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Structural Balances and All That: Which Indicators to Use in Assessing Fiscal Policy

Nigel A. Chalk

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**Structural Balances and All That:
Which Indicators to Use in Assessing Fiscal Policy**

Prepared by Nigel A. Chalk[1]

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Abstract

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Structural indicators of a country's fiscal position are regularly used as estimates of both discretionary changes in fiscal policy and the effect of fiscal policy on aggregate demand. This paper looks at such indicators and evaluates, from a theoretical standpoint and from empirical case studies, their usefulness in measuring the size of discretionary policy action or fiscal demand stimulus. Two propositions are examined in detail: first, that the change in the primary structural balance provides a better indicator of discretionary fiscal policy than does the change in the primary balance; and second, that the change in the structural balance is a good indicator of the demand stimulus arising from changes in the fiscal position. In addition, the paper discusses measurement problems relating to structural balances and the use of the fiscal impulse as an alternative to structural balances.

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I. INTRODUCTION

Structural indicators of a country's fiscal position are regularly used to measure both discretionary changes in fiscal policy and the effect of fiscal policy on aggregate demand.[2] This paper looks at such indicators and evaluates, from a theoretical standpoint and from empirical case studies, their usefulness in measuring discretionary policy or fiscal stimulus. Two propositions are examined in detail:

First, that the change in the primary structural balance provides a better indicator of discretionary fiscal policy than the change in the primary balance; and

Second, that the change in the structural balance is a good indicator of the demand stimulus arising from changes in the fiscal position.

In addition, the paper discusses measurement problems relating to structural balances, and the use of the fiscal impulse as an alternative to structural balances.

The paper is organized as follows. Section II looks at a new Keynesian theoretical framework and draws some conclusions from theory concerning the demand impact, structural component, and discretionary component of fiscal policy. Section III takes two well-known case studies (Japan and Germany in the 1990s) and examines how misleading (if at all) equating the structural balance to discretionary policy or to demand stimulus can be. Sections IV and V go on to look at the effects of mismeasuring potential GDP and to what extent structural balances differ from the fiscal stance indicator. Section VI contains concluding comments.

II. A THEORETICAL FRAMEWORK

A simple neoclassical model will inevitably show fiscal policy to have limited effect through the demand side; typically Ricardian properties prevail. In such a model, government spending can be shown to have an effect only through the supply side by entering into the production function or by resorting to externalities (as in Barro, 1990). Taxation even in a neoclassical model, however, can be shown to have demand effects, but only insofar as it distorts either the labor-leisure decision or the consumption-savings decision (lump-sum taxation would have no such effects). As a result, to provide a framework where both public spending and taxation have not only a demand effect but also a multiplier effect, some of the assumptions of the neoclassical model need to be dropped. The key neoclassical assumption to be dropped here is that firms are perfectly competitive and price at marginal cost. A simple model with imperfect competition in the productive sector (along the lines of Mankiw, 1991) leads to some familiar Keynesian properties of fiscal policy.

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[2] See Blanchard (1990) for a discussion.

A. The Model

Households

Two-period lived consumers maximize utility over consumption and leisure when young subject to a budget constraint. Specifically, they

$$\text{max} \quad u(c_t^i) + \beta u(c_{t+1}^i) + v(l_t)$$
$$\text{s.t.} \quad p_t c_t^i + z_t = \left(w_t - l_t + \pi_t \right)(1 - t_t) \tag{1}$$
$$p_{t+1} c_{t+1}^i = R_{t+1} z_t$$

where c_t^i is consumption by generation t when young, c_{t+1}^i is consumption by generation t when old, l_t is leisure, z_t is the savings of the young, p_t is the price of the consumption good, R_t is the return on savings, and π_t is the profit received by the young from their ownership of the firm. Since wages are the numeraire and consumers have an endowment of w_t units of labor when young, then $w_t - l_t$ is total labor income. Both labor income and profits are subject to a uniform income tax at a rate of t_t.

Assuming a simple Cobb-Douglas utility function, consumption by the young is given simply as a constant fraction of total after-tax potential income

$$p_t c_t^i = \phi(w_t + \pi_t)(1 - t_t). \tag{2}$$

Aggregate consumption in period t, assuming for simplicity zero population growth, is given by

$$p_t c_t = \phi(w_t + \pi_t)(1 - t_t) + R_t \beta \phi(w_{t-1} + \pi_{t-1})(1 - t_{t-1}). \tag{3}$$

Government

Government is subject to the usual flow budget constraint

$$B_{t+1} = R_t B_t + G_t - T_t \tag{4}$$

where B_t is the stock of government debt and G_t and T_t are noninterest spending and tax revenue respectively. This flow budget constraint could, of course, be solved forward and a no-Ponzi game restriction applied to yield the usual intertemporal budget constraint. However, this has little impact on the results of the model and so is omitted here. From examination of the individual's budget constraint, total taxes can be written as

$$T_t = t_t(w_t + \pi_t). \tag{5}$$

Firms

There are N firms producing a single good under imperfect competition and facing a unit-elastic demand function and a cost function composed of both fixed costs (f_i) and marginal costs (m). Since the firms play an oligopoly game, they price goods at some margin over marginal cost given by

$$\mu = \frac{p-m}{p} \tag{6}$$

with $0 \le \mu \le 1$. As a result, total profits for each firm i are given as

$$\pi_{i,t} = p_t q_{i,t} - m q_{i,t} - f_i \tag{7}$$

where $q_{i,t}$ is production by firm i. Aggregating across firms and recognizing that

$p_t \sum_{i=1}^{N} q_{i,t} = Y_t$, yields an expression for total profit

$$\pi_t = \mu Y_t - F \tag{8}$$

where $F = \sum_{i=1}^{N} f_i$ is total fixed costs incurred by all firms.

Goods market clearing

Substituting (3) and (8) into the usual national income yields

$$Y_t = \phi(w_t + \mu Y_t - F)(1-t_t) + R_t \beta \phi(w_{t-1} + \mu Y_{t-1} - F)(1-t_{t-1}) + G_t . \tag{9}$$

It should be clear from (9) that it is the assumption of imperfect competition which drives the Keynesian properties of the model presented here (and allows for fiscal policy to effect aggregate demand with a multiplier). An expansionary change in the fiscal position increases aggregate expenditure which, in turn, raises firm profits (since $\pi_t = \mu Y_t - F$). However, since firm profits comprise part of the individual's budget constraint, the fiscal expansion has second-round effects by increasing private consumption and further increasing aggregate expenditure (and thus yields a multiplier effect). As Blanchard and Kiyotaki (1987) point out, the introduction of imperfect competition creates an aggregate demand externality whereby the economy is stuck at an inefficient equilibrium and activist demand management can be used to push the economy to an equilibrium with higher demand, higher profits, and higher aggregate consumption.

