PRELIMINARY AND INCOMPLETE

Is Capital Mobility Overrated? The Fiscal Joys of Japan's Stay-at-Home Savers*

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The effectiveness of fiscal policy in Japan in the 1990s has been at least as controversial as the currently more public disputes over monetary policy. There has been open debate over the degree to which expansionary fiscal policy has even been tried, let alone whether it has been effective, along with widespread assertions about the degree of forward-looking behavior by Japanese savers. The rapid visible more than doubling of Japanese public debt in less than a decade, to a surprising number of observers, speaks for itself: the fiscal deficit has grown sharply, yet the economy has continued to stagnate. No less an economist than Milton Friedman recently wrote, "[D]oes fiscal stimulus stimulate? Japan's experience in the '90s is dramatic evidence to the contrary. Japan resorted repeatedly to large doses of fiscal stimulus in the form of extra government spending. … The result: stagnation at best, depression at worst, for most of the past decade."[1] But it is easy to demonstrate from just charting publicly available data that the bulk of the increase in the deficit is due to a plateau in tax revenue rather than to increased public expenditure or even discretionary tax cuts.[2]

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[1] Friedman, "No More Economic Stimulus Needed," *Wall Street Journal*, October 10, 2001, p. A17. See also Ian Campbell, "Friedman Opposes Stimulus Package," *UPI Newswire*, October 9, 2001.

[2] This of course reflects the inverse cyclical relationship between output and tax revenue. If one applied a plausible tax elasticity of 1.25 to the output gap measures estimated in Kuttner and Posen (2001), the result would be a much-reduced estimate of the structural budget deficit; in fact, using the measure of potential based on a constant productivity trend growth rate of 2.5 percent a year all but eliminates the non–social security portion of the deficit. Moreover, as measured by the fiscal shocks derived from the structural VAR estimated below, fiscal policy has been generally contractionary since 1997.

More tellingly, the massive increase in Japanese government debt outstanding over the period has had little apparent effect to date on either the level of long-term interest rates or the steepness of the yield curve, or even the trend value of the yen. This is commonly attributed to the passivity of Japanese savers, and there surely has been no sign of crowding out or of inflation fears. This fact has not gone unremarked upon in the financial press.[3] As this paper is being written, Moody's has just announced a new downgrade of Japanese (domestically denominated) government debt to a level below that of Italy. But with the exception of a brief panic-induced spike in rates in January 1999, more than half of which was reversed within two months, holders of Japanese government bonds have yet to take any significant capital losses.

Against these stable trends in revenue and long-term interest rates, the actual course of Japanese fiscal policy, both discretionary and passive, has been almost tumultuous, rather than one of unremitting spend-spend-spend, as often assumed. The variety of perceptions may be due to the fact that Japan has a centralized, if arcane, fiscal system.[4] Every year since 1994 has brought announcements of various tax reforms, but their actual impact is difficult to ascertain.[5] On the public works spending side, as discussed elsewhere by Posen (1998), given institutional complications, estimating the *mamizu* ("true water") of any Japanese fiscal stimulus requires great care. Meanwhile, in terms of revenue collection, the Japanese tax base is rather small by developed economy standards, especially on the household side, where salaried urban workers pay a disproportionate share of the taxes, and small business owners and rural residents pay

[3] *The Economist* observed, "[government bond yields] fell as the government pumped the economy with . . . fiscal stimulus, as the yen plummeted by 40% from its high in the middle of 1995, and even as the government's debt climbed to 100% of GDP. By late [1997] the Japanese government was able to borrow more cheaply than any other government in recorded history.""Japanese Bonds: That Sinking Feeling," *The Economist*, February 21, 1998, pp. 74-75.

[4] See Ishi (2000) for a historical perspective; Balassa and Noland (1988), Bayoumi (1998), and *OECD Economic Survey: Japan*, 1999, for institutional descriptions; and Schick (1996) for a comparison of U.S. and Japanese budget processes. Tax Bureau (2000) gives the official account of the tax system.

[5] See Watanabe, Watanabe, and Watanabe (2001) and Tax Bureau (2000).

almost none.[6]

The absence of interest rate or other effects from the fiscal measures undertaken leads us to examine what really happened with fiscal policy in Japan in the 1990s. If standard Mundell-Fleming theory tells us that an open economy engaged in expansionary fiscal policy drives up interest rates and limits fiscal effectiveness, then perhaps the absence of an interest rate rise is indicative of the opposite. Our first consideration therefore is simply whether the fiscal impulses had Keynesian counter-cyclical signs, and what impact those impulses had. As many observers have stressed, traditional public works in Japan more closely approximate the building of pyramids in hinterlands, famous to macroeconomics undergraduates, than do those in any other OECD country.[7] Some have indicated that they would expect the multiplier on such wasteful expenditures to be less than one.[8] Of course, although Keynes maintained that even overtly wasteful public works projects were an effective source of fiscal expansion, several observers have stressed that in the Japanese context tax cuts are likely to be more effective.

We then turn to historical decompositions of the effect of fiscal policy on the Japanese economy in the 1990s - the ample variation in Japanese fiscal policy, moving from expansionary to contractionary back to expansionary, on both the tax and the spending sides, with some tax measures temporary and others permanent, not only provides a rich basis for econometric investigation, but an apparent explanation for a surprisingly large amount of the variation in growth over the period. Meanwhile, on the tax side, all tax cuts were preceded and accompanied by loud declarations by government officials that eventually taxes would have to go up due

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[6] See Balassa and Noland (1988).

[7] Sixty percent of the Japanese coastline is today reportedly encased in concrete (Ian Buruma, "The Japanese Malaise," *New York Review of Books*, July 5, 2001, p. 5). Similar examples are easy to come by: see, for example, Martin Wolf, "Japan's Economic Black Holes," *Financial Times*, January 17, 2001, p. 21**,** and Bergsten, Ito, and Noland (2001, pp. 64-65).

