structural reform" scenario (Japan Cabinet Office, 2003: 202-3). Section III can be extended as well: those retired dissave (or at least save less), so that as the proportion of elderly increases, Japan's savings-investment imbalance will ease (Dekle, 2002; Faruqee, 2003). Among other things, this implies that Japan will shift from being a net exporter to a net importer. The focus below is on fiscal sustainability, in connection with social programs for retirees. This approach relies on generational accounting and on overlapping generation models, which try to assess the magnitude of government liabilities, particularly retirement benefits, relative to assets in the form of future taxes. All paint a similar picture: the current tax structure will prove woefully inadequate to finance promised benefits.

One contrast with the US is that the generation soon to retire in Japan saved copiously. However, output in an economy cannot readily be stored. While investment can expand total future output, health care services are consumed when they are produced. Hence the burden of providing for tomorrow's elderly ultimately rests upon tomorrow's workers. An aging society means that this burden will increase, and the share of the national pie that workers consume must fall.

[insert Figure 3 about here]

Retirement obligations

Japan, like most developed countries, set up a social security system in the early 1960s that includes cash payments to retirees as partial replacement of pre-retirement earnings and that

provides comprehensive health insurance. This represents a large future liability. Though the Japanese healthcare system is far more cost effective than that of the U.S. (J. Campbell, 2003), as the population ages expenditures will rise inexorably. In addition, over the past decade per person costs for the elderly rose by 33%, as modern medicine extended life expectancy. Reforms such as nursing homes and home health care can pare the rate of increase, but providing services for the elderly will remain costly.

The dependency ratio of retirees to workers is a quick indicator of the magnitude of these pressures. Today the old comprise 27% of the working age population, or, to look at the inverse, there are 3.7 people age 20-64 for each person over the age of 65. By 2025 that will rise to 47%, or a mere 2.1 working-age adults per retiree. (See Figure 3.) The declining number of youth will only partially compensate for that. First, the reduced costs for education are replaced by (much) higher costs for health care. Second, the consumption of retirees is higher. Many live in single person households, and hence consume an array of housing services by themselves, in contrast to the economies of scale in household production that accrue to young dependents. On net the costs to those of working age will rise significantly.

The fact that the saving rate of those soon to retire has been high is of scant benefit. At first glance most of the costs of retirement will be born by the elderly as they dissave. Indirectly, however, those of working age population still bear a burden, since they must reduce their consumption to purchase the assets of the elderly, though that choice is voluntary. Government programs, in contrast, are effectively universal in coverage and rely on non-voluntary taxes. Indeed, if current levels of pensions and healthcare support are maintained, then taxes for such social programs must rise from 14% to 30% of income, generating an effective income tax rate in excess of 50%. Alternatively, despite scheduled cuts to benefits, the consumption tax (national sales tax) must rise from its current level of 5% to 25%. The methodology of individual studies varies, but this estimate is broadly consistent across sources that include OECD (1997), Dekle (2002), Kato (2002) and IMF (2003). Such studies also suggest, depending upon the details of the simulations, that this will lower living standards even with a continued increase in real wages.

In any case, this retirement burden represents a swing of approximately 10% of GDP, by itself a large but not impossible amount. However, a shift of this magnitude will prove politically contentious. That is in part because it will be inequitable: those already retired benefit relative to

their children, one key theme of the generational accounting methodology developed by Lawrence Kotlikoff and others.⁴ Today's elderly are drawing national pensions and receiving national health insurance. However, under the *status quo ante* level of benefits and taxation, they incurred few obligations in their younger days to support their own parents, and in the extreme case receive 8 times more social benefits than they paid in taxes during their working days. Younger Japanese face a different situation: they will have to pay high taxes to provide for the elderly, while receiving substantially less, as the government is moving both to extend the retirement age and to reduce payouts. How will the youth of today react to an environment in which they work to pay taxes to maintain the comfort of those who are already retired, knowing that they will have a less comfortable old age for themselves? Their parents and grandparents worked very hard and even suffered outright privation during their working lives. It may be only fair that younger generations sacrifice out of their comparative comfort (Hugh Patrick, 2004, personal communication). However, one can have suspicions over their ability to empathize with their elders, much less accede to the requisite tax levels. Other countries will have much to learn from observing what happens in Japan.

