

Japanese Macroeconomic Dilemmas

*The Implications of Demographics for Growth and Stability*¹

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Abstract

Japan's post-WWII baby boom and the subsequent drop in fertility resulted in a series of sharp demographic transitions. The macroeconomic impact is large. Due to labor force changes, growth in the 1990s would in any event have been in the range of 1-2%, little better than actual performance; poor monetary and fiscal policy are secondary in importance. Demographic changes also led to swings in domestic savings and investment balances and in the flow-of-funds among sectors. With hindsight it should not be surprising that policymakers made major blunders or that financial institutions incurred large losses attempting to adapt to swings in the structure of their balance sheets. Finally, Japan now faces the demographic transition to an old-age society, from a starting point of large fiscal deficits and with a large stock of government debt. Restoring fiscal sustainability on top of the need to increase revenues to cover age-related transfers will require net taxes to increase by 19% of GDP. Accomplishing that will be a major political and administrative challenge and will inevitably hold growth below its 1% potential level during the coming decade.

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I. Introduction

This paper examines the implications of Japan's rapid demographic transition for understanding the bubble of the 1980s, the slow growth of the 1990s, and barriers to growth during the next decade. Japan, like Europe and the US, experienced both a sharp post-WWII baby boom and a subsequent baby bust. While demographic change remains a slow process, changes in population growth and age structure interact with the economy to affect its current performance. First, it determines the growth and composition of the working age population, and hence potential output. Because of demographics, potential growth fell from 2% at the start of the 1990s to 1% in the latter half of the decade. Despite macroeconomic policy mistakes and the aftereffects of the collapse of the late-1980s stock market and real estate bubble, growth in fact averaged just above 1%, not much different from what might be expected.

Second, shifts in age structure affect the balance of savings and investment. Managing that is a challenge for macroeconomic policy, since such shifts alter the flow of funds and in turn affect the financial system. In the 1970s private investment fell but private savings did not. The intrinsic difficulty of handling that imbalance explains the fumbling nature of macroeconomic policy that began in the 1970s and continued throughout the 1990s. This imbalance also led to large-scale shifts in the flow-of-funds in the economy and the inherent difficulty of banks in adjusting to the need to change their portfolio underlies the non-performing loans that continue to plague the financial sector.

Third, the baby boom's aging implies a high dependency rate of retirees to workers, beginning in the next decade. Given the generous retirement benefits that all rich nations provide retirees, this will require large fiscal outlays. On top of that, Japan has already accumulated a large stock of debt and the government is running the largest deficit in the OECD, accentuating the magnitude of needed fiscal adjustment. The magnitude of tax increases and expenditure cuts this entails will depress growth for the next decade. The *status quo* cannot be maintained, and adjusting to that will be the dominate policy concern of the coming decade. During the development process, countries typically go through a period of high dependency ratios, but of children to adults. Now the developed world will be facing the opposite transition, from a population with few dependents, young or old, to one with a high proportion of retirees. Japan is in the vanguard; no society has gone through this transition before, and so we have no precedents as to what choices might be the most feasible politically. It is Japan that will set the precedent for

the rest of us, in North America, Europe and the rest of East Asia, which is also locked into a similar demographic path.

Three models

The first analytic approach this paper uses is growth accounting. While it is a well-developed framework, it is easy to forget the implications of its careful application. Even the crudest of models, such as the ones used in calculations of potential GDP, indicate that at present Japan's potential growth rate is no more than about 1% (Bank of Japan 2003, Hayashi and Prescott 2002). While a short-run boost to output can be realized by re-employing idle resources, the current (2003-4) burst of growth cannot be maintained. This is because on average growth must decline as the size of the labor force stops increasing. However, for the purposes of understanding the 1990s, we can note with hindsight that the application of disaggregated growth models, in the tradition of Nishimizu and Hulten (1978), would have pointed clearly towards the observed slowdown. Similarly, the business cycle of the 1990s does not look particularly severe by historic norms. It is simply unrealistic to believe that Japan could have done much better than it did, or that in the future a return to "normalcy" will lead to the 3%-4% growth that a naïve comparison with the 1980s seems to assume remains possible.

The second fundamental problem is that demographic change engendered large swings in domestic savings and investment balances, and more narrowly in the flow of funds. The "bubble" and the apparent repeated failures of macroeconomic policy are in fact a side effect of the slowing of long-run potential growth. After 1970, personal savings remained high, a legacy of low income during the early working years of the generation now retiring (*cf.* Modigliani and Cao 2004). However, given the rapid drop in the birth rate, the expansion of the labor force slows before the baby boomers enter retirement and begin dissaving. Slower growth of the labor force in turn causes investment to fall, generating a savings surplus.

One potential outlet for excess savings, accumulating foreign assets, suffers from limits for a large economy such as Japan's. As has long been noted, international markets are unable to handle capital flows of a volume sufficient to smooth domestic output (Feldstein and Horioka 1980, Obstfeld and Rogoff 2000, Japan Cabinet Office 2003: 197). Similarly, a long history of trade friction indicates the inability of the world economy to handle the magnitude of capital flows (and corresponding trade imbalances) needed to soak up Japan's excess savings. In the

absence of such flows, macroeconomic policy has been unable to resolve the resulting “paradox of thrift,” either through stimulative fiscal policy, to directly soak up savings through government deficits, or through loose monetary policy, which sought to bolster the level of investment. It was not for the lack of trying; rather, the extent of the requisite stimulus was either beyond the reach of interest rate tools (in the case of monetary policy) or beyond what was viewed as sustainable, in the case of fiscal deficits. (See Fukao 2001 for another version of the excess savings story.)

The redirecting of the flow of funds also makes financial markets susceptible to bubbles. Managers operate using rules-of-thumb, and bureaucracies are wedded to routine. These are not readily abandoned, and with good reason. Risk assessment, for example, relies upon procedures derived from a knowledge of past losses. Rapid change undermines such accumulated wisdom. Habit and folk wisdom also influence household allocation of savings. As a result, the development of new avenues for the flow of funds does not proceed smoothly, indeed rapid shifts can overwhelm a financial system. In Japan’s case, the banking system faced a continual influx of deposits, at the same time that borrowers were disappearing. For a time bankers believed that lending to small business and to real estate development would be a viable strategy, but in the end this overwhelmed their intermediating capabilities. It was this that underlay the bubble, rather than misplaced monetary policy, or even poorly sequenced deregulation (*cf.* Hoshi and Kashyap 1999). Given the 10+% of GDP magnitude of the swing, it is naïve to think that better financial regulation, or deeper and more accessible corporate stock and bond markets, could have avoided financial distress.

Third, long-run models point to at best continued slow growth, as the labor force is currently declining, at a speed too fast to be offset by increases in hours, participation or immigration. However, the government has committed itself to providing generous retirement benefits. As the dependency ratio increases, that will require higher taxes, on the order of 10% of GDP, in an era of slowly increasing per capita income. In addition, the past dozen years has saddled the economy with the highest level of national debt in the OECD, which in the future must be serviced in an environment where near-zero interest rates are unlikely. Restoring fiscal sustainability will require a combination of higher taxes and decreased expenditures to the tune of 9% of GDP.

It is easy to be pessimistic. With an aging population, taxes must rise by 10% of GDP if the government is to meet its current commitments to provide retirement and healthcare benefits. Combined with debt stabilization, in the aggregate taxes must rise and expenditures cut by a net 19% of GDP. Half of this represents intergenerational transfers, and so would not directly lower demand, though it would lower savings and hence over time output, but the process of raising taxes will inevitably depress growth. Furthermore, the Japanese budgetary system has difficulties consolidating individual tax and budget changes into sensible aggregate packages, which can also prove disruptive. In any case, the political system will face very difficult choices, of the sort that few if any governments, in Japan or elsewhere, have managed well. Hence, while we may see occasional spurts of good economic performance due to improvements in capacity utilization and declines in unemployment, for the next two decades it is more realistic to assume that growth will remain below potential. Failure to manage this transition well could lead to one or another sort of debilitating financial crisis, with debt and inflation skyrocketing.

The message is not all one of gloom. Though the labor force and soon the overall population will be in decline, zero economic growth implies neither falling real wages nor (given modest productivity growth) falling per capita income. Economic restructuring continues, and this will provide many opportunities for productivity improvement. Labor can be removed from highly inefficient sectors such as construction with little impact on output, while improved productivity in retailing, restaurants and financial services will free up resources that can boost output elsewhere. We are likely to see new entrants in healthcare, specialized financial services and retailing that will better meet the demands of an older, well-off populace with time on their hands. Even if things do not proceed smoothly and personal incomes stagnate, that is not in itself a bad outcome for a high-income society; Switzerland, after all, has had minimal growth over the past 3 decades.²

At the same time, Japan's experience should provide a sober warning to other OECD members, several of which are entering their second demographic transition with large deficits, high levels of debt and tax levels too low to finance current commitments to future intergenerational transfers. Most of Asia is also aging, including China, India and most of ASEAN (Eberstadt 2004). These countries are likely to see similar swings in domestic savings balances. That will be particularly relevant for China. Like Japan, it is too large in the world

² This example is thanks to Arthur Alexander.

economy to rely upon international capital flows to fully employ future surplus savings and it has a weak fiscal and financial system and high levels of debt. In addition, it has no systematic provision for old-age pensions and health care, a situation that other countries have not found politically sustainable (World Bank 1997, Krumm and Wong 2002, Wang et al. 2000). With their already old populations, it may be too late for the developed world to learn from Japan, but that hopefully is not the case for the rest of Asia.