[8] In June 1998 the then–Vice Minister of Finance for International Affairs Eisuke Sakakibara (1999, p. 45), expressed a contrary point of view: "Concerning the current fiscal package, I know that there have been various criticisms of it, but I think there is now a wider acceptance, even in the international community, of public works as a more effective means than tax cuts. In addition, under current circumstances, a strong multiplier effect can be expected. . . ."

variously to the looming demographic threat, to the unsustainability of Japanese public debt, or to the declining potential growth rate. Even though we find that these well-publicized dangers from debt did not have any obvious short-run effect on multipliers, we also directly examine the possibility of Ricardian equivalence. Finally, we conclude by considering some of the questions raised by the apparent fiscal power granted through savers' passivity in Japan.

1. The Short-Run Effects of Fiscal Policy

To assess the impact of fiscal policy on the economy, we employ a structural three-variable VAR model adapted from the work of Blanchard and Roberto Perotti.[9] Their approach is designed to identify the impact of fiscal policy while allowing for contemporaneous interdependence among output, taxes, and spending. The one-lag version of the Blanchard-Perotti model can be expressed succinctly as

$$(1) \qquad A_0 Y_t = A_1 Y_{t-1} + B\varepsilon_t,$$

where $Y_t = (T_t, E_t, X_t)'$ is the vector of the logarithms of real tax revenue, real expenditure, and real GDP, and $\mathring{a}_t$ is interpreted as a vector of mutually orthogonal "shocks" to the three jointly endogenous variables.

Following Blanchard and Perotti, real GDP is allowed to have a contemporaneous effect on tax receipts, but not on expenditure. Taxes do not depend contemporaneously on expenditure, or vice versa, although tax "shocks" are allowed to affect spending within the year. This assumption conforms to the institutional setup for fiscal policy in Japan, where taxes are mostly collected from withholding and consumption, spending mostly is implemented with a lag, and both automatic stabilizers and the size of the public sector are limited.[10] With these assumptions

[9] Blanchard and Perotti (1999). Kuttner and Posen (2001) made a more limited implementation of this approach on Japanese data, without computing standard errors and confidence intervals.

[10] It is also possible to identify the model under the assumption that spending shocks affect tax revenue contemporaneously. The results under this alternative assumption are virtually identical to those reported below.

imposed, the model can be written as

$$
\begin{aligned}
T_t &= a_0^{13} X_t + a_1^{11} T_{t-1} + a_1^{12} E_{t-1} + a_1^{13} X_{t-1} + \varepsilon_t^T \\
E_t &= a_1^{21} T_{t-1} + a_1^{22} E_{t-1} + a_1^{23} X_{t-1} + b^{21} \varepsilon_t^T + \varepsilon_t^E \\
X_t &= a_0^{31} T_t + a_0^{32} E_t + a_1^{21} T_{t-1} + a_1^{22} E_{t-1} + a_1^{23} X_{t-1} + \varepsilon_t^X
\end{aligned}
\tag{2}
$$

where a_l^{ij} and b^{ij} represent the i,jth elements of the $\mathbf{A}_l$ and $\mathbf{B}$ matrices. Thus $a_0{}^{13}$ captures the within-period elasticity of tax receipts with respect to GDP, b^{21} is the effect of tax shocks on expenditure, and $a_0{}^{31}$ and $a_0{}^{32}$ allow taxes and expenditure to affect real GDP contemporaneously.

The model in equation 2 is not identified, however, with seven parameters to estimate from the six unique elements of the covariance matrix of reduced-form VAR residuals.[11] Our strategy, like that of Blanchard and Perotti, is to bring to bear independent information on the elasticity of tax revenue with respect to changes in real GDP, that is, the value of $a_0{}^{13}$. Specifically, we draw on the work of Claude Giorno et al. (1995) and use a value of $a_0{}^{13}$ equal to 1.25.[12] With that parameter fixed a priori, the model is exactly identified.

Comprehensive quarterly fiscal data for Japan are not readily available, unfortunately, and so we fit the model instead to annual consolidated central, state, and local fiscal data, compiled by the IMF, spanning fiscal years 1976 through 1999. The model also includes a linear trend and a trend interacted with a post-1990 dummy.[13] Tax receipts are defined as direct and indirect tax

[11] For a complete discussion of the identification and estimation of structural VARs, see Hamilton (1994, chapter 11).

[12] Giorno et al. (1995). Similar results are obtained under a range of plausible alternative assumptions about the value of $a_0{}^{13}$. It would be possible to extend the work of Giorno et al. to construct a time-varying elasticity that reflects the changing structure of the tax system, but because the results prove insensitive to the choice of $a_0{}^{13}$, this embellishment would be unlikely to alter the main conclusions.

[13] The model makes no explicit distinction between temporary and permanent tax and expenditure changes, in part because the temporary tax changes enacted in Japan have been much smaller in magnitude than the permanent ones (see Watanabe, Watanabe, and Watanabe, 2001). Many of the supposedly permanent tax changes were offset by subsequent tax legislation, however, and this pattern should be picked up by the model's dynamics.

revenue, excluding social security contributions. Expenditure corresponds to the sum of current and capital expenditure, less social security and interest payments.[14]

Figure 1 plots the estimated impulse response functions. These multiyear effects are the relevant ones for policy analysis. As can be seen comparing the left two boxes in the last row of Figure 1, both tax cuts and expenditure increases have expansionary effects, with the effect of the tax cut on GDP significantly different from zero (at the 90% confidence interval) for at least three years, while the effect of the spending shock is significantly above zero for two. The effects are not comparable in magnitude either: the point estimate of the effect of a tax shock on GDP is at or above the upper confidence band on the effect of a spending shock on GDP. Notwithstanding the characterization as permanent in intent of most Japanese tax law changes,[15] shocks to tax revenue tend to be relatively transitory, essentially disappearing after one year.[16] In contrast, public works spending shocks are highly persistent, as institutional and journalistic descriptions of Japan (and elsewhere) lead us to believe, as can be seen in the second box of the first row of Figure 1.