Non-retirement obligations

A complicating factor is that the Japanese government, central and local, has already built up debt of 170% of GDP. To that we must add in contingent liabilities, such as the costs of bailing out the financial sector. The banking system is still insolvent or nearly so, with very low levels of capital and bad loan losses conservatively estimate at ¥25 trillion, or 5% of GDP. In contrast, so far most life insurers have avoided bailouts by unilaterally rewriting existing policies. Any downturn in the economy in the next several years will return the system to crisis. Guarantees to depositors mean that the government will ultimately need to inject additional funds into the system. Problems do not end there. The Japanese post office is the world's largest financial institution, with ¥250 trillion (or roughly US\$2.5 trillion) in deposits. These funds have been handed over to the government, which has used it through FILP (the Fiscal Investment and Loan Program) to underwrite the construction of toll roads, bridges, and railroads, to guarantee small business loans, and to provide finance for a host of other programs, including subventions to local government. Many of these individual programs have not only run operating deficits for

⁴ For an overview see Kotlikoff (2003), Bonin and Patxot (2004) and Fenge and Werding (2003). As applied to Japan see Takayama *et al.* (1998) and Kato (2002).

their entire history, but the assets they hold are also of little value. Losses likely will total ¥75 trillion, or 15% of GDP (Doi and Hoshi, 2002). At the moment, therefore, the liabilities of financial institutions on which the government must make good are roughly ¥100 trillion, or 20% of GDP.

Adding in contingent liabilities for which the government is likely to be responsible to the current stock means that future generations will start out with 200% of GDP in gross government debt.⁵ To be sustainable, it must grow at a rate equal to or slower than GDP. That requires that the government generate revenues sufficient to cover interest due, less an amount to offset growth. Given a historic real interest rate of slightly over 3% and a real growth rate of 1%, the government, central and local, must run a combined surplus of $(3\%-1\%) \times 200\%$, or 4% of GDP. This is not a crisis level; there is no magic threshold for debt after which it ceases to be sustainable, and a few years' delay merely entails a slightly larger adjustment.

An obvious complicating factor is that the overall balance of finances, central and local, is currently in the red: on a consolidated basis, the government is running a deficit of 7% of GDP. A portion of this will disappear if the economy stays out of recession, but the 2003 *Economic White Paper* estimates this cyclical improvement in the budget deficit at under 2% (Figure 1-3-7, Japan Cabinet Office, 2003: 72). On net, then, the structural deficit is roughly 5% of GDP. In the short run that is not a problem, because nominal interest rates are extraordinarily low. Debt sustainability is *not* a near-term crisis.

In sum, Japan faces an adjustment of 19% of GDP. (See Table 4.) Part of the fiscal turnaround can potentially come from reining in infrastructure projects, which are about 3% higher than in other OECD countries. In general, however, government expenditures account for a relatively small share of the economy, and presumably have solid political support (*cf.* Japan's rice support policies to the EU's Common Agricultural Policy and the protection for sugar in the US). So the majority of this will ultimately come from tax increases.⁶ Currently general

⁵ Net obligations are far lower, at 70% of GDP, though still high in comparison to other OECD countries. Other than the BOJ, however, most bonds held by the government are matched by amounts owed directly or indirectly to the public. At some point they must be serviced out of general revenues or rolled over into general obligations. Even for debt offset by "good" assets, the government must locate Japanese residents to purchase them, which will require either that they increase their savings and thus reduce consumption, or that they divert savings from private investment. In macroeconomic terms, this would act much like a tax increase. The Bank of Japan could in principle sterilize asset sales; I am skeptical that would prove practical. I thus use gross debt.