II. Growth Models: Demographics and the Slowdown of the 1990s

The end of Japan's baby boom circa 1950 and the subsequent drop in birthrates made a sharp slowing of growth in the 1990s inevitable. Given the predictable decrease in labor inputs, the economy's growth potential fell to 1% per annum by the early 1990s. From that perspective, average growth over the decade of something over 1% was not bad. This is in sharp contrast to prevailing views of the period, which contrasts the 1990s to the 1980s, when Japan consistently performed better than the rest of the OECD. In contrast, the four prevailing explanations of Japan's slow growth in the 1990s blame:

- (i) the "bubble" and a subsequent failure to "clean up" the financial system,
- (ii) a secular slowdown in productivity,
- (iii) mistakes in macroeconomic policy,

and

- (iv) political economy stories.

Below I first set forth the alternate explanations, and then detail the impact of demographics using a simple growth model.

The Reigning Models

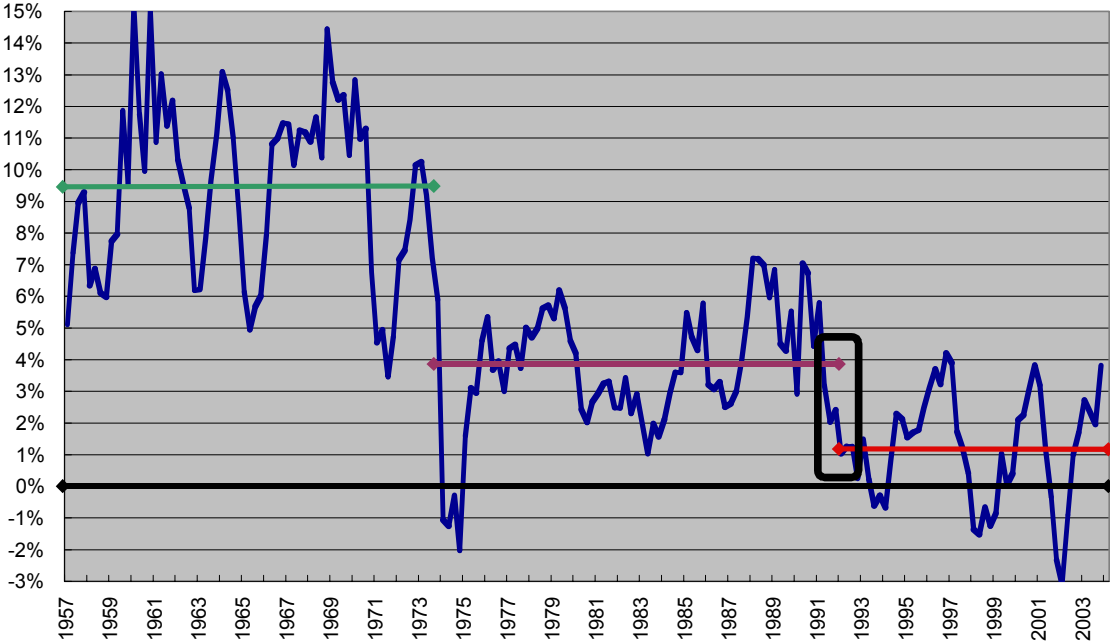
The first alternate explanation looks to the 1987-91 "bubble," during which the stock market and urban real estate quadrupled in value before collapsing, as a source of discontinuity. The initial 1992 recession was a function of overinvestment and dislocation stemming from the collapse of asset prices. Subsequent problems reflect a failure to address the non-performing loans that continue to plague the banking system today. This view dominates popular accounts, and certainly was a factor in the early 1990s, but Japan is not alone in experiencing the collapse of a bubble. Elsewhere the impact has been transitory, with growth interrupted for at most a few years by the Asian financial crises of 1997 and the "dot.com" bubble in the United States (Posen 2004). Given the pervasiveness of the problems, regulatory forbearance made sense. Japan was simply unfortunate in that it proved unable to grow out of its problems.

The second view also sees the bubble period as one of discontinuity, but instead focuses on structural problems. (See Figure 1, which uses the typology of Katz 1998, 2002.) This is awkward on *a priori* grounds. If nothing else, in his own periodization Katz shows two discontinuities, with the other due to the floating of the yen and the first oil crisis, and yet his

analysis pays little attention to the former. More generally, a unique event is not subject to analysis; it can be described, but not explained. That fits with a bias to which area studies are subject, of emphasizing the peculiar over the general. (For Japan, there is a “revisionist” literature in this vein.) Economics is of no use in such cases. While case-specific factors help round out theory-based explanations, at the conceptual level they cannot serve as a starting point. Furthermore, in Japan’s case, whatever the distortions of the 1990s, distortions were surely worse in earlier periods. Wartime economic controls reached their peak during the early years of the US occupation. However, reforms initiated in 1949 intensified over the two decades. Industrial policy and financial regulation gradually lost power, while agriculture shrank to where it was too small to affect the overall economy.

Figure 1

Real GDP Growth

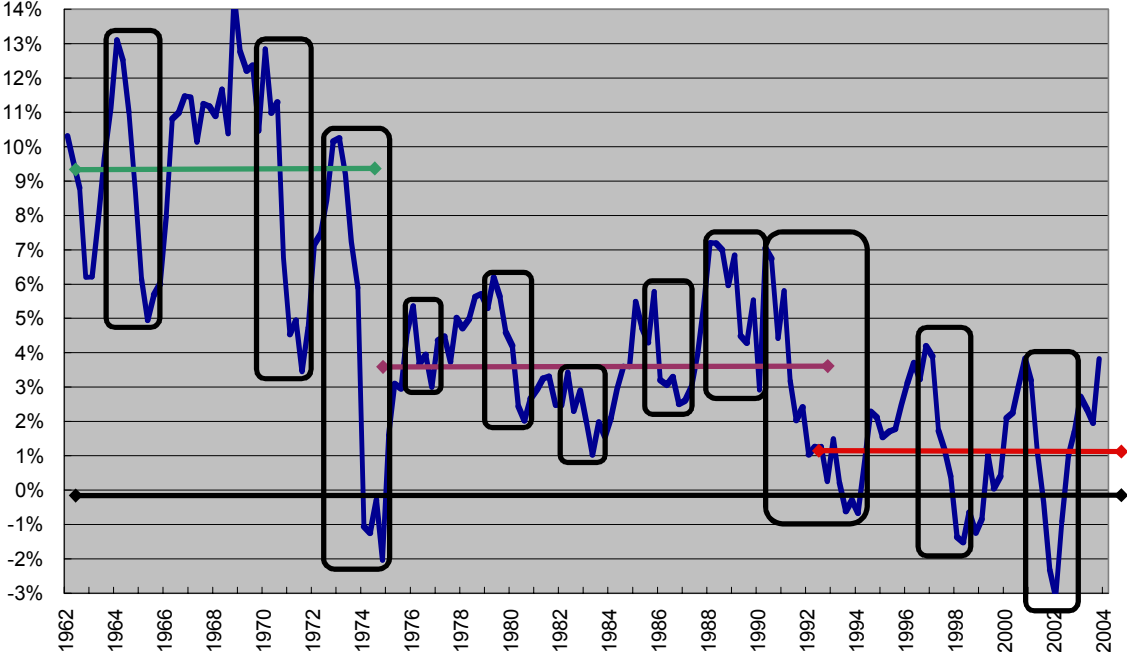


Instead, a focus on discontinuities leads naturally not to the analysis of a single event, but to business cycle analysis, the third set of models. From this perspective, there are many peaks and troughs, and while the economy was relatively stable from the 1970s through 1991, the recent volatility does not look exceptional in the context of the past 50 years. (See Figure 2.) Policy mistakes clearly amplified the late 1980s boom and the subsequent bust, and efforts to stimulate growth in the 1990s ended up a fumbling mix of on-again, off-again measures that

were less effective than they might be. (Again, see Posen 2004.) These are essentially short-run shifts, with a frequency of a few years. The economy, however, has been moribund for a decade. Business cycle models are simply inappropriate for analyzing performance over a decade-long time frame, and cannot explain why average growth is low or high.