The dynamic effects of tax and spending shocks, including the expansionary effect of tax cuts on GDP, is easier to interpret (and more dramatic) when put in yen terms, as is done in Table 1. To do so requires scaling up the response by the inverse of the share of taxes in GDP, which averaged 19 percent during the 1990s. Making this adjustment results in a cumulative ¥484 increase in GDP in response to a ¥100 tax cut. One explanation for the size of the response is that, over the sample period, tax cuts have tended to be associated with spending increases; in

[14] As noted by Blanchard and Perotti, estimating the third equation in the structural VAR is equivalent to using a measure of "cyclically adjusted" tax receipts (and a similarly adjusted measure of spending) as instruments for taxes and spending in a two-stage least squares regression.

[15] As documented by Watanabe, Watanabe, and Watanabe (2001).

[16] Watanabe, Watanabe, and Watanabe (2001). Because of the feedback between taxes and GDP, and the greater-than-unit elasticity of tax revenue with respect to GDP, the impact effect of a 10 percent tax shock on tax revenue is slightly less than 10 percent.

fact, the cumulative increase in spending is roughly equal to the fall in taxes.[17] Overall, GDP rises by more than twice the sum of the spending and tax effects.

The immediate impact of a 10 percent positive spending shock on GDP is 1.6 percent, however, which translates into ¥84 for a ¥100 spending increase, and the stimulus builds only slightly over time. One reason for the smaller estimated effect of spending than of tax shocks is that taxes tend to *rise* in response to positive spending shocks in this sample, partly offsetting the expansionary impact of the spending increase. This can be interpreted as evidence of the expensive maintenance of unproductive Japanese public works projects. Overall, the increase in GDP is about 1.75 times the net effect of the spending minus the tax increases—smaller than the effect of tax shocks, but still a respectable multiplier.

These results show that, when it has been used, discretionary fiscal policy in Japan has in fact had the effects predicted in standard *closed-economy* macroeconomic analyses. Both tax cuts and spending increases lead to higher real GDP, although the tendency for taxes and spending to move together has reduced the impact of spending increases.[18] The commonly held perception of fiscal policy's ineffectiveness in all likelihood stems from a failure to recognize the dependence of tax receipts with respect to GDP: as GDP falls, tax revenue shrinks, but to conclude from this that changes in the deficit have not affected growth would be incorrect.

2. Historical Decompositions of the Effects of Fiscal Policy

Despite the institutional complications mentioned above, one can give a fair picture of the

[17] Blanchard and Perotti (1999) found a qualitatively similar pattern in the U.S. data.

[18] Further work is needed to reconcile our results on the sizable effects of fiscal policy in Japan with the findings (using much different econometric approaches) of Bayoumi (2001) and Perri (1999) that fiscal policy had the expected sign but very small effects, and of Ramaswamy and Rendu (2000) that "public consumption had a dampening impact on activity in the 1990s." It is our initial evaluation that these other analyses did not take full account of the dynamic interactions among GDP, tax revenue, and expenditure in the way that we were able to, following Blanchard and Perotti.

timeline of Japanese fiscal policy since the bubble burst in 1990.[19] The purpose of this section is to link those policy developments with the tax and spending shocks estimated in our VAR, and then with their cumulative impact on GDP over time. These are reported in the bar charts of figures 2 and 3 respectively. In both charts, the light grey bars depict the tax shocks (defined so that positive values are stimulative, i.e., tax *cuts*) and the dark grey bars correspond to spending shocks (positive values are spending increases). Figure 2 plots the shocks themselves; the scale represents the percentage deviation from the tax revenues or expenditures that would have been predicted, given the lags and deterministic trends in the model. Figure 3 shows the contribution of those shocks, to real GDP growth, expressed as the annualized percent change.

Following the asset price collapses of 1990–1992, the Japanese government introduced the first of a series of stimulus packages of public works in August 1992 and April 1993, but the net incremental expenditure was small: 2 percent of GDP in total, versus an announced combined size of 5 percent of GDP. As seen in figure 2, however, these were quite stimulative, with the spending accumulating over the two years. The Diet passed a special income tax reduction in November 1994, to take effect in fiscal year 1995, amounting to 0.6 percent of GDP, but as seen in Figure 2, the effects were felt already in 1994.[20] Interestingly, this tax cut was accompanied by an almost offsetting spending cut. The effects on GDP growth of this sequence were as to be expected, as shown in Figure 3: the tax cuts were felt particularly in 1993 and 1995, but with little persistent effect, while the effects of the spending cut in 1994 was more than enough to offset the tax cut of that year. In 1995, the Japanese government made its first relatively large scale tax cut/public works spending combination to be implemented (see Posen 1998 for a discussion), which had a double-barreled impact on GDP that year; the greater multiplier on tax cuts, however, can be seen in the over 1.0% effect on GDP from the tax shock, despite that shock

[19] Posen (1998, chapter 2); *OECD Economic Survey: Japan*, 2000; IMF (2000); and Bergsten, Ito, and Noland (2001) give more detailed accounts of the policies undertaken over this period. Asako, Ito, and Sakamoto (1991) provide an excellent account of "the rise and fall of [the] deficit in Japan, 1965–90."

[20] The Japanese government fiscal year runs from April 1 to March 31.

being smaller than spending in impulse.

As is now famous, the 1995 tax cut not only was stated at time of passage to be reversed at the start of fiscal 1997, but it was to be accompanied then by an increase in the national consumption tax (a value-added tax) from 3 percent to 5 percent. At the time, Prime Minister Tomiichi Murayama and senior budget officials cited concern about the looming demographic threat as the primary reason for the tax consolidation and the shift to indirect taxes. Some belief in the power of an expansionary consolidation, due to Japan's debt situation, was also invoked as a reason for the planned tax increase.[21] In June 1996 the Tax Commission (an advisory body to the prime minister) and then the Diet reaffirmed the plan. In April 1997 contribution rates to social security were increased along with the repeal of the temporary income tax cut and the implementation of the consumption tax increase. The tax burden rose by nearly 2 percent of GDP, more *mamizu* than any of the fiscal stimulus packages implemented up to that time.