⁶ David Weinstein and colleagues are working on a more optimistic calculation. He projects persistent low real interest rates and argues for the use net debt instead of gross debt. This lowers the debt service component to

government receipts comprise 35% of GDP, roughly the level of the US but well below the European Union average of 45.5%. Future changes will thus push the gross tax rate to 54%, above the 50% level of France but still below that of the Nordic countries, of which Sweden is the extreme with government revenues at 59% of GDP.⁷ From that perspective, the level of taxes is not impossibly high, but would certainly require major changes in policy. That difficulty will be exacerbated by the current leaky collection of revenues in a country without a national tax ID system that *de facto* taxes small business lightly and does not tax farmers at all. It is less than clear how the politics of moving from a low tax regime to one of high taxes will work out. Despite the potential political ramifications, Prime Minister Koizumi is pushing for budget austerity now. This stance must continue for many years to come, and it will not obviate the need for higher taxes.

[insert Table 4 about here]

Achieving fiscal solvency will inevitably exert a drag on the economy. Even if phased in over two decades, it will require a tax increase on average of 0.5% per year. Since potential GDP will at best be growing under 2% and more likely under 1%, the end result must be to depress growth to very low levels, even assuming no multiplier effect. Of course the portion of tax increases designated to pay for retirement will be matched by higher expenditures on social services. Similarly, the taxes dedicated to the payment of debt represent additional income for government bond holders, who are almost entirely Japanese residents. Overlapping generation models suggest that increasing such transfers depresses incomes modestly, by holding down savings and capital formation. In contrast, tax increases to restore fiscal sustainability will unambiguously lower demand. Policy changes will inevitably take place in an economic environment of low growth.

Other adjustment mechanisms are available, including benefit cuts. Since those near retirement will have expected earnings reduced, to them this will be tantamount to a tax increase. Similarly, the retirement age (or at least the age at which retirement benefits can first be drawn)

1% of GDP. He likewise argues the government will realize 6% of GDP in savings in existing government programs. As a result he believes the required tax increase will be 10-11% of GDP (Weinstein, seminar comments, 2004). In the short run, however, a 6% cut in government expenditures will exert the same drag on the economy as a 6% increase in taxes.

⁷ OECD data, <http://www.oecd.org/dataoecd/5/51/2483816.xls>. The OECD calculates a -7.4% of GDP general government deficit for Japan for 2003, and gross debt of 155%. Tax rates are from the Ministry of Finance, <http://www.jil.go.jp/jil/estatis/eshuyo/200309/e0603.htm>.

will be increased. This is potentially very powerful for it both increases tax revenues and decreases obligations. Indeed, in Hviding and Mérette (1998) this has the largest impact among several policy options, and may be far easier to enact from a political perspective. It will, however, be fighting the observed desire of relatively prosperous older workers around the world to opt for earlier retirement.

Political stalemate could lead to a less desirable outcome, the resort to an inflation tax. Since the BOJ is currently sitting on an unusually high level of base money, such a bias has already been built into the economy. Inflation would be at best a partial remedy. It could solve the non-performing loan situation, by simultaneously increasing the value of assets and lowering the real value of deposits. Given an average 5 year maturity to its debt, the immediate impact of higher nominal interest rates on the government budget would be small, so this would also reduce the real size of the government's debts, albeit to the detriment of bond holders. It would not, however, eliminate the need to restore fiscal balance, nor would it solve the underlying issue of intergenerational distribution, since benefits are indexed. It would instead disrupt the overall economy, leaving everyone poorer, as Kotlikoff (2003) argues has happened in Argentina. Unfortunately, the poor track record of coordinating macroeconomic policy during the past 15 years is not reassuring as to the prospects for skillful management of the fiscal counterpart to Japan's demographic transition.