Figure 2

Real GDP Growth



Whether viewed as either a discontinuity or a cycle, focusing on the “bubble” is misleading. This does not imply that Japan does not have structural issues, as highlighted in the last two OECD Economic Surveys (OECD 2003, OECD 2004). Neither does this imply that growth has been hampered by unstable fiscal policy and maladroit monetary policy, nor that the slow pace of reductions in non-performing loans and the restructuring of borrowers has been a drag on the economy. Attempts to find a smoking gun have not been successful. A large literature has attempted to locate the cause; Bayoumi (2002) is representative both of such attempts and of their inability to reach a clear conclusion. Even Adam Posen, a staunch critic of macroeconomic policy (and particularly monetary policy), notes that in a low growth environment discerning whether policy is “tight” or “loose” is difficult (Posen and Kuttner 2004). Similarly, Hayashi and Prescott are reduced to arguing for an unexplained slowdown in

productivity (Hayashi and Prescott 2002). The impact of individual elements fails to provide a satisfying explanation for the slow growth of the decade as a whole.

Fourth, there is the political economy approach. Grimes (2001), for example, examines policy formation at the Ministry of Finance (MOF) and the Bank of Japan (BOJ), and the interaction of two forces. One was the fiscal conservative orthodoxy that prevailed at MOF, which fed into the budgeting process. The other was the lack of independence of the BOJ. This combination led to an excessive reliance on monetary policy, and then to inappropriate tightening when the Bank of Japan sought to assert its independence. Similarly, fiscal policy suffered from a tug of war between LDP politicians bent on re-election and desiring expansive budgets, and the Ministry of Finance trying to counter Japan's legislature, the Diet's, proclivity for spending. In sum, the balance of powers in the Japanese political system – weak government at various levels – impeded coordination, resulting in chronic inconsistent policy. However, the fact remains that fiscal deficits exploded during the 1990s, which is awkward to reconcile with the centrality of MOF dominance in his model.³

Demographics and growth

The above explanations add to the debate, but all are attempts to explain a decade's worth of data with either short-term models, or Japan-specific, idiosyncratic stories. It is, however, more appropriate to explain long-term phenomenon with long-run models. Doing so 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 long-run model in macroeconomics is the “classical” growth framework. It states quite simply that output is a function of inputs and that if we know what is happening to the growth of the labor force and to investment, then we can place an upper bound on growth. In the late 1950s Robert Solow initiated “growth accounting,” showing theoretically that the growth of output could be modeled as a weighted average of the growth of inputs, and then plugging in data on the growth of labor and capital to implement it empirically. Such models have now gone

³ Katz (1998; 2002) also introduces a political economy story, drawing on Calder (1988). Katz's emphasis is on vested interests that operate as a millstone around the economy's neck, which by the 1990s was in his telling enough to stall economic progress.

through two cycles of development. To the initial surprise of these modelers, their efforts explained only about half of US growth. That residual, comprised of unexplained sources of growth, was later dubbed technical change or total factor productivity (TFP) growth. Later work used better data – hours worked, for example, instead of number of workers – and more sophisticated mathematical forms and statistical techniques, leading to smaller estimates of the role of productivity (Solow 2000). Such models have been applied to many countries, including Japan, and have helped delineate what contributed to, and what limited, growth.⁴

A larger capital stock was a major contributor to growth. During the 1960s high investment provided workers both more and better equipment with which to work. Such gains were not restricted to manufacturing. In Japan, new houses and office buildings were more comfortable than old – better lit, better cooled, better furnished, and generally more spacious. Likewise, formal education and skills acquired on the job made workers more productive. Such inputs can be measured, as can the absolute size of the labor force and changes in hours worked. Finally, research on Japan highlighted one-time factors that increased output.⁵ These include the “come-from-behind” introduction of new technology from overseas, and the transition from low-productivity farming to high-productivity factories. In sum, the increase in inputs, and the working out of one-time transitions in economic structure enabled higher output and higher incomes.

Such accounting indicates that Japan’s growth was fated to slow by the 1990s. Investment exhibits diminishing returns, and so even when it continues at high levels its contribution to growth inevitably declines. Technological catch-up and the end of rural-urban migration both lowered profits, the latter via decreased demand for housing and durables (Yoshikawa 1995). Investment and the growth of the capital stock slowed from 1970. However, the labor force continued to expand as baby boomers matured and the quality of the labor force continued to expand with greater education and experience. Table 1 provides a summary of one

⁴ Note the limits of this approach: that Japan *could* grow rapidly, which is the focus of these models, does not explain why it *did* grow rapidly.

⁵ W. Arthur Lewis developed a 2-sector model of development, applied to Japan by Ranis (1957). World Bank (1997) is based on a 3-sector model in which migration is central. In Japan’s case, research starting with Nishimizu and Hulten (1978) shifted to multisectoral models, using 30 or more sectors. Doing so lowers total factor productivity (or, more accurately, the residual not otherwise accounted for).

such accounting exercise, with likely magnitudes for the coming decade added in for comparison.

Table 1
Growth Accounting 1960s & 1970s Extrapolated

Contributions, 1961-71		Contributions, 1970s		Contributions, 2000s	
1.78	Labor	0.68	Labor	-0.6	Labor
	+0.11 Hours		-0.15 Hours		-0.2 Hours
	+1.09 Workers		+0.68 Workers		-0.4 Workers
	+0.58 Educ etc		+0.50 Educ etc		+0.0 Educ
2.57	Capital	0.86	Capital	+0.2	Capital
2.78	Structural	0.42	Structural	+0.1	Structural
2.43	“Knowledge”	1.28	“Knowledge”	+0.7	Knowledge
9.56	Total	3.24	Total	+0.6	Total

Notes: Drawn from Denison and Chung (1976). “Structural” includes the shift out of agriculture, achieving economies of scale, and gains from trade via cheaper imports. The labor extrapolation assumes a -0.6% drop in the working age population with a 0.6 weight, for a -0.4% net contribution. The capital component reflects 0.5% growth with a 0.4 weight. Productivity is intermediate between the TFP calculation of Fukao *et al.* (2003) and the more common assumption of 1.2%. With labor force shifts of (i) 3% from construction, (ii) 5% from manufacturing and (iii) 2% from within services, 10% could be reallocated over a half decade, so this could be much greater. In that direction, Fukao and his colleagues find productivity growth in key service industries is greater than the economy-wide average.

Unfortunately existing models do not directly incorporate demographic elements beyond measures of the aggregate labor contribution and average education. They thus underpredict the slowdown of the 1990s. Over a worker’s career, wages on average increase in a stable manner, rising rapidly upon entry into the labor force, then slowing over time to peak around age 40. 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.⁶ By the late 1980s, however, this effect would have peaked. Simultaneously the rapid decline in fertility meant that new entry decreased steadily over time, while the rise in education came to an end as 40% of all youth continued on to higher education. So both the aggregate growth of the labor force, and the productivity-enhancing contributions of experience and education, petered out. 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

⁶ This paper does not incorporate such demographic data into the growth accounting framework. A few studies have attempted this for other countries. Lindh 2004 does so in a study of Swedish growth, as do Bloom and Williamson 1998 in a cross-sectional study of emerging Asian economies.

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. That is what recent attempts to calculate potential GDP demonstrate, that Japan's economy was capable of growing a little over 1% per annum. Most of these calculations were undertaken in an attempt to measure output gaps, and because they are motivated by real-time policy constraints, they tend to be very simple in structure. By construction they also tend to track the evolution of real GDP quite closely, since they incorporate short-term changes in hours worked, labor force participation and capacity utilization that reflect the vagaries of demand as much as they do long-term supply capabilities. (Compare Haltmaier 2001, Harada and Nakata 2003, Hayashi and Prescott 2002, and Posen and Kuttner 2003.)