These measures would have been thought to have had two competing effects: a Ricardian effect of a clearly temporary tax cut whose very reason for temporariness was the imminent budget crisis; and an intertemporal substitution effect, with households seeking to make purchases before the tax increase took effect. As both of these forward-looking effects cannot be measured directly in our VAR by the fiscal components, we estimate a dummy variable for the year 1996, where a positive effect on GDP would indicate a pre-dominance of the intertemporal substitution effect.[22] We find that the impact of the 1996 dummy on GDP is about 3%, significant at the 10% level. This impact should not be entirely attributed to such effects, however, as the dummy also picks up the cumulative effect of past fiscal measures as well as any other factors idiosyncratic to 1996 (like the last year of Asian economic expansion). This can be seen in Figure 3 where there is

[21] See David Holley, "Japan Approves a Tax Cut Plan; U.S. Lukewarm," *Los Angeles Times*, November 26, 1994, p. D1; "Editorial: Drastic Reforms Must Be Carried out," *Daily Yomiuri*, June 21, 1996, p. 13; William Dawkins, "Japan Confirms Sales Tax Increase," *Financial Times*, June 26, 1996, p. 6; and the account in Posen (1998, p. 50).

[22] Again, limitations of Japanese government revenue data availability force us to annual data rather than trying to key to the specific months of the fiscal year or of the time of announcement.

a sizable combined tax and spending impact on GDP, but nothing like 3%. Still, it is clear that despite the announcements and warnings accompanying the tax cut, Japanese consumers in 1995–96 did not behave in a Ricardian fashion.

A recession and a series of financial failures hit Japan in the months following the April 1997 tax increase. The contractionary fiscal impulses and its extremely sizable effect on GDP are strikingly obvious in Figures 2 and 3.[23] In response to these events as well as to international pressures stemming from the Asian financial crisis and an electoral setback for the Liberal Democratic Party in July 1998, apparently large stimulus packages were announced in both April and November. These included front-loaded public works to make up for the falloff in public spending in the second half of 1998 (and creating such a shortfall in the second half of 1999), as well as a combination of permanent income tax rate cuts, primarily for corporations and the top personal income tax bracket. According to the IMF, these initiatives contained 4 percent of GDP in "real water" measures.[24] It is clear from Figure 2, however, that after the cumulative effect of previous spending cuts were taken into account, the 1998 stimulus package was smaller than that of 1995, and once the lingering tax effects were put in, on net policy was nearly zero. More importantly, the cumulative impact of 1997's fiscal contraction persisted through 1998 and into 1999, taking away an additional more than 2.5% of growth. There was no expansionary impact of this contraction through confidence or any other channel.

3. Taxes, Public Expenditure, and Savings in the Long Run

On many *a priori* criteria — the connections of households across generations, the looming demographic burden, and the repeated public statements by officials and commentators

[23] Because the fiscal impulses are measured relative to long-term trends, the dummying-out of 1996 fiscal policy is not a source of exaggeration of these within 1997 effects.

[24] "The implementation of these packages was mostly felt in calendar 1999, however, due to the 3–6 month gestation period for public works projects, and owing to the fact that most of the tax measures were implemented through the FY1999 initial budget." IMF (2000, p. 29).

about future budget difficulties, not to mention the obvious rapid rise in public debt — it would appear that if anywhere forward-looking savers were to offset fiscal expansion, and respond with confidence to fiscal contraction, it would be in Japan in the 1990s. In the words of Allan Meltzer, "There is no way to finance these present and future [government] liabilities that will not involve higher future tax rates. The U.S. Treasury may not understand it, but the ordinary Japanese citizen has been told the truth about this problem for years."[25] In one of his last public speeches to the Diet, on March 8, 2001, then-Finance Minister Kiichi Miyazawa announced that Japan's finances "are very close to collapsing. We need fundamental fiscal restructuring aimed at rebuilding our finances in the 21st century, looking 10, 20 years into the future."[26] Asher asserts, "Overall, consumption in Japan is 'rationally suppressed' by structural factors outside of the range of monetary policy influence. . . . Moreover, with public anxiety over the ballooning government debt growing it seems that this is generating a fair degree of Ricardian 'precautionary saving.'"[27]

Such fears would have a surface plausibility, given reasonable concern for oncoming demographic shifts as well as the apparent decline in the government's fiscal position. It is well documented that, on current trends, Japan faces a greater demographic challenge from its aging work force and increasing social security burden than any other developed economy. Andrew Smithers adds to the picture evidence of widespread weakness of local government balance sheets.[28] Asher and Smithers point out that the government of Japan is potentially liable not only for local and central government debt, but also for the liabilities of the Trust Fund Bureau (to postal savings account holders) and of the state pension scheme.[29] The OECD concludes that the rate of increase in Japanese government net debt (that is, debt outstanding after accounting for

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[25] Meltzer (1998).

[26] "Japanese Finance Minister Says Nation's Finances 'Near Collapse,'" Associated Press Newswires, March 8, 2001.

[27] Asher (2000, p. 13).

[28] Smithers (1999).

[29] Asher and Smithers (1998).

public assets and government holdings of its own bonds) "must soon be brought down for the dynamics of the debt not to become explosive, even if the pensions' problem is separately resolved."[30] Simulations based on demographic projections by the IMF and by Hamid Faruqee and Martin Mühleisen yield daunting estimates of the policy changes and trade-offs that need to be addressed if Japan is to restore fiscal sustainability.[31]

Yet, perhaps because it seems to logical, the actual extent of the Ricardian offset to fiscal expansion in Japan has not yet been assessed. The apparent Keynesian response of GDP to fiscal policy documented in the last two sections, however, would seem to be prima facie evidence in the opposite direction. We look for Ricardian effects directly through an adaptation of the saving regressions used by Michael Hutchison.[32] A key benefit of this approach is that it allows us to break out the differential effects on saving behavior of taxes, transfers, and public spending; these effects may indeed differ, especially in the Japanese context. The regression results are based on the equation

$$(3) \qquad S_t = \alpha + D_t \beta + \boldsymbol{x}_t' \gamma + e_t \ ,$$

where S is saving measured as a percentage of GNP, net of taxes, plus social security payments; D is a demographic variable (the old-age dependency ratio); and $\boldsymbol{x}$ is a vector of fiscal variables, each expressed as a percentage of GDP.[33] Since S, as well as many of the regressors, appears to be difference stationary, this regression can be interpreted as a long-run cointegration relationship; as such, it abstracts from the dynamics of the relationships between fiscal policy and the rest of

[30] *OECD Economic Survey: Japan*, 1998, p. 85.