B. Discussion

In examining a country's fiscal position, it is important to distinguish among three different concepts that are often used interchangeably but which, in fact, represent quite different ideas:

- the *demand stimulus* provided by the fiscal position;

- the *structural* component of the fiscal position; and

- the *discretionary policy* component of the fiscal position.

These concepts are not necessarily mutually exclusive and indeed there may often be significant overlap among them (for example, the demand stimulus provided to the economy may be closely related to the size of discretionary policy action). However, treating these concepts as synonymous can lead to inappropriate inferences. The theoretical framework outlined above allows for a specific interpretation of each term.

Demand stimulus provided by the fiscal position

Taking total differentials of (9), the impact of the fiscal position on aggregate demand is given by

$$dY_t = \frac{1}{1 - \phi\mu(1 - t_t)} dG_t - \frac{\phi}{1 - \phi\mu(1 - t_t)} dT_t. \tag{10}$$

That is, the demand impact is given by the change in expenditure and tax revenues weighted by their respective multipliers. If the marginal propensity consume is high (i.e., $\phi \approx 1$), the change in the overall balance ($G - T$) will be proportional (but not equal) to the fiscal demand stimulus.

Structural component of the fiscal position

Assume that government spending and taxation are given by

$$G_t = G(Y_t^*) - \gamma(Y_t - Y_t^*) \tag{11}$$

$$T_t = T(Y_t^*) + \tau(Y_t - Y_t^*). \tag{12}$$

with primary spending and tax revenues made up of a "structural" component (given by their levels that would be generated if the economy were operating at full employment Y_t^*), and a cyclical component (reflecting the current position of the economy relative to full employment). The structural component of changes in the fiscal position can be written as

$$dG(Y_t^*) - dT(Y_t^*) = (\gamma - \tau)dY + dG - dT. \tag{13}$$

Table 1 provides three commonly used indicators of the structural component of the fiscal position (see Banca d'Italia, 1999; Chand, 1993; Heller and others, 1986; and Roger and Ongena, 1999). It should be noted, however, that these indicators are not perfect representations of the structural part of the fiscal position and have a number of well-known weaknesses. First, the indicators adjust revenues solely for movements in GDP despite the fact that important tax bases (e.g., consumption and wages), while cyclical, may be poorly correlated with GDP movements. Second, the various methodologies capture the effect of the cycle in a linear way; as such they are unable to pick up nonlinear aspects of a downturn (as would be seen in corporate income taxes for example). Third, the elasticities used to calculate the structural balance are not derived from empirical relationships but instead are a product of marginal and average tax rates estimated from a country's tax code applied to a simulation exercise using the OECD's INTERLINK model.[3] Finally, the structural balance only adjusts for the effect of the cycle on unemployment-benefit spending, whereas there are clearly other cyclically sensitive components of government spending (such as social welfare payments), which are not adjusted.

How does the structural component of the change in the fiscal position relate to the demand effect of fiscal policy given by (10)? From (10) and (13), the difference between the demand effect and the change in the structural component is

$$dG(Y_t^*) - dT(Y_t^*) - dY_t = \frac{\gamma - \tau - \phi\mu(1-t)}{1 - \phi\mu(1-t)}dG - \frac{1 - \phi + \phi(\gamma - \tau) - \phi\mu(1-t)}{1 - \phi\mu(1-t)}dT. \qquad (14)$$

It is clear that the two are equal if and only if $\phi\mu(1-t) = \gamma - \tau = 1$, which will never be true since $\phi\mu(1-t) < 1$. Therefore, using the change in the structural balance as a proxy for the fiscal demand stimulus can either over- or underestimate the demand stimulus and may even predict its direction incorrectly (depending on the combination of parameters).

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[3] See Giorno and others (1995) and Van den Noord (2000) for a description.

Table 1. Alternative Indicators of the Structural Component of the Fiscal Position

Indicator	Interpretation	Formula
Structural balance	What would be the fiscal position if the economy were at potential output?	$T \times \left(\dfrac{Y^*}{Y}\right)^{\varepsilon} \times \left(\dfrac{Y^*_{-1}}{Y_{-1}}\right)^{\varepsilon lag} - \left(G + UB \times \left(\dfrac{U^*-U}{U}\right)\right)$
Fiscal stance	How does the current fiscal position relate to the fiscal position at a point in the past, when the economy was at potential output?	$\left(t_0 \times Y - T\right) - \left(g_0 \times Y^* - G\right)$
Cyclically adjusted balance	What would be the fiscal position if the economy were at the mid-point in the cycle?	$T \times \left(1 - \varepsilon\left(\dfrac{Y-\bar{Y}}{Y}\right) - \varepsilon lag\left(\dfrac{Y_{-1}-\bar{Y}_{-1}}{Y_{-1}}\right)\right) - \left(G - v\left(\dfrac{Y-\bar{Y}}{Y}\right)\right)$

Where Y^* and Y are potential and actual output, $\bar{Y}$ is trend output (a moving average of the actual output over the cycle), UB is the level of unemployment benefits, U^* and U are the natural and actual rate of unemployment, ε and εlag are elasticities, t_0 is the revenue-output ratio and g_0 is spending to potential output in some base year, and v is the elasticity of changes in unemployment benefits to changes in output.

Discretionary policy component of the fiscal position

Assume that the structural component of primary spending and taxation is made up of two parts: that which is determined by policy and that which is due to changes in exogenous factors—such as oil prices, inflation, or exchange rates[4]—which are not related to the output gap.

$$G_t = \sigma_t + G^P(Y_t^*) - \gamma(Y_t - Y_t^*) \tag{15}$$

$$T_t = \theta_t + T^P(Y_t^*) + \tau(Y_t - Y_t^*) \tag{16}$$

where σ_t and θ_t are exogenous shocks and $G^P(Y_t^*)$ and $T^P(Y_t^*)$ are spending and tax policies at full employment. The discretionary policy component of the fiscal position is therefore given by

$$dG^P(Y_t^*) - dT^P(Y_t^*) = \left[\frac{1+\gamma-\tau-\phi\mu(1-t)}{1-\phi\mu(1-t)}dG - d\sigma\right] - \left[\frac{1+\phi(\gamma-\tau)-\phi\mu(1-t)}{1-\phi\mu(1-t)}dT - d\theta\right].\tag{17}$$

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[4] Other exogenous factors could also impact the structural balance (such as changing demographics or shifts in parameters of taste or technology) but these are unlikely to be an important factor in the year-on-year change in structural fiscal aggregates.