Table 2
Growth Accounting, 1973-1998

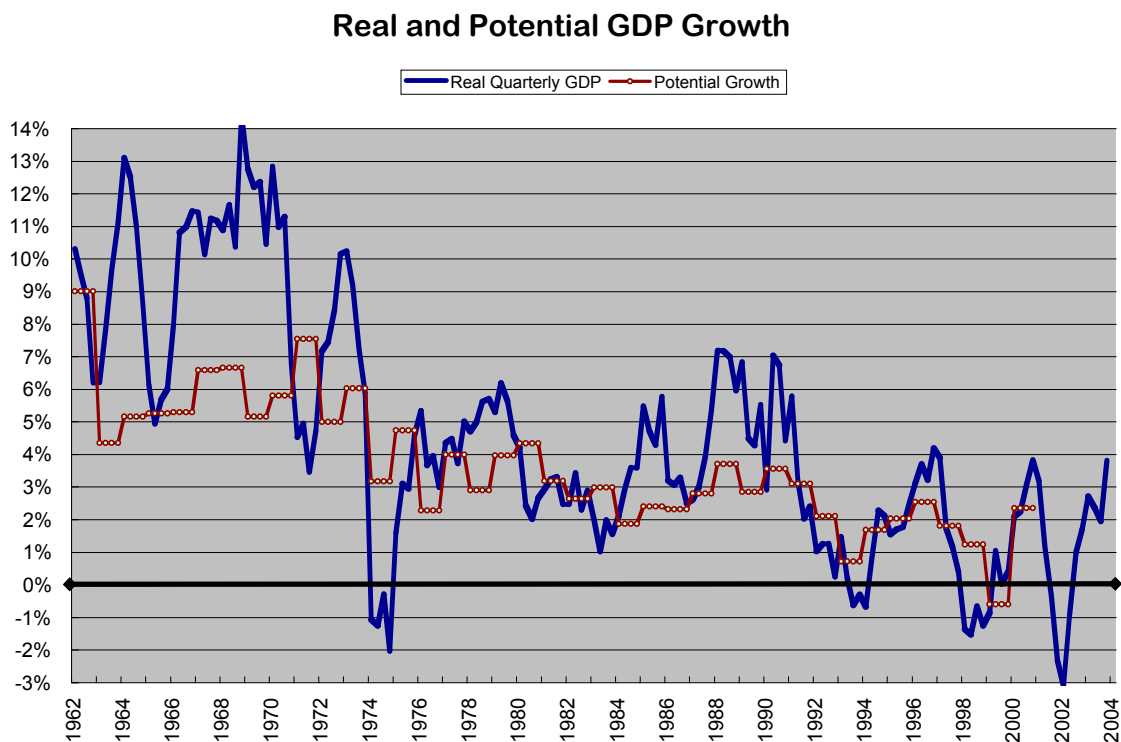
	1973-83	1983-91	1991-98
Total Real Growth	+3.56%	+3.94%	+1.25%
Working age population	+0.88%	+0.84%	+0.06%
Real output per worker	+2.68%	+3.09%	+1.19%
Man-hour contribution	+1.53%	+1.79%	-0.08%
Output per man-hour	+2.03%	+2.15%	+1.34%
Labor Quality	+0.65%	+0.46%	+0.21%
Capital contribution			
<i>Per worker</i>	<i>+1.12%</i>	<i>+1.08%</i>	<i>+0.12%</i>
Per man-hour	+1.68%	1.29%	+1.10%
<i>IT portion</i>	<i>+0.16%</i>	<i>+0.37%</i>	<i>+0.33%</i>
<i>Non-IT capital</i>	<i>+1.52%</i>	<i>+0.92%</i>	<i>+0.76%</i>
TFP, adjusted for utilization	-0.30%	+0.40%	+0.03%
TFP, unadjusted	-0.27%	+0.54%	+0.11%

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 incorporates corrections both for capacity utilization and for hours worked.

To illustrate this, Figure 3 compares GDP growth with a very simple growth accounting model. This calculation does not incorporate the multisector decomposition used in research focusing on productivity such as Nishimizu and Hulten (1978), Jorgenson (1988) or Fukao *et al.*

(2003). In particular, the more sophisticated accounting of Fukao and colleagues finds minimal TFP growth since 1973; Table 2 presents a summary of their results, and of the slowdown growth accounting predicts for the 1990s relative to the 1970s and 1980s. However, their study focuses on industry-level productivity and interindustry shifts, and ignores the other one-time factors emphasized by Denison and Chung (1976), or the mismeasurement of the capital stock emphasized by Motohashi (2002) and Jorgenson and Motohashi (2004). Finally, it fails to account for the shifting age composition of the labor force. It thus does not capture important components of the decline in potential output. Nevertheless, it underscores that potential growth was low, matching the actual performance of the economy during the 1990s.

Figure 3



Notes: Potential GDP is calculated using a simple Cobb-Douglas function and the weights and data of Hayashi and Prescott (2002). Their data extend only through 2000. To lessen the cyclical impact of shifting work hours and capacity utilization in their data, input growth was smoothed using a backward-looking, declining weight 5-year moving average. Growth incorporates a fixed productivity increase of 0.7%. Estimation errors aside, potential GDP implicitly holds capacity utilization constant. In the short run, over the course of the business cycle, actual growth thus diverges from potential.

Growth accounting thus shows its fruitfulness as a model when used to ask why growth slowed, serving as a powerful antidote to both casual analysis and short-term models. The

economy was visibly decelerating by 1970, due to the combination of lower investment and slower growth of the labor force. This was widely discussed by contemporary economists, at least inside Japan. (See also Denison & Chung 1976.) However, that lesson was often forgotten given Japan's strong performance relative to that of the US and the EU coming out of the first oil crisis and of course was easy to ignore while affected by bubble fever.

The absolute size of the labor force is also now shrinking, and absent large-scale immigration will continue to do so. The latest *Economic White Paper* calculates a need for 640,000 immigrants a year merely to offset the gross decline in the labor force. At least initially, immigrants have lower productivity than those already in Japan's labor force and occupy lower productivity (or equivalently, lower-income) jobs. Hence the requisite number of immigrants to prevent an effective shrinking of the labor force is much higher than the gross decline of the workforce (Japan Cabinet Office 2003: 186). Incorporating such factors, Feldman (2004) calculates that Japan would require a total 7.4 million immigrants by 2012 (of whom 4.9 million would actually be workers). (See also Fehr et al. 2003.) Immigration 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. 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. Likewise, productivity improvements are likely. In parallel with the earlier shift from farm to factory, we now see a shift from factory to services. Because of productivity gains in manufacturing, output is not reduced much by pulling out workers. 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 health care and other expanding sectors, then reallocation will provide little boost to productivity. 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.

Growth accounting, in other words, indicates that the Japanese economy has an upward bound to grow of 1%. Optimists hope that might actually be realized. Section IV, however, argues that the need for fiscal retrenchment will depress demand below this. At the same time, we need to remember that zero GDP growth is not a bad outcome, much less a crisis. With a shrinking population, the economy can decline in absolute terms with little impact on average welfare, and indeed with rising per capita income.⁷

This simple model thus provides an antidote to the natural tendency to focus on Japan's bubble and its aftereffects. It is not the whole story, but no model ever is. However, as is true of other powerful models, the insights it offers are capable of generalization. Population growth is slowing throughout Asia (Eberstadt 2004). That is particularly true in the case of China, whose economy has been growing rapidly for the past 25 years. Capital accumulation there has been even more rapid than in Japan. The shift from field to factory is in its initial stages and remains an important component of potential growth. Similarly, average education and experience levels are low but increasing. As a result, high growth will continue for another decade, perhaps even two. However, as in Japan, diminishing returns will set in as the capital stock expands, and a demographic slowdown is already guaranteed. Mao was a pro-natalist, but with his death in 1976 that policy stance was reversed, and the drop in the Chinese birthrate that began in 1980 with the "one-child" policy continues. The children of the large Cultural Revolution generation will all have entered the labor force by 2015, and China's growth will decelerate. The youngest of its baby boomers will hit age 50 in 2030 and population will be shrinking by mid-century. The same model can both elucidate the *potential* for continued rapid growth in China today, and predict its cessation within two decades. Of course, political events and other problems could derail the economy in the interim (World Bank 1997).

⁷ I have not recalculated data on a *per capita* basis, one of the useful critiques from Arthur Alexander. Similarly, I could extend the treatment of the capital component of the growth accounting model. His work shows that Japan has an inexplicably high level of capital and a correspondingly low rate of return. That is consistent with the shift in the corporate sector to a net saving position demonstrated above. However, his model could be used to estimate how long that process must continue before Japan's capital stock would fall to a level comparable with other OECD members. Finally, he makes a claim that OECD members converge on a 2% *per capita* growth rate. Without converting my data to a *per capita* basis I cannot check my projection against that level, though I believe that my analysis for Japan adopts a more pessimistic stance by about 0.5 percentage points.

III. The “Bubble:” The Slowdown and Its Impact on the Financial System

Japan’s postwar growth spurt inevitably slowed, and with it investment – but 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 also 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 continued excess capacity in banking. In retrospect, it should not 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.

I develop this argument in three stages. First I trace the impact of declining growth on the short-run balance of domestic savings and investment. Second, I argue that these shifts also affected the flow of funds in the financial sector. Finally, I note the response of financial institutions – and above all bank lending behavior – to these changes.

Many analysts stress mistakes in monetary and fiscal policy; Posen (2004) and Grimes (2001) are but two such. However, the analysis below suggests that no policy mix would have been adequate to offset the large savings-investment gap. Likewise, subsequent events revealed gross deficiencies in corporate governance and government regulation and deregulation; Hoshi and Kashyap (1999) provide a good overview. Given the shocks suffered by Japan, not even a robust, American-style financial system could have survived unscathed. While we have much to learn from existing analyses, they provide a misleading picture of the potential of policy to counteract the inevitable deceleration of rapid growth. More generally, looking for changes in the flow of funds may provide a good leading indicator for the propensity for bubbles in an economy.