[31] Faruqee and Mühleisen (2001).

[32] Hutchison (1992).

[33] Following Hutchison (1992), we also tried including real GNP growth but found it to have no significant effect on saving. This is a logical result: because real GNP growth is stationary, it should have no long-run inpact on saving.

economy, which are modeled more explicitly in the Blanchard-Perotti framework.[34] Accordingly, Phillips-Ouliaris statistics are reported for the test of the null hypothesis that the residuals from the estimated regression are nonstationary (that is, that there is no cointegration). Following Hutchison, we start with the simplest measure of fiscal policy—the overall fiscal balance, or government net lending—and proceed from there to disaggregate that balance into its components. Table 2 displays the results.[35]

The simplest regression, containing only the old-age dependency ratio and the fiscal balance, reported in column 1, displays a positive coefficient on the old-age dependency variable. This is inconsistent with the usual life-cycle interpretation, in which old people are dissavers, and suggests that this hypothesis does not adequately capture the behavior of Japanese elderly.[36] The estimated coefficient on the balance is significant but quantitatively small: it implies that a 10 percent increase in the overall budget deficit is associated with a 1.2 percent fall in private saving over the long-run. Adjusting for the dependent variable's smaller denominator (income net of taxes plus social security payments is 79 percent of GDP over the 1990s), the effect in terms of yen is smaller still: only 0.9 percent of GDP for a 10 percent increase in the deficit. The Phillips-Ouliaris statistic of –5.23 is sufficient to reject the null hypothesis of no cointegration among the three variables at the 1 percent level.

Column 2 replaces the overall fiscal balance with the two measures of spending and tax revenue used for the structural VAR in section 1: expenditure net of interest and social security payments, and revenue excluding social security contributions. The coefficient of -0.31 on the tax revenue variable is significant and suggests a somewhat larger, but still modest, degree of saving

[34] As in the earlier analysis, the lack of comprehensive quarterly fiscal data forces us to use annual data, but since the relationship focuses exclusively on the long run, this is not a major handicap.

[35] Additional analysis, including robustness checks with other demographic variables, is under way, but unfortunately was not ready in time for the conference.

[36] Using microlevel data, Horioka (1990, 1991, 1993, 1995, 1997), Horioka and Watanabe (1997), and Horioka and others (1996) come up with results more supportive of the life-cycle hypothesis, although the later studies give a more mixed picture than those at the start of the 1990s. This may indicate rising precautionary saving motives as the Great Recession dragged on and the prospect of unemployment or lost pensions rose.

offset. (The coefficient on expenditure has the "wrong" sign but is statistically insignificant.) Adjusting for the relative sizes of the variables' denominators, the revenue coefficient implies a ¥24 increase in saving in response to a ¥100 tax cut over the long run. (Given the de facto transitory nature of tax changes in Japan, some saving offset is to be expected, concerns about demographics and future obligations aside.) There is some apparent tension between this long-run response and the short-run multiplier on tax cuts estimated in the previous analysis, but this should not be overdrawn. In essence, the multiplier in table 1 is net of these offsetting saving effects to the degree they are incurred within the three-year horizon.

The final specification, in column 3, adds to the previous specification the two remaining elements in the overall fiscal balance: the social security balance and net interest expenditure. Collectively, these four variables make up the overall fiscal balance (except for a very small "other revenue" category, which is omitted). Neither the social security balance nor net interest seems to bear a systematic relation to saving in Japan over the period: both are insignificant, and together they increase the adjusted R^2 only marginally.

One potential lacuna in this analysis is the failure to incorporate off-budget liabilities, such as pension shortfalls, debts of semipublic institutions, and likely insurance company failures.[37] These are omitted largely for lack of dependable time-series data. Still, since these liabilities and their implications for future tax liabilities are even more opaque than on-budget taxes and expenditure, a large Ricardian offset from these sources seems unlikely, given that the more obvious factors had only a small impact on saving. Overall, our results provide little support for the Ricardian equivalence hypothesis under perhaps the most propitious conditions ever seen for it to hold: a rapid and large increase in public debt contemporaneous with a widely publicized projection of demographic dangers to social security benefits, in an economy already prone to high rates of saving.

[37] See Asher and Smithers (1998) and Asher and Dugger (2000) for lengthy descriptions of these mounting contingent claims on the Japanese government, as well as Kotlikoff and Leibfritz (1998) for a generational accounting assessment of Japan's demographic imbalances.

4. Dysfunctional Savers and Functional Fiscal Policy

Our examination of the effects of fiscal policy in Japan in the 1990s has taken us on what seems to be a tour of macroeconomics' past: when economies were closed, savers were myopic, and consequently fiscal stabilization was effective. Thus, Japan's experience would appear to offer evidence that one can join Laurence Ball and Gregory Mankiw (1995), and Willem Buiter and Kenneth Kletzer (1992), in asking, "Who's afraid of the public debt?" If this indeed the case, the short term can be separated from the long term: responsible stabilization policy today to maximize growth today is not harmful and indeed is perhaps the optimal response to long-run sustainability issues. Yet this is a very discomforting place to end up as economists even if it might be pleasing to policymakers. We are all familiar with the real-world example of Mundell-Fleming in France in 1980–81, where Francois Mitterand tried "socialism in one country" with fiscal expansion that was almost completely reversed by rising interest rates, an appreciation of the Franc, and capital inflows. Of course, France was and is more globally integrated than Japan, but it is not as though French households circa 1981 were significantly more likely to move their savings abroad than Japanese households circa 1999 — and certainly from the point of view of regulatory and product options, if not mores, Japanese savers today have an easier time of moving money than their French counterparts of twenty years earlier did.