It is clear that, by definition, the change in the primary structural balance will be a good approximation of the change in discretionary fiscal policy only if the exogenous factors that affect the fiscal position are relatively unimportant (i.e., $d\sigma$ and $d\theta \approx 0$) *and* the structural indicator appropriately removes the cyclical component from the fiscal aggregates.

C. Summary of Implications From Theory

- If there is an aggregate demand impact of fiscal policy, then the "true" indicator of the demand stimulus provided by the fiscal position is given by the change in the components of the overall balance weighted by their respective multipliers.[5]

- The change in the overall balance may be a good indicator of the direction of the demand impact of changes in the fiscal position but only if the multipliers for each component of the overall balance are similar (i.e., there is a relatively high marginal propensity to consume out of changes in taxes). Even then, the change in the overall balance will underestimate the size of the demand impact up to a linear scalar.

- Even if the change in the structural balance perfectly removes the effect of the cycle from the fiscal position, it will never be a good proxy for the demand impact of fiscal policy as it can either over- or underestimate the demand effect, and may even have the wrong sign.

- The change in the primary structural balance can potentially be a good indicator of changes in discretionary fiscal policy if the fiscal position is little affected by exogenous influences such as exchange rates, interest rates, inflation, and oil prices.

III. CASE STUDIES

With the theoretical underpinnings of the various fiscal indicators established, the paper now turns to two case studies from the 1990s. Comparing the various fiscal indicators requires an estimate for the structural balance, the demand impact of fiscal policy, and the discretionary policy component. Appendix I provides details of how the indicators are arrived at.

A. Case Study 1: Japan 1990–2000

Appendix II provides a brief summary of the prevailing economic environment, the fiscal policy measures undertaken, and the perceived fiscal and macroeconomic policy stance in Japan during the 1990s. The use of the structural balance to proxy discretionary policy changes and the demand impact of fiscal policy are examined in turn.

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[5] Of course, if the Ricardian view is correct, then the "true" indicator of the demand stimulus from fiscal policy is simply zero (since private consumers fully offset the activities of the government).

Does the change in the primary structural balance provide a better indicator of discretionary fiscal policy than the change in the primary balance?

The change in the primary structural balance, and both quantitative and qualitative indicators of the change in discretionary policy, are shown in Figure 1.[6] Overall, the change in the primary structural balance does a mixed job in tracking policy changes during the 1990s. It does not appear to capture well the neutral stance of 1991–92, and it underestimates the scale of expansionary policy in various years (even taking into account possible lags in the execution of the stimulus packages).[7]

On the tax side, the government did little in terms of a *policy* response to the worsening economic conditions prior to 1994 (when a 20 percent reduction in the personal income tax was announced). The next major change in tax policy did not occur until 1997 when, in April, the government increased the consumption tax by 2 percentage points. Following these attempts at consolidation, economic conditions worsened and the government switched to an expansionary stance with tax stimulus packages announced in April 1998 (providing direct rebates to income taxpayers) and in November 1998 (involving cuts to personal and corporate income tax). Figure 2 graphs the estimated size of these various tax measures, along with the calculated change in structural revenues; there appears to be little relation between the two. In the early 1990s, structural revenues declined despite the absence of tax measures, suggesting that the structural revenue indicator fails to adjust fully for the impact of the cyclical downturn during this period or that other exogenous factors (such as the exchange rate or inflation) were simultaneously weakening revenues. Similarly, an expected large increase in structural revenues in 1997, given the increase in the consumption tax, does not show up in the data.[8]

On the expenditure side there was a long list of spending measures introduced throughout the 1990s, largely reflecting the government's efforts to stimulate the economy with higher public works spending. With regard to the change in structural spending in Figure 3, there appears to be a closer relationship between the *direction* of structural primary spending and the qualitative evidence on the timing of the expenditure packages, although there are still some anomalies.[9] However, changes in structural spending are quite far from approximating

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[6] Structural indicators are presented as a percentage of potential GDP while all other indicators are shown as a percentage of actual GDP.

[7] Note that conducting the same exercise on a fiscal year basis does not materially alter the conclusions presented here.

[8] While consumption tax revenues did rise in 1997, this was offset by declines in corporate tax revenues and stagnant growth in other revenues (beyond those that would be predicted by the cyclical adjustment embedded in the structural revenue measure). It could be the case that, since the increase in the tax was anticipated, consumption was brought forward, which lessened the impact of the tax on structural revenues (although there appeared to be little impact on structural revenues in 1996 either).

[9] For example, in 1994, despite a major expenditure effort in late 1993 and early 1994, the overall structural expenditure picture indicates a reduction in expenditure stimulus.

the *size* of the policy changes contained in the supplementary budgets.[10] For example, from December 1992 to December 1993, a total of 3½ percent of GDP in new spending (predominantly new public investment) was authorized in supplementary budgets but the structural stimulus implied in that year shows a change of only around 1 percent of GDP (followed by a withdrawal of stimulus in 1994).

How should these findings be interpreted? First, it appears that the measured structural balance in Japan is not orthogonal to the cycle, indicating an underestimation of the cyclical component of the fiscal balance. Second, while approximating changes in policy *direction* during some years, the structural balance seems to do poorly at estimating the *magnitude* of policy changes.

If the primary structural balance is of little use in estimating the size of discretionary policy changes, does it at least provide a clearer picture than the primary balance? As Figure 4 shows, there is little to choose between the primary balance and the structural primary balance as an indicator of policy change. Neither the change in the primary structural balance nor the change in the primary balance appears to be an accurate representation of discretionary policy changes. There are two notable episodes where the two indicators differ. First, in 1998 the primary structural balance appears to miss the increased stimulus being provided through the supplementary budgets while the primary balance at least partially picks this up. Second, in 1996 the primary balance underestimates, relative to the primary structural balance, the spillover from the August 1995 supplementary budget.

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[10] Posen (1998) has suggested implementation problems at the local level have meant that even the "real water" content of the supplements may overstate the true fiscal policy action by the Japanese government.