V. Conclusion

This paper showed that, due to Japan's postwar demographic transition, the slow growth of the 1990s was to be expected, that macroeconomic policy faced problems adjusting to the surplus savings generated as the baby boomers aged, and that financial institutions likewise failed in their efforts to recycle savings once Japan's period of rapid growth came to an end. Furthermore, growth will remain depressed, as the government begins the fiscal adjustment necessary to provide retirement benefits from a starting point of high government debt and large budget deficits. That adjustment will be a major, if not *the* major, political and economic challenge that Japan will face during the coming decade. Europe is aging almost as quickly, and cannot learn from this transition. The real beneficiary of understanding the economic side effects of the shifting age profile of Japan's population will be Asia. Fertility is declining rapidly even in

India and Indonesia, two of Asia's population heavyweights. It is in China, however, that the transition will first occur. Chairman Mao was pro-natalist, and the 1960s was an era of high fertility. In reaction, restraints on fertility began in the 1970s, strengthening with the implementation in 1980 of the "one-child" policy. China's labor force will stop growing in 2015, and the subsequent aging of its population will be more rapid than in Japan. Asia, however, is conscious of its demographic future and potentially has time to internalize the lessons of Japan's experience.

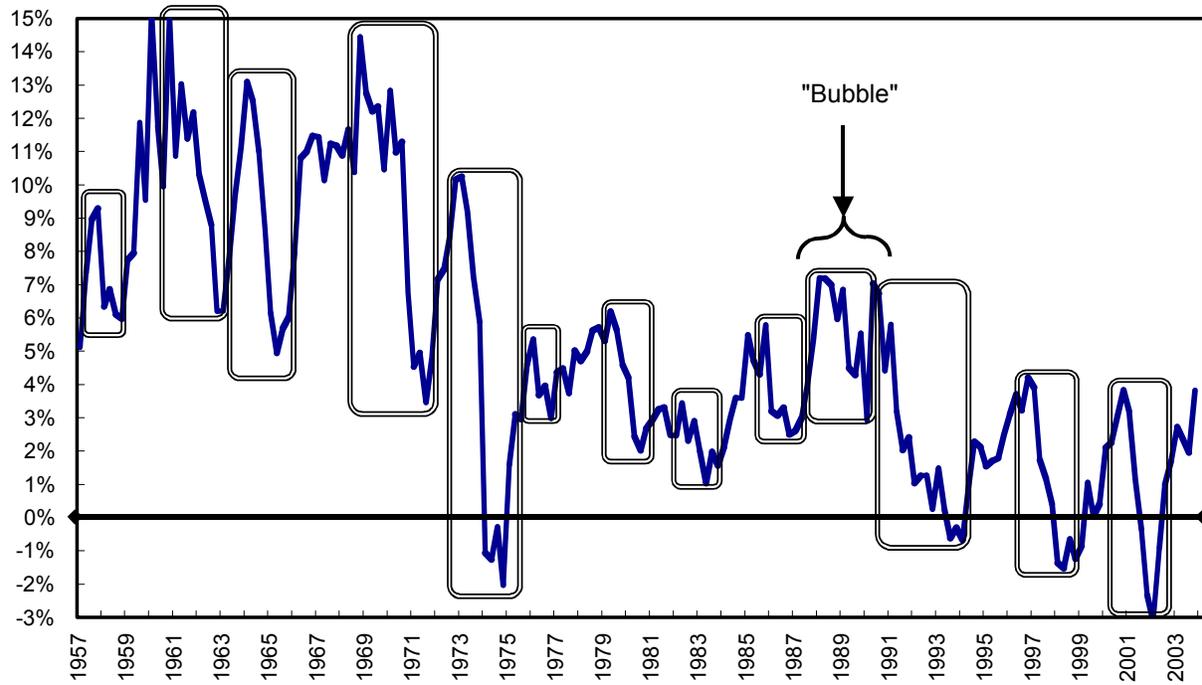
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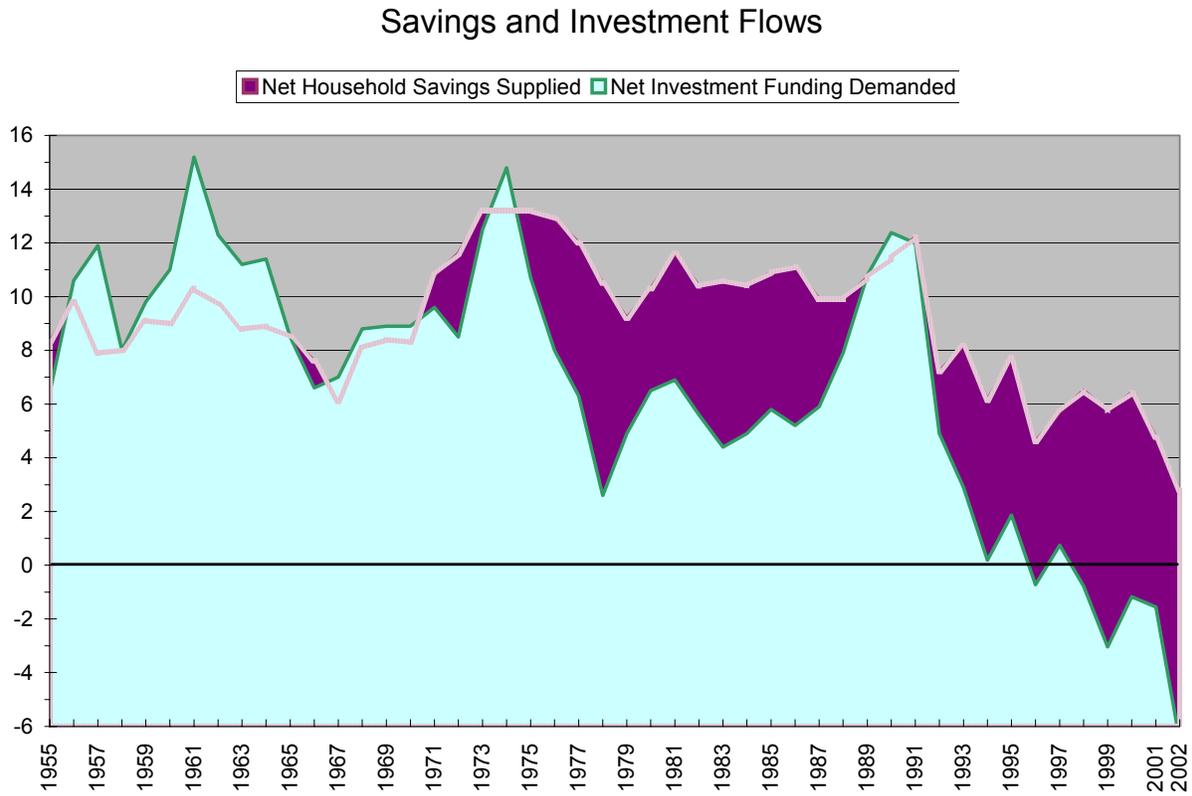
Figure 1