Currently, around $10 trillion in Japanese national private savings (as compared to a $4.5 trillion GDP) reside almost solely domestically — and almost 50% of that number is kept in savings accounts of one form or another. These accounts earn well under 1% interest annually; when the much higher yielding $1.5 trillion in CD-equivalents in the Postal Savings system came due in 2000–01, most of them were rolled over into similarly low yielding accounts rather than sent out to pursue new higher-yielding investment opportunities. Merrill Lynch and Charles Schwab are currently shrinking their Japanese consumer operations which were built on the expectation that some of this rollover money would role their way, only to be disappointed.

Meanwhile, there are now over $6.5 trillion in JGBs outstanding versus under $3 trillion a decade ago, and real interest rates are around only 100 basis points higher on JGBs on average. So captive savings do translate into fiscal power. Clearly there is an absence of intermediation or at least of arbitrage taking place of the pool of Japanese savings. The institutional and cultural factors explaining such a vast and costly home bias are beyond the scope of this paper, but it is interesting to contemplate the macroeconomic consequences of this apparent bias, or of its disappearance.

To understand these consequences, consider the thought experiment in which one morning a significant fraction (say 20%) of bank savings account holders in Japan woke up and decided to reallocate their portfolios towards higher-yielding assets. With no domestic assets paying an attractive rate of return, this means a significant flow of savings ($1 trillion in our example) out of yen-denominated assets and into assets denominated in foreign currencies. What would be the consequences of such a massive reallocation?

For the banks, at least on the first go around, this makes little difference: since they hold a large share of JGBs in their portfolios, the outflow of deposits can be accommodated by simply selling off some of those JGBs. The only cost would be from the loss of the (tiny) spread between the rate earned on JGBs and the rate paid on deposits, and because JGBs have a zero risk weighting, the shift would leave banks' Basle capital ratios unchanged.

But what happens to the $1 trillion worth of JGBs sold off by the banks? This is the point at which monetary policy comes into play. Absent any response by the Bank of Japan, the shift out of yen-denominated assets would drive up domestic interest rates: specifically, a higher interest rate would be required to find buyers for the freed-up JGBs on the international market (or alternatively to a more competitive domestic market), and their interest rates would tend to rise towards the level of comparable assets, such as U.S. Treasury securities. (Of course, the outflow of capital from Japan would in part reduce interest rates in global markets, but this effect would be small, relative to the increase in Japanese rates.) Another effect of the shift out of yen-

denominated assets would be a depreciation in the yen, which goes hand-in-hand with the increase in the capital account deficit (which implies an increase in the current account surplus). Thus, an increase in Japanese savers' taste for foreign assets would be something of a mixed blessing for aggregate demand, with higher interest rates offset by a weaker currency.[38] Higher rate would exacerbate the fiscal sustainability problem, however.

An active response on the part of the BoJ would significantly alter this scenario. Faced with Japanese savers' abandonment of the JGB market, and the prospect of rising longer-term interest rates, the BoJ could respond with stepped-up purchases of JGBs — essentially monetizing the government's outstanding debt. This would tend to keep nominal interest rates low. Furthermore, this would in principle, by increase inflationary expectations, decrease *real* rates, and lead to a further fall in the value of the yen. In other words, this particular outcome might be just the right policy to combat the current deflationary environment.

The reservoir of captive domestic savings has therefore been one factor contributing to the continued efficacy of traditional fiscal policy measures in Japan (sustainability concerns notwithstanding). Ironically, however, this same source of low-cost funds to finance the government deficits may have let policymakers to "get off easy," in the sense that it has allowed them to defer the sort of aggressive actions needed to break the deflationary spiral, and pull the economy out of its prolonged recession.

[38] The yen would still be stronger than it would have been in the absence of a fiscal expansion, of course.

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Table 1: The Dynamic Impact of Fiscal Policy

Estimated Yen-Denominated Impulse Responses

Effects of expansionary ¥100 shocks, in yen

	Impact of –¥100 tax shock			Impact of +¥100 spending shock		
	Taxes	Spending	GDP	Taxes	Spending	GDP
Year 0	-96	3	16	20	100	84
Year 1	-32	16	158	34	87	105
Year 2	0	36	168	37	77	89
4-year cumulative	-111	104	484	127	332	353

Source: Authors' calculations based on the estimated structural VAR. The impact of ¥100 tax and spending shocks are computed assuming taxes and spending represent 19% of GDP.