Shifts in Savings and Investment

During the high-growth era of 1955-1970, domestic demand expanded just under 10% pa, feeding and in turn fed by investment demand. Initially domestic savings were low, and Japan ran into periodic balance-of-payments problems, like many developing countries today. Perhaps fortunately, international credit markets were weak, capital controls were strong, and in any case Japan was not viewed as creditworthy. Any incipient drain on foreign reserves had to be met by

restrictive macroeconomic policy, and in Japan this was done in a timely manner, avoiding any debilitating balance-of-payments crises. In any case, by the late 1960s savings rose sufficiently to cover domestic needs, and even to allow lending to the rest of the world, with matching trade surpluses. Overall, the government maintained orthodox fiscal policy; at the start of the 1970s the stock of government debt was insignificant.

As growth slowed so did investment. However, savings continued to rise. Personal savings is determined with a time horizon of decades, aiming at children's education, marriage and above all retirement. In the 1970s, Japan's baby boomers were entering the labor force while older workers had to make up for the paltry amounts that they had set aside early in the growth process, when they were still poor. This is a general side effect of rapid growth (Modigliani and Cao 2004). The net result was a surfeit of funds in the financial system. Given Japanese financial regulation, almost all savings were placed in the banking system. In addition, from a macroeconomic standpoint, the flip side of a high savings rate is a low share of consumption in income. The decline in investment was thus not offset by a rise in spending by the household sector, due to a rational desire to save for anticipated future expenses rather than a structural inability to consume.⁸

Figure 4 illustrates this evolution, showing the changes in the net demand for funds by the corporate sector, and the corresponding position of the household sector. Around 1961 Japan faced a savings deficit and began running out of foreign exchange; recession and a trip to the IMF were needed. However, by 1971 domestic savings were in surplus, and except for the two "bubbles" of 1973 and 1989, remained that way.

⁸ The closest to my analysis is Fukao (2001). However, he stresses the international dimensions, noting that the definition of GDP requires arithmetically that foreign savings (the financial flows implicit in net trade, exports less imports) must equal private savings net of investment plus government savings (receipts less expenditures), typically expressed as $(S - I) + (T - G) = (X - M)$.

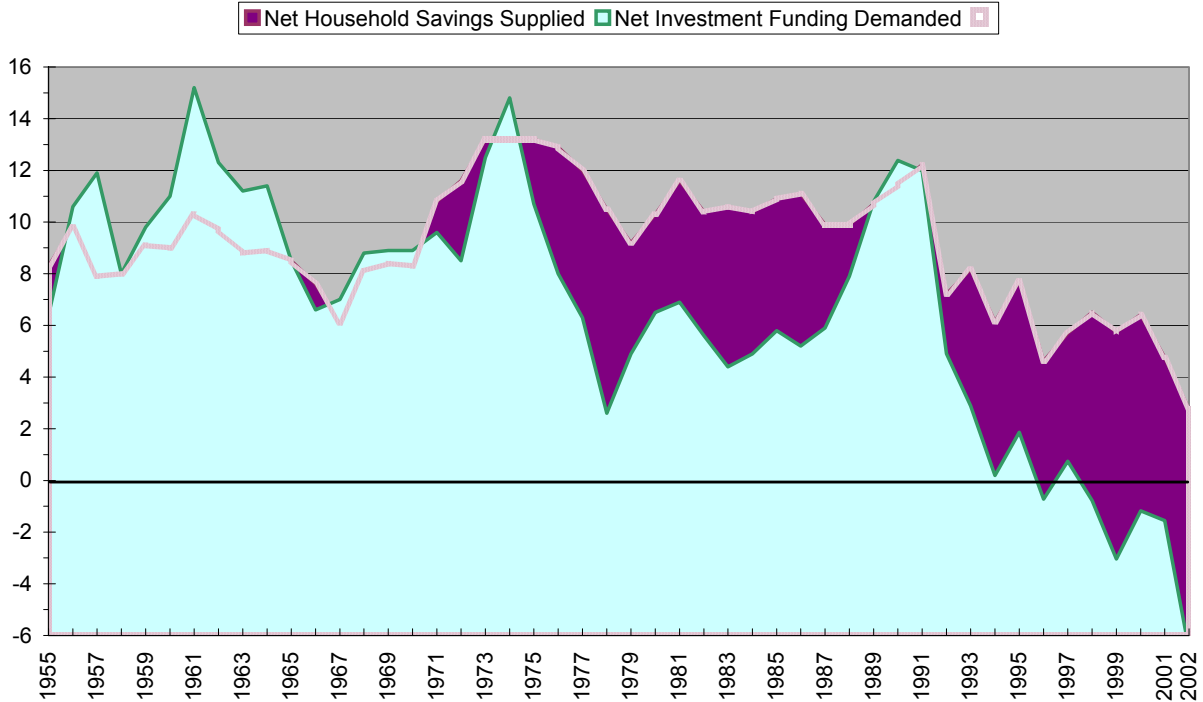
Richard Katz (2003) labels excess savings "anorexia." He tries to explain this as a by-product of government industrial policy. However, unless relative prices change sharply over time rather than across products, industrial policy would not affect intertemporal substitution and thus would leave savings and hence the share of consumption unchanged.

Thanks to Hugh Patrick for pointing out that, in retrospect, policies to tax savings and stimulate consumption would have been appropriate. However, the low elasticity of savings to changes in interest rates implies that even high tax rates on savings would have had only a modest impact.

Figure 4

Savings and Investment Flows

Pre-1990 data are SNA68, thereafter data are SNA93



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 3, this was nevertheless a huge change. In contrast, net household savings actually climbed from 8% to 11% of GDP. The trend towards surplus private sector savings was already apparent before the boom (and associated real estate bubble) that began in 1972, prior to the first oil crisis. The level of savings rose rapidly once the 1974 recession hit. For the next two decades the economy was awash in savings, and remains so today.

The savings initially went to the government, which ran deficits in the late 1970s; when these were reined in growth slowed markedly (Lincoln 1988). Then it was US consumers 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, it is hard for exports to be 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 this could not have continued. More generally, as

noted long ago by Feldstein and Horioka (1980) and reiterated in the latest *Economic White Paper* (Japan Cabinet Office 2003, p. 197 and Appendix Tables, p. 274), international capital flows are insufficient to smooth domestic income and consumption. By 1986 and the dollar depreciation that followed the Plaza Accord, foreign demand was no longer a palliative.

The gradual expansion of the “bubble” economy in the late 1980s kept the economy out of recession due to the combination of renewed investment and lower savings (the flip side of a consumption boom). The proximate cause of the bubble is still debated; excessively easy monetary policy was certainly one factor, as the Bank of Japan responded to the strengthening yen and weak investment demand in an era of fiscal constraint. Asset prices climbed, as eventually did investment, with a view to the profits to be made in real estate, and secondarily consumption was high with workers incomes boosted heavy overtime and fat bonuses, as well as 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.

None of this served to do more than paper over the gap between domestic savings and investment. Once government demand and foreign demand reached their limits, growth could not be sustained. Despite the return of large government budget deficits in the 1990s, the Japanese economy has proven incapable of soaking up such bountiful savings, and despite greater depth in international capital markets – and the hunger for imports of the US – the same is true of markets overseas. On average the economy failed even to achieve the low levels that the growth accounting framework of Section II suggested were possible due to excess capacity and chronic unemployment. This is a novel situation, one not faced to date by other developed countries. That policy fumbled should not be surprising; even with hindsight it is not clear that better timing or a more stable set of macroeconomic policies would have worked. In the end, the on-again, off-again nature of that exercise merely left a burden of debt for the next generation.

Eventually this imbalance will disappear. With aging, the share of the population in the dissaving portion of their life cycles will inevitably expand, and net savings will decline. Indeed, the data in Table 4 show 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. Until restructuring is finished, the corporate demand for funds will remain very

low. Even a modest increase in investment will not erase the proclivity of firms on net to be paying down debt, rather than soaking up private savings. Such restructuring will last until the latter half of the decade; for more detail see Tanaka (2003), T. 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 then other effects of the aging population will depress growth.

Shifts in the Flow of Funds: Implications for Financial Intermediaries

Swings in savings and investment affected not only the growth of the economy but also induced massive shifts in the flow of funds. Since firms were no longer investing, new channels had to be developed to allocate Japan's still-abundant savings. Other changes amplified this, since not only were large firms borrowing less, but financial liberalization meant that they were able to borrow from sources other than 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.