Figure 1. Japan: Change in Primary Structural Balance and Size of Supplementary Budgets
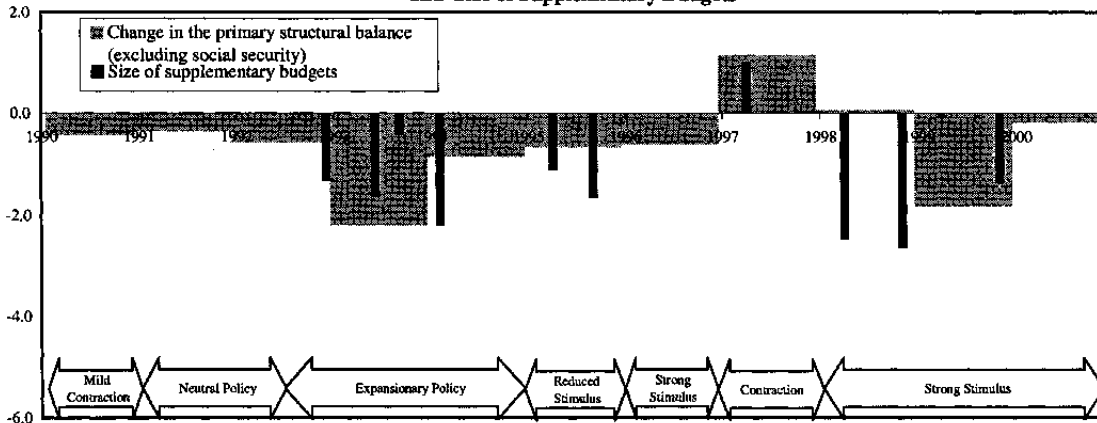

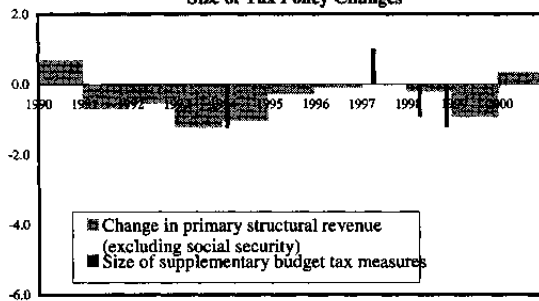**Figure 2. Japan: Change in Primary Structural Revenue and the Size of Tax Policy Changes**

Figure 3. Japan: Change in Primary Structural Expenditure and Size of Supplementary Budget Spending
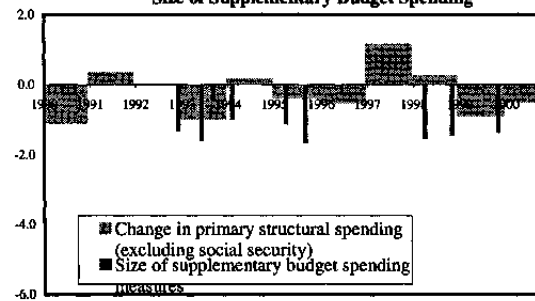

Figure 4. Japan: Change in the Primary Structural Balance, Primary Balance and the Size of Supplementary Budgets
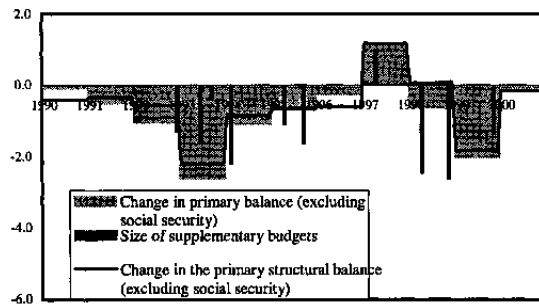
Figure 5. Japan: Change in Structural Balances and Impact of Fiscal on Aggregate Demand
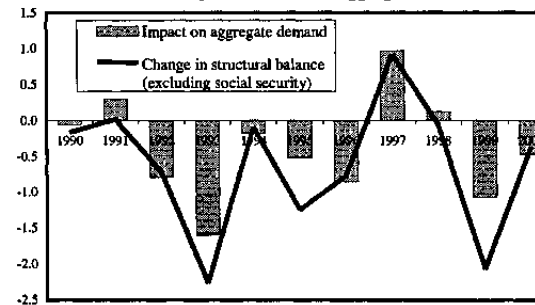
Does the change in the structural balance provide a useful indicator of the demand stimulus arising from changes in the fiscal position?

The demand stimulus, as measured by the weighted change in the fiscal position, is shown in Figure 5 along with the structural balance.[11] It seems that the structural balance and demand impact indicators correspond closely (which is not surprising since much of the demand stimulus was provided by spending changes which have a multiplier close to one). In 1991, the impact on aggregate demand indicator suggests a withdrawal of stimulus while the

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[11] In calculating the aggregate demand impact, national accounts data are used rather than budgetary data.

change in the structural balance would imply no demand stimulus.[12] In 1993, 1995, and 1999, the change in the structural balance seems to overestimate the size of the demand stimulus; during these years, a large part of the stimulus was provided either by a fall in revenues or by shifts in spending to low multiplier categories (which the structural balance implicitly weights the same as changes in spending).

Summary of findings from the Japan case study

Some broad conclusions can be drawn from the examination of the experience in Japan during the 1990s:

- Structural indicators of fiscal aggregates do a poor job of quantifying the scale of discretionary changes in fiscal policy;

- The primary balance and primary structural balance provide equally poor descriptions of changes in fiscal policy;

- There is some evidence that the structural representations of fiscal aggregates do not fully control for the endogenous effect of the cycle on the fiscal position; and

- The structural balance gives a reasonable estimate of the demand impact of fiscal policy, but is unable to capture the demand effects of compositional changes in the fiscal position (since the structural measure implicitly weighs all components of fiscal changes equally).

B. Case Study 2: Germany 1990–1999

Appendix III provides a brief summary of the main policy initiatives and the perceived fiscal policy stance in Germany from 1990–99. How does the experience of Germany during the 1990s shed light on the use of the structural balance?

Does the change in the primary structural balance provide a better indicator of discretionary fiscal policy than the change in the primary balance?