Real GDP Growth
Post-1955 Economic Downturns



Source: Author's calculations from GDP data at <http://esri.cao.go.jp/>

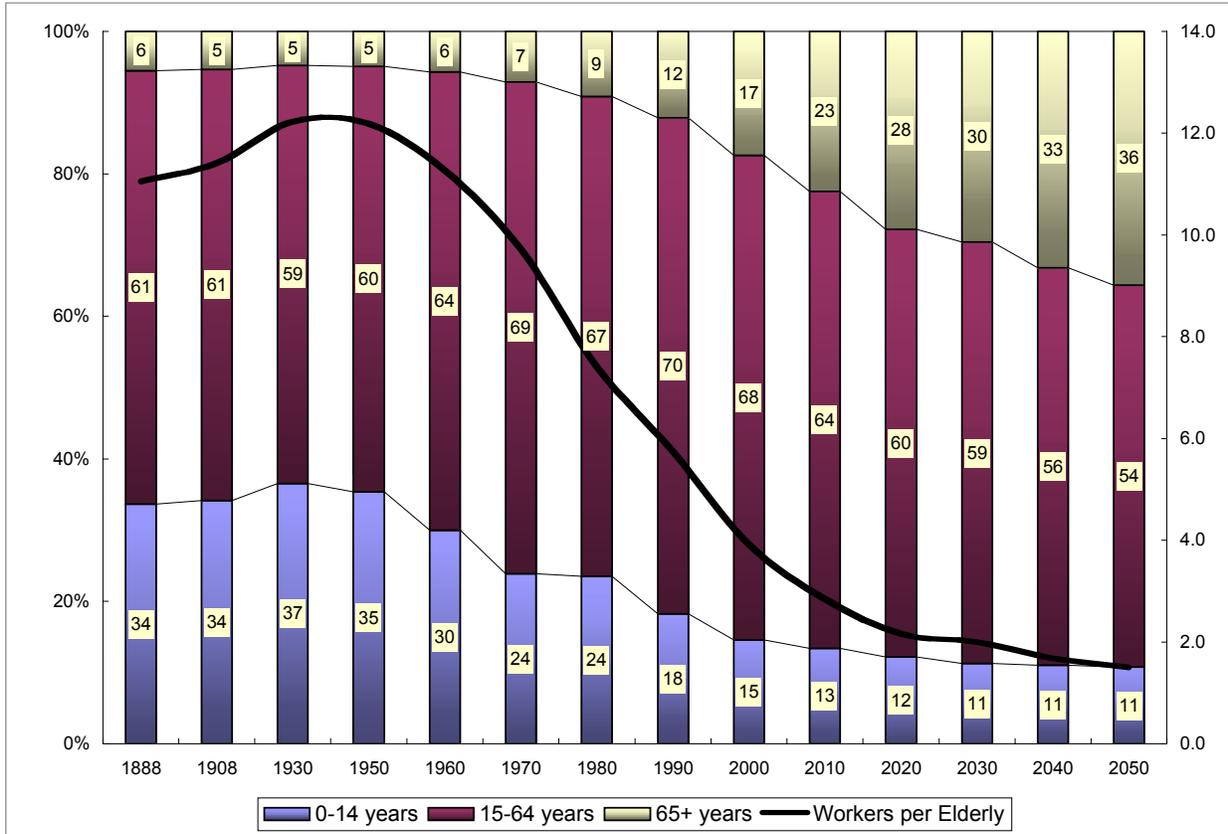
Figure 2



Source: Author's calculations. See Table 2 for details on data.

Figure 3

Japan's Evolving Population Structure



Source: Author's calculations from Japanese population projections at <http://www.ipss.go.jp/>

Table 1

Growth Accounting, 1973-1998

	1973-83	1983-91	1991-98
Total Real Growth	+3.56%	+3.94%	+1.25%
Real output per worker	+2.68%	+3.09%	+1.19%
<i>Working age population</i>	+0.88%	+0.84%	+0.06%
Change in Man-hours	+1.53%	+1.79%	-0.08%
Output per man-hour	+2.03%	+2.15%	+1.34%
<i>Due to:</i>			
Labor Quality	+0.65%	+0.46%	+0.21%
Capital per man-hour	+1.68%	1.29%	+1.10%
<i>IT portion</i>	+0.16%	+0.37%	+0.33%
Non-IT capital	+1.52%	+0.92%	
	+0.76%		
TFP, adj. for utilization	-0.30%	+0.40%	+0.03%

Source: Adapted from Fukao *et al.* (2003), Table 2.2, Panel A: "Growth Accounting without Adjustment of Capacity Utilization Rates: 1973-1998", and Table 2.2, Panel B, which adjusts for capacity utilization and hours worked.

Table 4

Tax Changes Required to Maintain Fiscal Stability

Source	Amount
Elimination of fiscal deficit <i>(7% less 2% cyclical revenue boost)</i>	+5%
Retirement programs	+10%
Debt service coverage <i>(3% interest – 1% growth) x 200% debt to GDP ceiling</i>	+4%
Subtotal of required tax increases	+19%
Current general taxes	+21%
Current social program taxes	+14%
Future tax rate	≈ 54%

Source: Author's estimates; see text.