At one level, the shifting flows forced financial liberalization. Beginning with the Occupation-imposed Dodge Plan of 1949 the government had run budget surpluses, or at most small deficits. 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 Yamaichi Securities, Japan's largest brokerage, had to be bailed out, 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 source of outside funds was the banking system.⁹ Individual savers likewise had no option but to place their money in banks. This of course suited officials at the Ministry of Finance, since the financial institutions they monitored faced less competition. Consistent with this regulatory stance, when the government first began running sizeable deficits after the first oil crisis, it was financed via private placements of Japanese government bonds directly with banks and insurance companies.

By 1979 banks became reluctant to continue purchasing bonds on this basis. Regulators had to allow the development of a bond market, opening a hole in the dikes that segmented

⁹ Life insurance companies, aided by preferential tax treatment, served as a source of long-term loans, partially compensating for the lack of a bond market.

different parts of the financial system (Lincoln 1988, Hoshi and Kashyap 1999).¹⁰ 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 had to find new customers.

Shifts in Lending Behavior

Leverage allows banks to use a small amount of capital to move a large amount of loans. It is also potentially dangerous, as bad loans can deplete the cushion of safety provided by the reserves of an individual bank and can even push a financial system into crisis. The typical analytic approach concentrates on identifying individual shocks, and how they are transmitted. The result is a plethora of sometimes idiosyncratic, often mutually inconsistent, analyses. It is more fruitful to stand this methodology on its head. Rather than asking why crises occur, it is better to ask why financial distress does not arise more frequently.

Two factors stand out when the question is phrased in this manner. First, bankers develop experience in avoiding problems. This is encapsulated in organizational structures and operating rules-of-thumb. In the case of the dozen Japanese “city” (large national) banks that dominated the financial system, these included a focus on lending against physical collateral, primarily real estate, and maintaining a stable set of large firms (in the extreme, one in each industry) as customers. Many such borrowers were regulated, or were parts of tight oligopolies or otherwise stable industries, and were historically low in risk. Furthermore, during the high growth era even firms that were poorly managed did well enough to survive, so losses were not great. Real estate prices rose steadily; collateral provided a reliable cushion. Banks thus tended to focus on straight loans to support the expansion of borrowers’ ongoing operations. By 1980, they had already had a stable set of customers for 20 or more years.¹¹ These rules-of-thumb proved sufficient for 40 years; from the return of normalcy to Japan at the start of the 1950s until the mid 1990s there were no bank failures.

¹⁰ In the US inflation undermined regulation, as savers shifted funds from banks to money market funds.

¹¹ Hoshi and Kashyap (1999) stress that regulation prohibited banks from engaging in fee business, so the emphasis on straight loans may not have been by choice.

Second, 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, as an indirect tool to buttress the stability of the financial system. If banks could not grow quickly, they faced diminished incentives to undertake risky (albeit potentially more profitable) lending, reducing moral hazard, the tendency for those who are insured to take greater risks. Banks were also required to maintain capital reserves and were regularly inspected by the Ministry of Finance to check that they were honest and had sound management. That was easy to do since innovation was also discouraged. Finally, the authorities insured depositors against losses and prohibited banks from offering higher deposit interest rates than their peers. Customers thus had no incentive to switch banks if they feared their bank was in ill health. With competition muted, banks did not have to bother watching costs carefully. Indeed, they 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 their rivals and protect their own loan portfolio from poaching by other institutions.

This cozy world proved a bit too comfortable; the rapid shift in the flow of funds undermined both internal and external checks. By 1980 fiscal restraint reduced budget deficits. Banks thus could no longer plan to supplement their loan portfolio with the purchase of government bonds. Strategically, if they couldn't lend to large firms, they needed to try lending to small firms, or to lend internationally for project finance. However, this was not compatible with prevailing management practices. Banks entered the 1980s with very weak capabilities in credit analysis and without administrative structures and information systems that could support the granting of large numbers of small loans to unfamiliar borrowers. Most banks also had scant experience in international markets.

In reality, neither banks nor regulators 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.¹² However, as noted, lending in such markets requires very different capabilities, and with their reliance on collateral (rather than cash flow) and on loans to leading firms, banks had not developed skills in credit analysis. Furthermore, creditworthy small firms were already served by

¹² As part of this process, for example, large banks dispatched staff to the Small and Medium Enterprise Agency, which I observed first-hand as a summer intern there in 1982.

trading firms, and by mutual savings banks and other local financial institutions. 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 they seem to have done both. The use of land as collateral allowed both banks and regulators to fool themselves as to the viability of their lending to small firms. Once money began to flow easily, and land prices began climbing, the expansion in lending to small firms looked both safe and simple. There (mistakenly) seemed to be no need to rethink historic rules-of-thumb on the part of either banks or regulators. The same pattern can be observed in foreign lending, where Japanese banks followed the lead of major American banks in eurodollar lending to Latin America.¹³ In sum, everything large Japanese banks tried their hand at tended to go sour, and in the process they drove down the profitability of traditional lenders to small business.

Even in the best of times organizations find change difficult, the core observation of the population ecology literature (Carroll and Hannan 2000, Smitka 2002). Change is both expensive and risky, and the appropriate strategic direction is hard to diagnose. As a result, firms are quite rational to resist change. Hindsight helps. It is now obvious that when problems surfaced after 1992, there was little pressure to undertake the sort of restructuring and retrenchment that appears to have been sensible. The temporary boom of 1996, ahead of the hike in the consumption tax, played into the hand of the procrastinators within large firms. Both banks and regulators put off foreclosing on bad loans and trimming branch networks and lending staff.

Despite claims to the contrary, this was also the US experience in the 1980s, where delay was the favored response to banking problems. In the US case, S&Ls (savings and loan institutions), which specialized in residential mortgages, were rendered insolvent in 1979, when interest rates on their short-term deposits jumped above the returns they earned on their portfolios of fixed-rate 30 year mortgages. Various “quick” fixes were tried for 10 years, vastly increasing the costs of closing S&Ls and paying off depositors. It was only in 1989 that the Resolution Trust Corporation was established to purchase their bad assets; RTC operations

¹³ International lending also required new analytic skills that, as it turned out, neither Japanese nor American banks had. One task I had while working for the Bank of Tokyo in early 1980 was to trade information on my bank’s exposure to Brazil with major American banks. As long as Citibank or JPMorgan were still lending, then Japanese banks could feel reassured, though they were still lending in part because Japanese banks continued to pour money into the market. Participants were nervous, though with hindsight it was already too late.

continued through 1995. The process thus took 16 years.¹⁴ The US was merely lucky that the banking sector successfully outgrew its problems. However, Japan's banking problems occurred going into a period of permanently slower growth. Japan has not, and will not, outgrow its banking problems, particularly since the savings-investment shifts traced above imply shrinking loan demand, a point also stressed by Hoshi and Kashyap (1999).

Summary

Thrift imposed a high price on the Japanese economy. Its continuation as growth slowed faced those in charge of macroeconomic policy with an impossible challenge, as demand chronically lagged the supply potential of the economy. It 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.¹⁵

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. Of course there were problems 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, as it has yet to fully separate the institutions that balanced the accounts of the command economy from true lending institutions. China will thus enter a period of rapid structural change with a financial system already burdened with bad assets.

¹⁴ The danger of the maturity mismatch at S&Ls was well known, as their profits plummeted every time interest rates rose. However, the US Congress tabled reform proposals in 1969 that would have prevented the crisis from occurring. Similarly, regulators exercised forbearance in 1983-84, when commercial banks suffered losses on loans to Latin America booked in the late 1970s. Only with the issuance of Brady Bonds in 1989 were they forced to write down these loans. Strict bank supervision, of the sort some advocate for Japan, would have led to the closure of Citibank and several other money center banks, which were already weak due to bad commercial real estate loans that paralleled those of the S&Ls.

¹⁵ It would be interesting to trace the impact of the improving US fiscal balance during the mid-1990s on the flow-of-funds. A hypothesis based on the argument of this section is that the "dot.com" bubble was a reflection of the efforts of financial markets to adjust to that swing.

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

Japan is now on the threshold of a fascinating transition: it will be the first nation to experience a natural population decline, which will result in a society where 40% of all adults will be over age 65. The margin of error in this prediction is small; we know the number of children in the current population and thus the size of the adult population 20 years from now. (See Figure 5.) Japan's birthrate has declined monotonically for over 50 years, and longevity has increased steadily. Absent accepting millions of immigrants, there is no reason to expect much deviation from such projections even 30 or 40 years hence.