The change in the primary structural balance and the measured change in policy are shown in Figure 6.[13] As can be seen from Figure 6, while capturing the sizeable policy expansion in 1990 and the corresponding withdrawal of stimulus from 1992–94, the change in the primary structural balance poorly captures the tightening of policy in 1995,[14] and also seems

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[12] It appears this difference is due to the use of SNA data to calculate the aggregate demand impact, which differs slightly from the calculation using IMF general government data.

[13] It should be noted that, since there is a structural break in the data in 1991 due to reunification, measures of the change in the fiscal position for that year have to be discarded.

[14] Although the definition of the fiscal aggregates was affected by previously off-budget debt of the Treuhand and housing sector's being brought on budget this should not have affected the *primary* structural balance. The

to underestimate the policy effort that was put in place in the run-up to EMU (both of which seem clear from the quantitative and qualitative evidence).

Examining the structural revenue and spending components separately provides an even more mixed picture. The change in structural revenues seems to go in exactly the opposite direction of policy changes in 1993 (when the VAT was increased to replace the expiring solidarity surcharge) and in 1995 (when the solidarity surcharge was reimposed) (see Figure 7). Similarly, the structural revenue picture would suggest a withdrawal of stimulus in 1999 although the tax changes during that year were likely revenue neutral (or if anything, slightly expansionary with the reduction in the personal income tax burden). Throughout the period the change in structural revenues seems to be a poor guide of the size of the tax policy changes.

The structural spending picture suggests continual expenditure restraint following the 1990-91 spending on reunification, which is in line with both the qualitative and quantitative evidence during this period (see Figure 8). Overall, the structural spending indicator appears to be a reasonable proxy for the direction of expenditure policy changes during the period but, as in Japan, it is a poor guide to the size of such policy changes. This is particularly true for 1997, where the structural spending indicator seems to underestimate the large effort made that year to achieve the Maastricht conditions.

Given that the primary structural balance is a poor representation of policy changes in Germany, does it at least provide a clearer picture of policy change than the primary balance? Figure 9 shows the primary and structural primary balance together. The primary and structural primary balances seem to offer a similar picture of the direction of policy except in two years—1993 and 1996—where growth took a sharp downturn. In 1993 the structural balance provides a more reliable indicator of policy direction, while for 1996 there is little to choose between the two indicators. There appears, therefore, to be some evidence to favor the structural balance as an indicator of policy change in Germany—where automatic stabilizers are stronger—than in Japan. However, the fact remains that neither the structural primary nor primary balance provides a good indicator of the size of policy adjustments.[15]

Does the change in the structural balance provide a useful indicator of the demand stimulus arising from changes in the fiscal position?

Figure 10 shows the relation between the weighted budget balance and the structural balance. As is clear from the figure, the change in the structural balance appears to be a poor indicator of the level of demand stimulus. In 1992, 1993, and 1996 the structural balance incorrectly

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main reason the primary structural balance shows a neutral picture in 1995 is because of a corporate revenue shortfall—resulting from the lagged effect of the 1992–93 recession and the increased use of East German investment incentives during that year.

[15] Both seem to miss out on the withdrawal of stimulus in 1995 and the scale of the policy actions taken in 1997.

predicts the *direction* of the demand stimulus. For example, in 1992, while policy measures, primarily on the revenue side, reduced the deficit, the structural balance was unable to pick up the fact that the revenue consolidation was outweighed by both an increase in total spending and a shift of spending from low to high multiplier components. In 1993 and 1996, on the other hand, the structural indicator (adjusting for the cyclical downturn at the time) indicates a withdrawal of stimulus even though the deficit in these years rose (mostly due to higher unemployment spending). Overall, the structural balance in Germany is a deceptive indicator of the size of economic stimulus being provided by the fiscal position. In a downturn the structural indicator can indicate a reduction in stimulus despite an increase in the overall balance (e.g., if the government is pursuing procyclical fiscal policies that work against the automatic stabilizers). Similarly, where there are sizeable compositional changes in fiscal policy (e.g., from low to high multiplier components) the structural balance provides misleading information on the size and even the direction of fiscal stimulus.

Summary of findings from the Germany case study

The preceding discussion of the conduct of fiscal policy in Germany during the past 10 years leads to some general conclusions:

- The structural indicators of fiscal aggregates, particularly structural revenue, are imperfect descriptors of the size of discretionary policy changes in Germany.

- Unlike Japan, structural indicators are preferable as indicators of policy direction.

- The change in the structural balance is a misleading indicator of the demand impact of fiscal policy in Germany.

**Figure 6. Germany: Change in the Primary Structural Balance
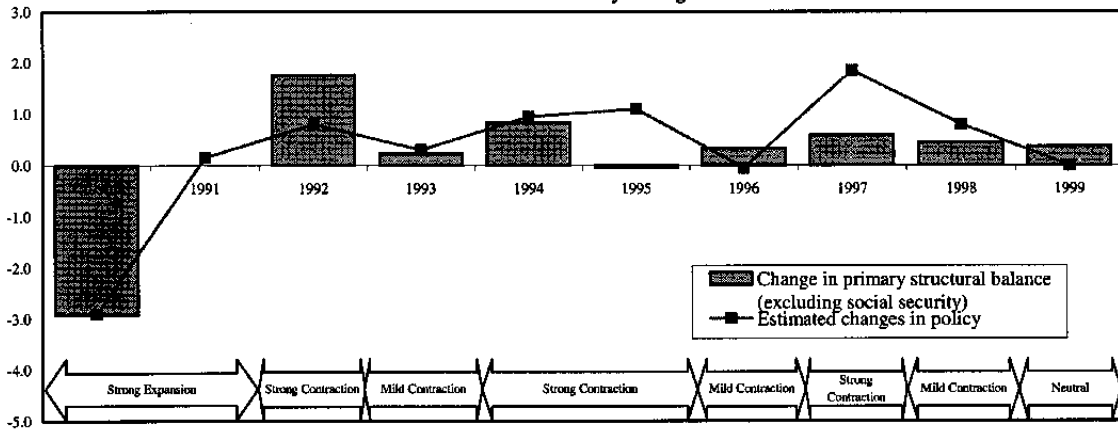and the Size of Policy Changes**

Change in primary structural balance
(excluding social security)
Estimated changes in policy

Strong Expansion | Strong Contraction | Mild Contraction | Strong Contraction | Mild Contraction | Strong Contraction | Mild Contraction | Neutral

Figure 7. Germany: Change in Primary Structural Revenue and the Size of Tax Policy Changes