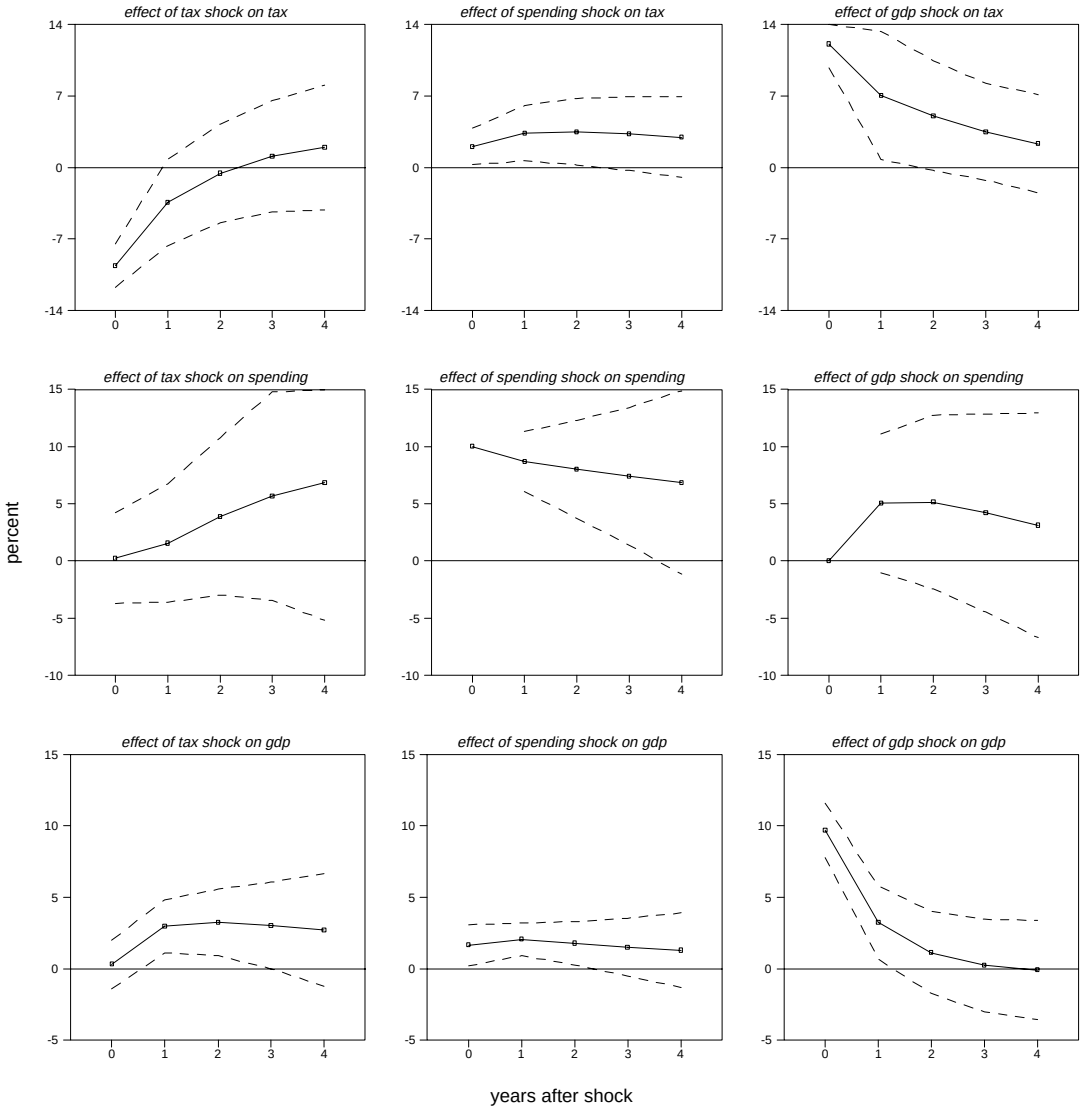
Table 2: The Long-Run Relationship Between Saving and Fiscal Policy

Results from Savings Rate Regressions

		Equation		
		1	2	3
Constant	α	30.6***	38.4***	37.9***
Old age dependency ratio	β	0.11***	0.12***	0.17*
Fiscal balance (revenues – expenditures)	γ_1	-0.12**	...	...
Tax revenue	γ_2	...	-0.31**	-0.32**
Government expenditure	γ_3	...	-0.10	-0.09
Social Security balance	γ_4	...	...	0.30
Net interest expenditure	γ_5	...	...	0.13
$\bar{R}^2$		0.481	0.578	0.585
Durbin-Watson statistic		1.25	1.51	1.48
Phillips-Ouliaris Z_t test statistic		-5.23***	-5.46***	-5.10**

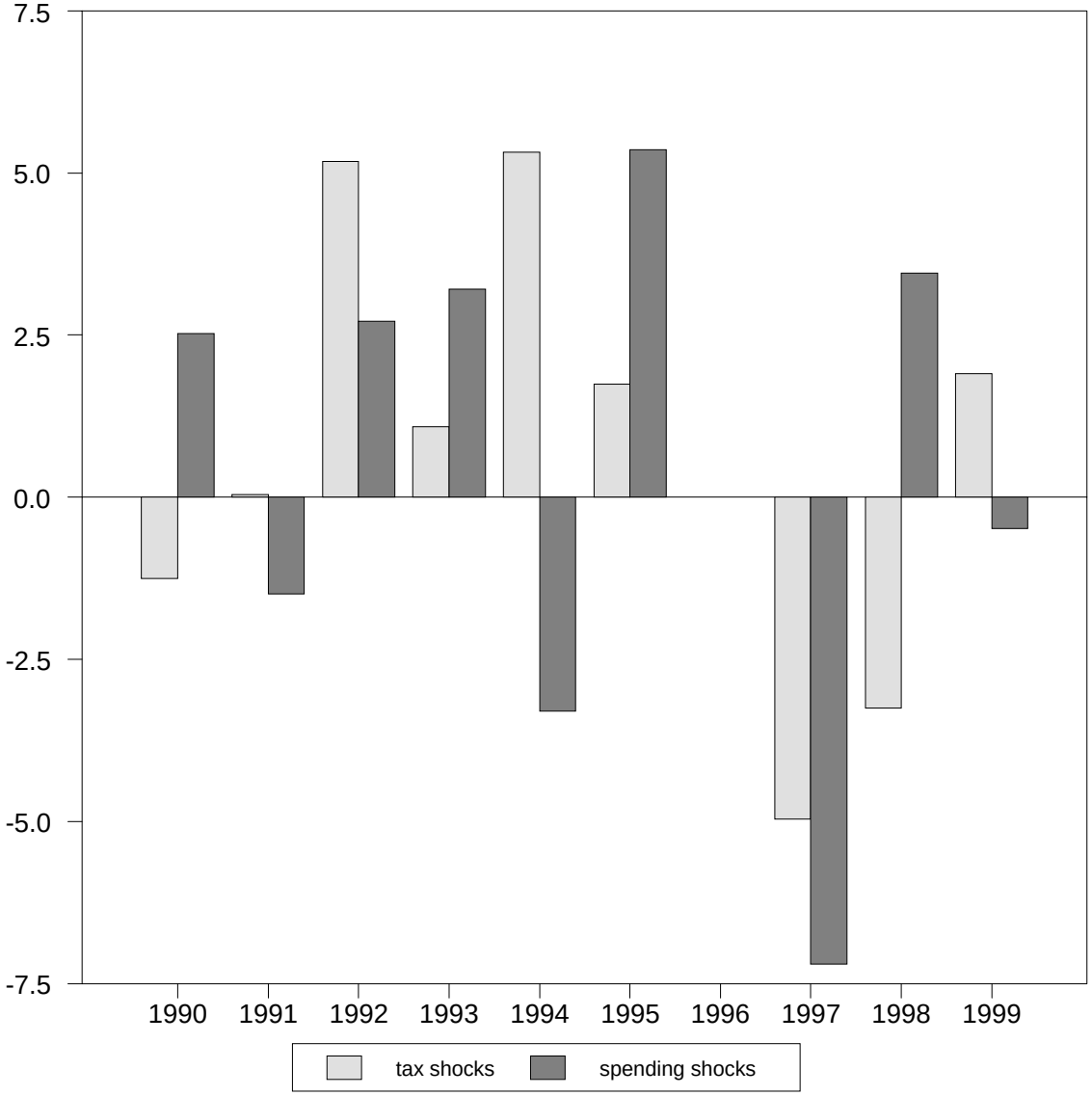
Notes: The dependent variable is private saving, as a share of GNP net of taxes, plus social security payments. Fiscal variables are expressed as a percentage of GNP. Estimation is by OLS on annual data spanning fiscal years 1976 through 1999. Asterisks indicate statistical signficance: *** for 0.01, ** for 0.05, and * for 0.10.