Table 2

Japanese Savings and Investment
5-year averages

	1955-1959	1960-1964	1965-1969	1970-1974	1975-1979	1980-1984	1985-1989	1990-1994	1995-2002
Household Savings	10.6	11.8	12.0	15.0	18.0	14.0	11.9	13.6	10.7
Household Investment	2.0	2.5	4.2	3.6	6.5	3.4	1.4	4.5	5.1
NET	8.6	9.3	7.7	11.4	11.6	10.7	10.5	9.0	5.5
Corporate Savings	2.7	5.9	7.3	6.3	1.9	2.9	3.2	13.0	16.7
Corporate Investment	12.0	18.1	15.2	17.1	8.4	8.6	10.4	19.4	15.3
NET	-9.3	-12.2	-8.0	-10.9	-6.5	-5.7	-7.1	-6.5	1.4
Net Private	-0.7	-2.9	-0.2	0.6	5.1	5.0	3.4	2.6	6.9
Government Savings	5.0	6.9	6.3	7.5	2.6	3.2	6.6	6.3	0.9
Government Investment	4.4	5.2	5.6	6.7	7.3	7.3	6.0	6.6	6.4
NET	0.5	1.7	0.7	0.8	-4.7	-4.0	0.6	-0.4	-5.5
Net Domestic Savings	-0.2	-1.2	0.4	1.4	0.4	1.0	4	2.2	1.4

Sources: Data through 1986 are from Lincoln (1988), data through 1986 are from D. Campbell (1995), both using SNA68. Data from 1990 are author's calculations from SNA93 data, which are published with a 2-year lag, available at <http://esri.cao.go.jp/>

Table 3
Savings and Investment Balances, SNA93

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Household Savings	13.4%	14.1%	13.7%	13.6%	13.1%	12.6%	11.1%	11.0%	11.7%	11.4%	10.4%	8.6%	8.4%
Household Investment	2.0%	1.9%	6.5%	5.4%	6.9%	4.9%	6.5%	5.3%	5.2%	5.7%	4.0%	3.8%	5.7%
NET	11.4%	12.2%	7.2%	8.2%	6.1%	7.7%	4.6%	5.7%	6.5%	5.7%	6.4%	4.8%	2.8%
Corporate Savings	12.7%	12.5%	12.5%	13.5%	13.6%	14.2%	15.9%	16.1%	16.0%	16.6%	17.5%	17.8%	19.3%
Corporate Investment	25.1%	24.5%	17.5%	16.3%	13.8%	16.1%	15.1%	16.8%	15.2%	13.6%	16.3%	16.3%	12.8%
NET	-12.4%	-12.0%	-4.9%	-2.9%	-0.2%	-1.9%	0.7%	-0.7%	0.8%	3.0%	1.2%	1.6%	6.5%
Net Private Savings	-0.9%	0.2%	2.3%	5.3%	5.9%	5.8%	5.3%	5.0%	7.3%	8.8%	7.6%	6.3%	9.3%
Government Savings	7.7%	7.7%	7.2%	5.1%	3.7%	2.7%	2.7%	2.8%	1.3%	-0.2%	-0.2%	0.0%	-2.2%
Government Investment	5.8%	6.0%	6.6%	7.4%	7.4%	7.3%	7.4%	6.4%	6.4%	6.7%	5.9%	5.7%	5.3%
NET	1.9%	1.8%	0.6%	-2.4%	-3.7%	-4.6%	-4.7%	-3.6%	-5.0%	-6.9%	-6.1%	-5.6%	-7.5%
Net Domestic Savings	0.9%	1.9%	2.9%	2.9%	2.2%	1.2%	0.6%	1.3%	1.9%	1.6%	1.3%	0.6%	1.7%
Net Foreign Savings	0.9%	1.6%	2.1%	2.2%	2.0%	1.4%	0.5%	1.1%	1.8%	1.6%	1.4%	0.6%	1.3%

Source: Author's calculations, as per Table 2. Domestic savings differ from foreign savings due to GDP measurement errors.