Change in primary structural revenue

Estimated changes in tax policy
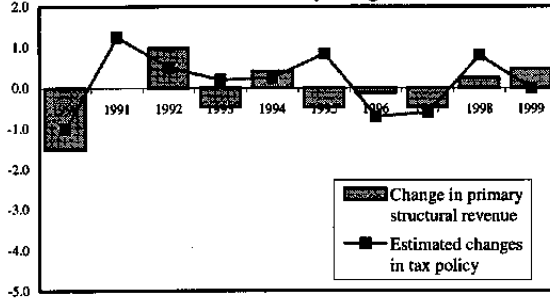
Figure 8. Germany: Change in the Primary Structural Expenditures and the Size of Expenditure Policy Changes

Change in primary structural expenditure

Estimated changes in expenditure policy
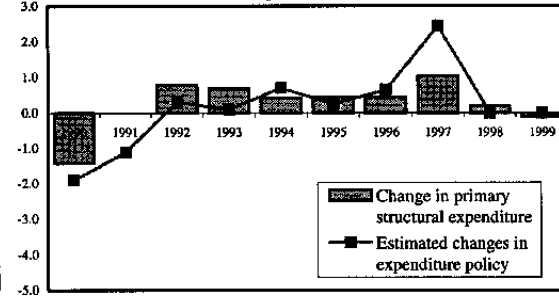
Figure 9. Germany: Change in the Primary Structural Balance, Primary Balance and Change in Policy

Change in primary structural balance (excluding social security)
Change in primary balance (excluding social security)
Estimated changes in policy

Figure 10. Germany: Change in the Primary Structural Balance and Impact of Fiscal on Aggregate Demand

Impact on aggregate demand

Change in structural balance (excluding social security)

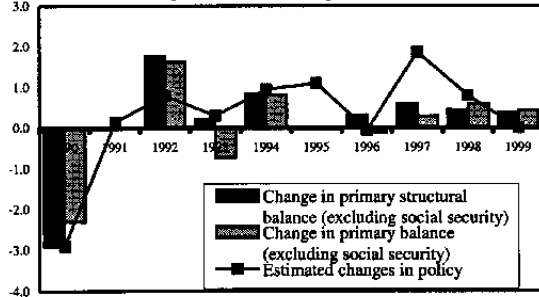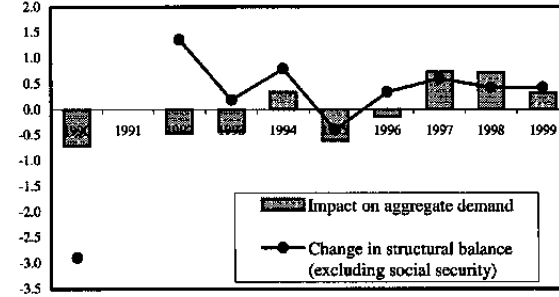## IV. IMPACT OF ERRORS IN MEASURING POTENTIAL OUTPUT

Implicit in the discussion above has been the acceptance that potential GDP, a necessary ingredient in the structural balance calculation, is a measurable construct. There are several methodologies for calculating potential output (see Cerra and Saxena, 2000) but inevitably each method provides an inexact measure of the true level of potential output. However, determining to what extent such measurement errors distort the economic assessment of fiscal policy using indicators such as the structural balance is ultimately an empirical question. Some have argued that uncertainty in measuring potential output (or the growth of potential output) means that structural balances are measured with considerable imprecision and thus should not be relied upon.

Figure 11. Impact of Mismeasuring the Level of Potential Output
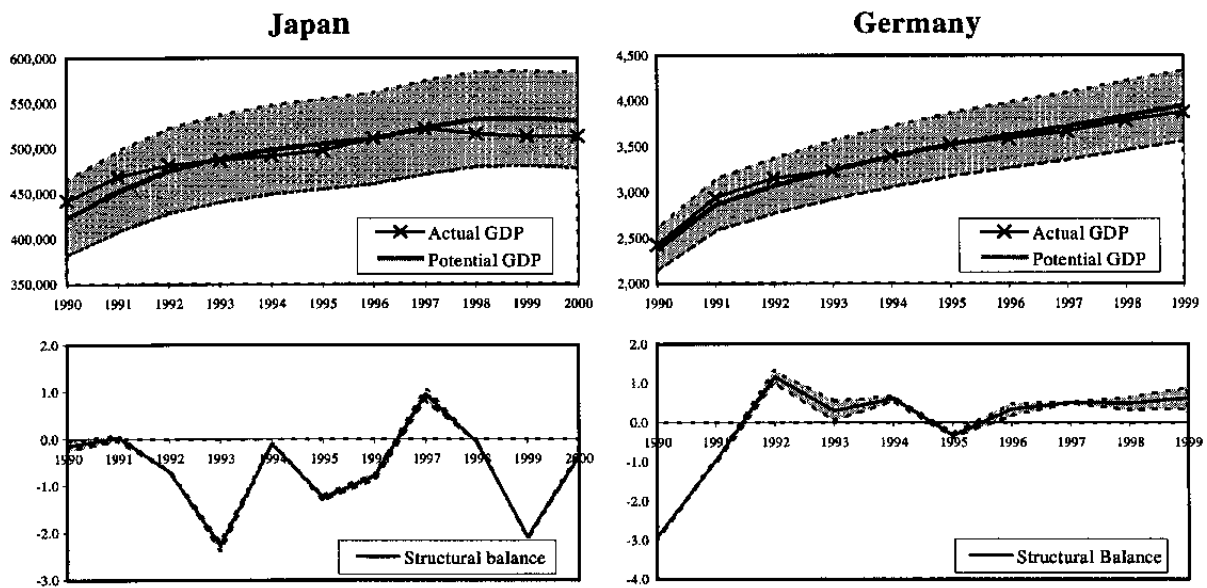
Shaded area represents 95 percent confidence intervals in the distribution.