Figure 1: Estimated impulse responses from structural VAR



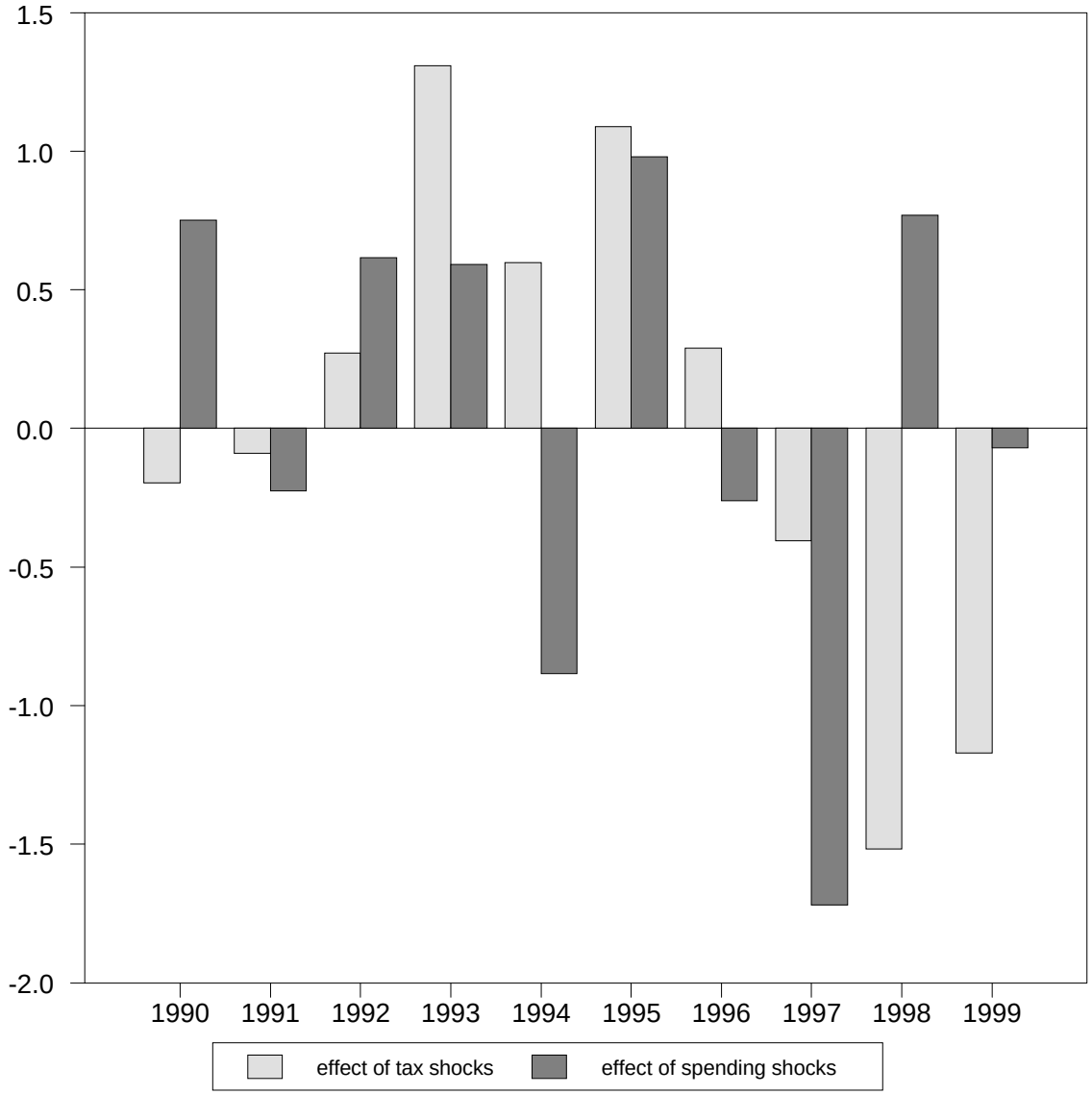
Notes: Standard errors computed via monte-carlo integration. Dashed lines are 90% confidence intervals. No standard errors are given for the contemporaneous effects of GDP and spending shocks on spending, as these are fixed by assumption. The tax shock represents a tax cut, and the spending shock represents a spending increase.

Figure 2: Estimated tax and spending shocks



Notes: The tax shock represents a tax cut, and the spending shock represents a spending increase. Vertical axis scale represents the percentage deviation from the predicted path of spending or taxes in the absence of any shocks. The shocks are zero in 1996, as the model includes a dummy variable for this year to capture the impact of the announced increase in the consumption tax.

Figure 3: Estimated historical impact of tax and spending shocks on real GDP growth



Notes: Estimated impact is from the historical decomposition of the fluctuations of real GDP around its trend into the cumulative impact of the model's shocks.