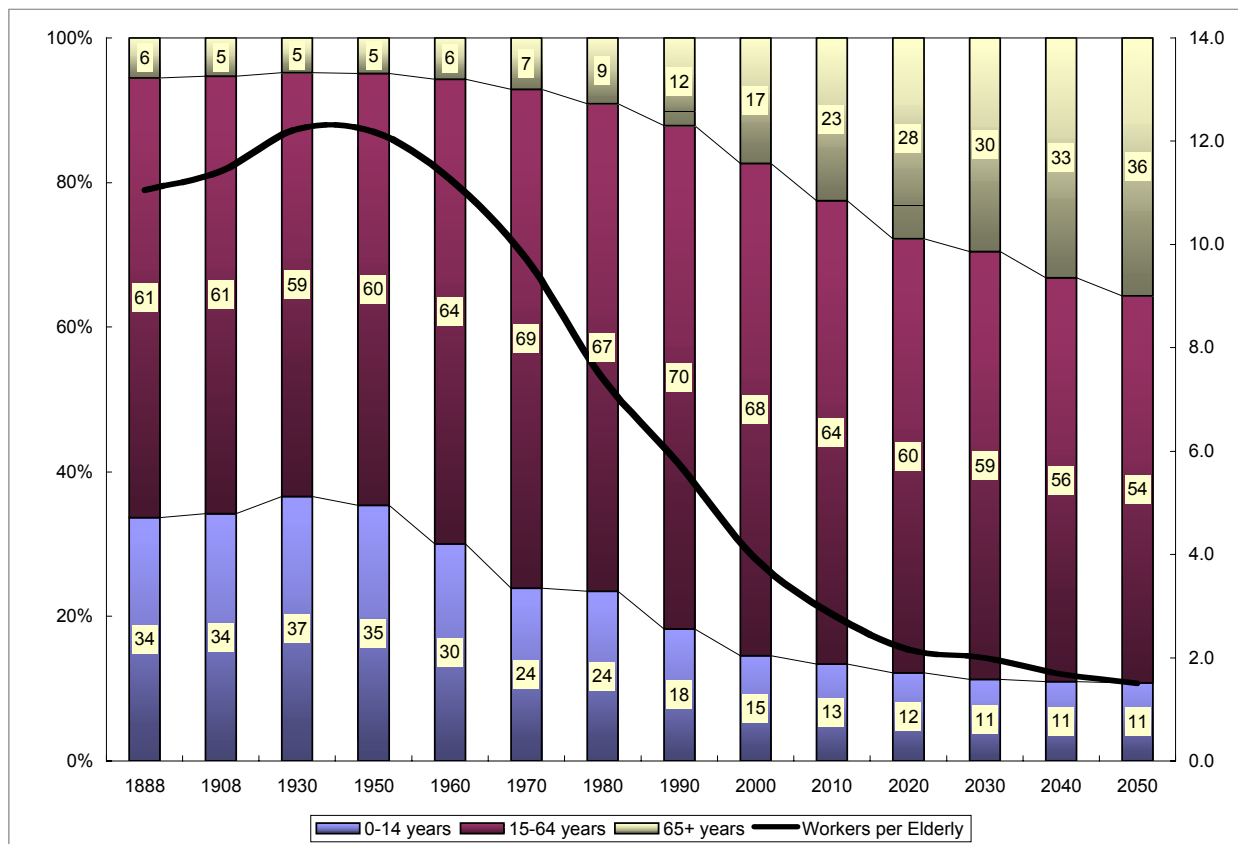
This transition ought to be of interest to all social scientists. There is a nascent literature in anthropology, sociology, and political science (Jenike 2003, Campbell 1992). In economics there is also a growing body of literature, some of which focuses on narrow issues such as savings behavior and health care reform. Here I draw from the literature on the broader issues of public finance in the face of the coming retirement boom.

Several analytic approaches offer insight. The growth accounting methodology of Section II provides one such 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 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, 2003; Faruquee 2003). However, the largest body of work is that which analyzes fiscal sustainability, in connection with social programs for retirees. These rely on overlapping generation models, which try to assess the magnitude of government liabilities, particularly its obligations for providing retirement benefits, relative to assets in the form of future taxes.

Two points stand out from such work. First, the status quo is not sustainable: the future revenues that the current structure of taxation will generate are not commensurate to the promises of pensions and health care made to those soon to retire. Second, in terms of lifetime net taxation, the status quo also generates winners, particularly those already retired and receiving benefits, and losers, workers under age 40 who must foot that bill but are unlikely to receive similar benefits in turn.

One contrast with the US is that Japan's current generation saves 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.¹⁶ Hence the burden of caring 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. The ratio of workers to retirees is thus a crucial variable. (See Figure 5 below.)

Figure 5
Japan's Evolving Population Structure



¹⁶ As noted earlier, international trade and capital flows are constrained, but even if they were not, in general health care and similar services cannot be traded.

In what follows I provide an estimate of the magnitude of future obligations, both for retirement benefits themselves and for servicing government debt, another form of obligation to the future. Most Japanese debt is owed to domestic residents, typically indirectly through the postal savings system, banks, and life insurers. The liabilities of the financial system are thus to a significant extent liabilities of the government. Since the public is unlikely to liquidate their savings, there is no need to repay this debt, but it must be kept under control, to where interest is paid and any increases in debt are manageable.

The result is quite simple: current tax rates will be insufficient to provide either for the current level of commitments to future retirees, or to keep government debt under control, much less both. As a result, some combination of tax increases or a renegeing on commitments to retirees and asset holders must occur. For expositional convenience, the summing up that follows will be done in terms of taxes; from that perspective, Japan must evolve from being the lightest taxed country in the developed world to imposing tax rates that would place it at the high end of the OECD. How accounts might be brought into balance, such as using an “inflation” tax, will be touched upon at the end.

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 health care system is far more cost effective than that of the U.S., as the population ages, obligations will rise inexorably. Over the past decade per person costs for the elderly have already risen by 33%, as modern medicine extended life expectancy.¹⁷ Reforms, such as funding nursing homes and subsidizing family care at home as an alternative, can only pare the rate of increase.

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 5.) The declining number of youth will

¹⁷ Health care is both comprehensive and compulsory, and hence avoids the “adverse selection” issues that plague the US with its large numbers of uninsured.

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. They thus do not benefit from the economies of scale in household production that accrue to young dependents. (Lindh 2004 finds this empirically important for Sweden, though Bloom and Williamson 1998 argue that in a developing country context it is the young that are more burdensome.) So on net the costs to those of working age must still rise, and indeed the age structure guarantees that they must rise significantly from a macroeconomic perspective.

To reiterate, the fact that the saving rate of those soon to retire has been high is of scant benefit. At first glance, some of the costs will be born by the elderly, as they dissave. However, this requires that someone else be saving, in order to buy their assets. Indirectly, therefore, those of working age population still bear a burden, since they must reduce their consumption to generate the savings to purchase the assets of the elderly.¹⁸ That choice, of course, is voluntary. Government programs, however, are effectively universal in coverage and rely on non-voluntary taxes. If current levels of social security and health care support are maintained, then social security taxes must rise 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 level is broadly consistent across sources that include OECD (1997), Dekle (2002), Kato (2002) and IMF (2003). Such studies also suggest, though with considerable variation depending upon the details of scenarios, that this will be a large enough shift to lower living standards, and not just the relative size of benefits received by different generations.

In any case, this retirement burden represents a swing of approximately 10% of GDP – by itself a large but not impossible amount. Of course a shift in taxes of this magnitude would prove politically contentious. What is already certain is that that process will be inequitable: those already retired benefit relative to their children. This is one key theme of the generational

¹⁸ One traditional way to do this is for parents to raise children to provide for their old age; in return, children inherit the family farm or home. The underlying adjustment still requires that children reduce their own consumption to provide for their elders. As longevity increases, it becomes difficult for children to fulfill their end of the bargain, since the children of the elderly may themselves be retired. Note, however, that Horioka et al. (2000) find little evidence of a conscious behest strategy in Japan.

accounting methodology developed by Lawrence Kotlikoff and others.¹⁹ 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.²⁰ However, one can have suspicions over their ability to empathize with their elders, much less accede to the requisite tax levels. This is a novel situation, and we will have much to learn from observing what happens in Japan.

Non-retirement obligations

A complicating factor is that, at present, the current fiscal stance of the Japanese government, central and local, is not sustainable. First, it has already built up a large stock of explicit debt, at about 170% of GDP. However, 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.²¹ 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.

¹⁹ 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).

²⁰ Thanks to Hugh Patrick for this point.

²¹ In addition, life insurers face problems, and are unilaterally reducing payouts to remain solvent. Since Japanese hold a much greater amount of their wealth in insurance than do Americans, this ought to be factored in. Even if the government does not step in, retirees will have less wealth. This will not have a short run effect, unless those with now-less-valuable insurance policies offset that by saving more.

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.²² Many of these individual programs have not only run operating deficits for their entire history, but the assets they hold are also of little value, suggesting that they cannot realistically be expected to cover interest, much less pay back their borrowings. Bridges to nowhere (or that have tolls so high that they remain unused) will never pay back the bonds issued to cover construction costs. For all practical purposes, the government is liable for this difference. FILP-related 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.