To test this hypothesis a simulation exercise was carried out in two parts. First, a normal distribution was assumed around the *level* of potential output to represent priors on the uncertainty in measuring potential output. This distribution was then translated, via simulation, into a distribution around the measured change in the structural balance for Japan and Germany. For both countries, as Figure 11 shows, despite a wide range of assumed error in the *level* of potential output (with 95 percent of the distribution within ±10 percent of

calculated potential output), there was virtually no impact on the calculated change in the structural balance.[16]

The second experiment was to assume an error in the estimates of the *growth rate* of potential GDP. As Figure 12 shows for Japan, variance bounds taken around the calculated growth in potential (of ± 1 percent growth rates) lead to a wider error on the size of the structural balance than with mismeasurements in the level of potential GDP. However, despite these relatively large potential growth rate measurement errors, the effect on the structural balance is relatively modest; as a rough rule of thumb, a one percent error in the growth rate of potential GDP translates into a ¼ percent of potential GDP error in the change in the structural balance. In Germany, the possible measurement errors in the structural balance are somewhat larger than in Japan due to the stronger cyclical effects. A 1 percent error in the potential growth rate translates into around 0.4 percent of GDP error in the calculated structural balance position. While not insignificant, the errors in measurement of the structural balance resulting from misestimation of potential growth rates are unlikely to have a material impact on fiscal policy analysis (especially when viewed relative to the potential shortcomings of structural measures discussed above).

Figure 12. Impact of Mismeasuring Growth in Potential Output
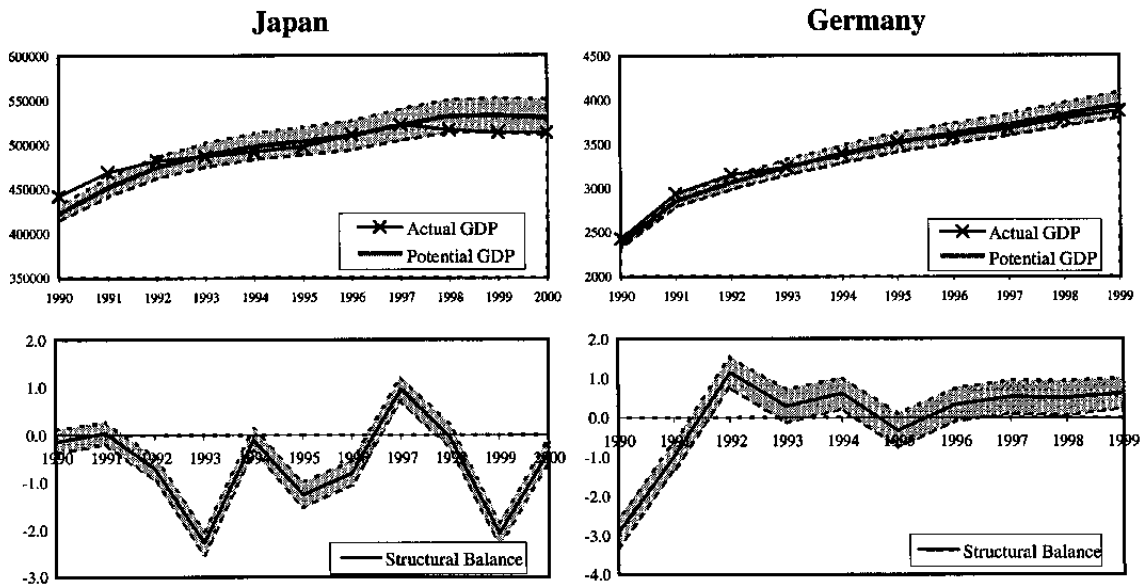
Shaded area represents 95 percent confidence intervals in the distribution.

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[16] This helps explain why changes in the cyclically adjusted balance are virtually identical to those of the structural balance since the primary difference between the two constructs is the level of trend or potential GDP used.

These simulation exercises suggest that concerns over the mismeasurement of potential GDP are somewhat misplaced and should not overly influence our perception of the usefulness of the structural balance indicator.

V. STRUCTURAL BALANCE OR FISCAL STANCE?

The fiscal impulse indicator (see Table 1) is sometimes used as an alternative to the change in the structural balance for cyclically adjusting the fiscal position. A question arises then as to whether the fiscal impulse is any better at capturing either the change in fiscal policy or the size of the demand stimulus. As Figure 13 demonstrates, for Japan and Germany there is actually no difference between the fiscal impulse indicator and the change in the structural balance during the 1990s. Certainly, one is not to be preferred over the other as an indicator of policy or the size of demand stimulus being provided by the fiscal position; they both are subject to the same shortcomings. However, given that the fiscal impulse is a simpler indicator to calculate, it perhaps should be preferred as a method for removing the cyclical component from the fiscal position.

Figure 13. Comparison Between Fiscal Impulse and Changes in the Structural Balance
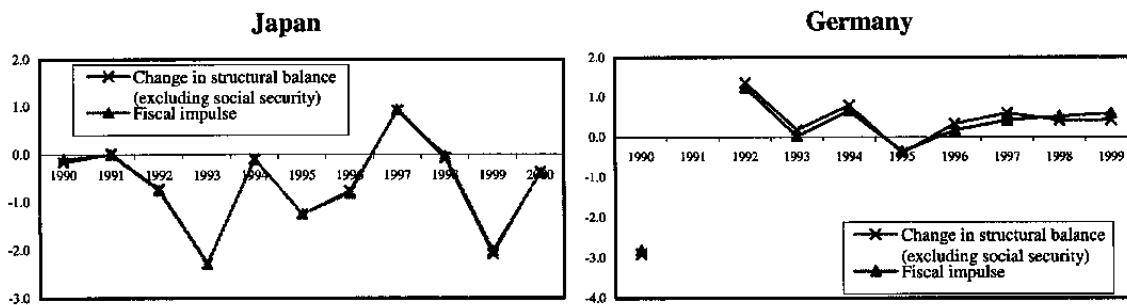
VI. SUMMARY AND CONCLUSIONS

The case studies of Japan and Germany during the 1990s, in conjunction with findings from a simple theoretical model, lead to several conclusions concerning the various indicators of the fiscal position described in this paper. These can be split into findings from theory and those from the two case studies.

A. Findings From Theory

- Structural balances do not, except under extremely unlikely conditions, measure changes in the demand stimulus. Indeed, if most of the stimulus is from the expenditure side, the overall balance is perhaps a preferred indicator of demand stimulus. Where changes in taxes or compositional changes in spending are important, both the structural and overall balance can be equally misleading as indicators of demand stimulus.

- Changes in the primary structural balance do not measure changes in policy although, in theory, they may provide a reasonable approximation in the absence of exogenous shocks. This would imply in normal times, when variables such as exchange rates, inflation, and oil prices are relatively stable, that changes in the primary structural balance may provide a reasonable approximation of policy change.