Again, losses of this magnitude certainly can be borne; how that will be done in practice is unclear (Beim 2002). However, adding in the various contingent liabilities for which the government is likely to be responsible means that future generations will start out with 200% of GDP in government debt. Since the government is currently running a deficit that will not be eliminated for several more years, that is a conservative estimate, but it is a conveniently round number. Any modest increase will not affect the qualitative calculations that follow.²³

Now for a given level of government debt to be sustainable, it must grow at a rate slower than GDP. That requires that the government generate revenues sufficient to cover interest due, less an amount to offset growth. As a close approximation, the government must therefore run a surplus before interest payments of $(r-g) \times \text{TargetDebt}$, where “r” is the real interest rate and “g”

²² Current reform proposals will let the postal savings system invest some of its own assets. Since it lacks any such experience, it is unlikely to do well, as per the logic in Section III-C.

²³ Net obligations are far lower, around 70% of GDP, though still high in comparison to other OECD countries. Most bonds held by the government, however, are matched by amounts owed, directly or indirectly, to the public and so at some point must be serviced out of general revenues or rolled over into general obligations. Even where debt is offset by “good” assets, the would government would have to locate Japanese residents willing to purchase such assets by increasing their savings and reducing consumption, or by diverting 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, but I am skeptical that would work well in practice. I thus believe focusing on “net” debt is not appropriate. David Weinstein’s project will argue the opposite case, that focusing on gross debt is inappropriate.

is the real growth rate. Given a debt level of 200% of GDP, 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 4% of GDP. There is no magic threshold for debt after which it ceases to be sustainable. It is thus possible for Japan to wait for several more years before achieving that level. However, the longer the delay, the larger the 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 fiscal deficit of 7% of GDP. A portion of this is cyclical in nature, and will disappear if the economy stays out of recession. The current *Economic White Paper* estimates this cyclical improvement in the budget deficit at under 2% (Japan Cabinet Office 2003, Figure 1-3-7, p. 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.

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 must ultimately come via tax increases. Despite the potential political ramifications, Prime Minister Koizumi is pushing for austerity now. This stance must continue for many years to come and must be accompanied by tax increases.

Table 5 below adds these up. First there is the 10% of GDP increase in net taxes to cover the costs of the retiring generation. To this must be added a 4% increase to restore sustainability to government finances, assuming that the economy can achieve 1% growth. Next, a 5% of GDP increase in taxes will be needed to eliminate current government deficits. This gives an increased tax burden of 19% of GDP. Currently general 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.²⁴

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.

Table 5
Tax Changes Required to Maintain Fiscal Stability²⁵

Source	Amount
Elimination of fiscal deficits	+7%
<i>Less cyclical component</i>	-2%
Debt service coverage <i>(3% interest – 1% growth) x 200% debt to GDP target</i>	+4%
Retirement programs	+10%
<i>Subtotal</i>	+19%
<u>Current general taxes</u>	+21%
<u>Current social program taxes</u>	+14%
<u>Total taxes</u>	54%

Politics aside, restoring balance will have economic side effects. Achieving fiscal solvency will inevitably exert a drag on the economy. Even if phased in over a decade, it will

²⁴ 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>.

²⁵ From comments at the April 2004 Japan Economic Seminar, David Weinstein at Columbia University is working on a project that will present a much more optimistic calculation. He projects the persistence of lower real interest rates, given Japan's large capital stock, and uses net debt instead of gross debt. This lowers the debt service component by 3% of GDP (to 1% of GDP). He likewise finds substantial savings in existing government programs, which results in a scenario with a tax increase at least 1/3rd smaller than what I calculate (? Under 13% of GDP).

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. Overlapping generation models, however, demonstrate that increasing such transfers still depress incomes, by holding down savings and capital formation. In contrast, tax increases to restore fiscal sustainability will unambiguously lower demand. Any policy changes will inevitably take place in an economic environment of low growth.

Other adjustment mechanisms are available besides hiking taxes. Obviously, benefits will be cut. Since those near retirement will have expected earnings reduced, to them this will be tantamount to a tax increase. They may react by cutting consumption and increasing saving, with the same net effect on demand as a tax increase, though this “Ricardian equivalence” effect has elsewhere been empirically small. Similarly, the retirement age (or at least the age at which retirement benefits can first be drawn) 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, a bias towards inflation may already be built into the economy. This 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. 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. Conclusions

This paper employed three simple approaches to look at the impact of the postwar demographic transition on Japan's economy. One was a basic "growth" accounting exercise, which associates changes in output to that of the inputs to production. Since the labor force is currently declining and will continue to do so for at least a generation, this suggests there will be at best a slow rise in per capita incomes and minimal aggregate GDP growth into the foreseeable future. The second approach laid out the dramatic shifts in the flow of savings during the past 3 decades, consequent to the ebb and flow of the postwar baby boomers through the labor force. The difficulties in adjusting to this help explain the many fumbles in macroeconomic policy from the 1970s through today. The strains it placed on the financial system also help explain the bubble and the subsequent banking crisis. Indeed, Japan continues to suffer from the "paradox of thrift" of high savings and low investment as it enters the middle of the first decade of the 21st century. The imbalance of savings and investments thus provide a separate impetus towards slow growth.

Third and finally, both the government and financial institutions have incurred a vast array of liabilities to the current generation, all too often matched by non-performing loans in the private sector, and with government debt that is not offset by assets or future tax revenues. The demographic "pig in a python" of the post-WWII baby boom cohort has now worked its way towards retirement, and as with the rest of the developed world, it has been promised retirement pensions and health care. As currently structured, future tax revenues will be insufficient to finance these obligations. Furthermore, the starting point is one of high budget deficits, not merely high debt. Japan must increase in taxes by 19% of GDP to eliminate deficits and to avoid renegeing on benefits promised to retirees and savers. That adjustment will be a major, if not *the* major, political and economic challenge that Japan will face during the coming decade.

All of these issues are linked, directly or indirectly, to Japan's demographic transition. Some of these problems are unavoidable, such as the rise of the dependency ratio of retirees to current workers. However, others are in part a consequence of poor policy; financial bubbles are probably not inevitable, and with stable policy, the burden of thrift need not be so high. Policy analysis, however, must incorporate the impact of demographics on potential output and shifts in the flow of funds. The US population is aging slowly, but Europe is aging almost as quickly as

Japan. The rest of the OECD would benefit from a better understanding of the widespread economic ramifications aging has held for Japan.

The real beneficiary of such analysis will be the developing countries of Asia. India and Indonesia, two of Asia's population heavyweights, are seeing their fertility plummet. It is in China, however, that the transition will first occur. Chairman Mao was pro-natalist, and the Cultural Revolution era (1966-76) was one of high fertility. In contrast, restraints on fertility began shortly after his death, most visibly in the "one-child" policy implemented in 1980. As a result, China's labor force will stop growing in 2020, and the subsequent aging process will occur even more rapidly than in Japan. Unlike the developed world, however, developing Asia is more conscious of its demographic future and potentially has time to internalize the lessons of Japan's experience.

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Table 3
Fifty Years of Japanese Savings and Investment
1955-2002, Five Year Averages

	1955-1959	1960-1964	1965-1969	1970-1974	1975-1979	1980-1984	1985-1989	1990-1994	1995-2002
I (business)	12.0	18.1	15.2	17.1	8.4	8.6	10.4	19.4	15.3
S (business)	2.7	5.9	7.3	6.3	1.9	2.9	3.2	13.0	16.7
S - I	-9.3	-12.2	-8.0	-10.9	-6.5	-5.7	-7.1	-6.5	1.4
I (household)	2.0	2.5	4.2	3.6	6.5	3.4	1.4	4.5	5.1
S (household)	10.6	11.8	12.0	15.0	18.0	14.0	11.9	13.6	10.7
S - I	8.6	9.3	7.7	11.4	11.6	10.7	10.5	9.0	5.5
S - I Private	-0.7	-2.9	-0.2	0.6	5.1	5.0	3.4	2.6	6.9
I (Center & Local)	4.4	5.2	5.6	6.7	7.3	7.3	6.0	6.6	6.4
S (Center & Local)	5.0	6.9	6.3	7.5	2.6	3.2	6.6	6.3	0.9
T - G	0.5	1.7	0.7	0.8	-4.7	-4.0	0.6	-0.4	-5.5
T - G + S - I	-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 until 1990 are from David Campbell (1995), data from 1990 to present are my calculations from SNA93 annual summaries, which are published with a 2-year lag. Figure 3 relies on these same data.

Table 4
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%
Household 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%
Corporate 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%
Private Net	-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%
Govt 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%
Govt 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%
Government 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%
Domestic Net	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%
Exports Net	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%
<i>Error</i>	0.0%	0.3%	0.8%	0.7%	0.2%	-0.2%	0.1%	0.2%	0.0%	0.0%	-0.1%	0.0%	0.5%

Data compiled by the author from the detailed annual national accounts summary, which is published with a two-year lag.