- There should be greater usage of the demand impact indicator, which weighs fiscal balance components by their multiplier, in describing the evolution of the fiscal position. This is particularly important in countries that have experienced large compositional changes in their fiscal positions. To do this, reliable empirical estimates of the fiscal multipliers for the various components of the fiscal position will need to be developed.

B. Findings From Case Studies

- As predicted by theory, in the cases of Japan and Germany, structural indicators appear to correspond poorly to the size of the demand stimulus provided by fiscal policy.

- Structural fiscal aggregates also appear to be poor descriptors of discretionary policy changes. There does, however, appear to be a closer relationship on the spending side between the change in structural fiscal aggregates and changes in policy than on the revenue side.

- Mismeasuring potential output should, at most, be of secondary concern when deciding the usefulness of the structural balance or fiscal impulse indicators. While errors in the potential growth rate have some impact on the preciseness of the structural estimates, these shortcomings are probably small relative to the other reasons, described above, to doubt the value of structural measures (i.e., such as their inability to proxy policy changes or demand stimulus).

- There seems to be only a minor difference between the fiscal impulse and the change in the structural balance, despite the structural indicator's purporting to have a stronger theoretical basis. Indeed, in a sample of the OECD countries from 1985 to 2000, the correlation between the change in the structural balance and the fiscal impulse was almost 1. Given that the fiscal impulse is an easier indicator to calculate it should perhaps be preferred (although, as described above, both indicators have significant shortcomings).

APPENDICES

I. INDICATORS OF FISCAL POLICY

Structural balance

For the structural balance, the IMF indicator is used (see Hagemann, 1999) whereby the structural balance is equal to

$$T \times \left(\frac{Y^*}{Y}\right)^{\varepsilon} \times \left(\frac{Y^*_{-1}}{Y_{-1}}\right)^{\varepsilon lag} - \left(G + UB \times \left(\frac{U^* - U}{U}\right)\right).$$

Potential output and the natural rate of unemployment are from IMF World Economic Outlook estimates. The structural balance is expressed as a ratio of potential output. However, the OECD and European Commission structural and cyclically neutral measure would yield broadly similar results to using the IMF structural balance indicator (with the correlation between first differences in IMF, EU, and OECD measures for Germany and Japan during the 1990s being over 0.9).

Demand impact

The demand impact of fiscal policy is measured by the weighted budget balance (i.e., the change in fiscal aggregates weighted by their multipliers). For both Japan and Germany multipliers of 0.5 for changes in net public savings and 1.2 multipliers on changes in consumption and capital spending are assumed. The multiplier estimates for Japan are derived from theoretical policy experiments conducted in the Fund's MULTIMOD model of the Japanese economy (See Lipworth and Meredith, 1998). Given the absence of empirical evidence that there are different structural parameters underlying the multipliers for Germany (e.g., personal savings rate etc.), the German multipliers are assumed to be similar to those for Japan. In addition, it is noted that Bryant (1993) finds spending multipliers for Germany in the range of 0.6 to 1.3 while the OECD's INTERLINK model has short-term spending multipliers for Germany of around 1.0.

It would, in fact, be preferable to derive empirical estimates of multipliers. Attempts were made to estimate the multipliers directly from time series data using a similar VAR approach to that of Bayoumi (1999). However, results of such regressions proved unreliable. This is particularly true for Japan (where a number of analysts have suggested there have been structural shifts in the size of tax and spending multipliers during the 1990s with concerns repeatedly raised over the declining effectiveness and efficiency of public works programs). It could be that a more sophisticated methodology that imposes identifying restrictions (such as in Blanchard and Perotti, 1999) would yield better results, but this is left for future research. Given the varying evidence on the size of multipliers in Japan and Germany, however, a concern remains that the demand impact indicator used here may be mismeasured.

Discretionary policy

Arriving at estimates of the change in discretionary policy is somewhat more complicated than the mechanical estimates that yield the structural balance or weighted budget balance. One has to confront questions of what exactly constitutes discretionary policy action. For example, if a country indexes wages or income tax brackets in response to inflation does that constitute a discretionary policy action or is it simply a continuation of past policies? Here two sources of evidence are used.

First, the paper surveys the **qualitative** evidence on the timing of fiscal policy measures implemented by the government. While there may be some disagreement among observers as to specifics, there is a general consensus on the main policy measures introduced during the 1990s in the two countries. Appendices II and III summarize these policy initiatives and provide a summary of the general direction of fiscal policy as indicated in the assessments by IMF staff, the Economist Intelligence Unit, and the OECD. This qualitative evidence attempts to capture both the general direction of fiscal policy and also some indication of the scale of the fiscal expansion or contraction.

Second, a **quantitative** view is estimated. For Japan the quantitative size of fiscal stimulus is given by the "real water" content of the various stimulus packages. The underlying presumption is that the original budget is one of "no policy change" which seems to be borne out, for example, by the statement in the IMF Staff Country Report (Morsink, 2000) that "the government's main tool for implementing expansionary fiscal policies has been a series of large stimulus packages" and by Mühleisen (2000) that "the demand impact of the stimulus package has largely been limited to the so-called 'real water' measures". However, it is noted that this "real water" measure must be treated with some caution since Posen (1998) suggests that the "real water" content of the stimulus packages actually overestimates the true fiscal stimulus provided to the Japanese economy (and thus colors any analysis of the effectiveness of fiscal policy action in Japan). For Germany, bottom-up estimates of the size of each of the various tax and expenditure initiatives were estimated from assessments by IMF staff. These were then aggregated to give a quantitative measure of the size of policy actions on the revenue and spending side.

While these are clearly imperfect quantifications of the true discretionary policy changes in the two countries—for example, there may be some policy changes that are part of the original budget in Japan or the IMF staff estimates of the size of policy change for Germany may be imprecise—it is believed that such estimates represent a best approximation of the magnitude of discretionary policy changes during the period under examination.

II. JAPAN: QUALITATIVE SUMMARY OF FISCAL POLICY, 1990–99

	Economic environment	Policy Measures	Stance
1990	In the midst of an overheating economy with high levels of capacity utilization and robust domestic demand, asset price bubble bursts in late 1989.	Policy of fiscal consolidation continues with slight reduction of fiscal stimulus through only modest increases in FILP loans, strong growth in PIT receipts, and tax increases of ¼ percent of GDP.	Mild Consolidation
1991	Growth slowdown becomes apparent in private consumption and business and residential investment.	Central government deficit rises by ¾ percent of GDP due to cyclical decline in tax revenues and some small tax increases and spending cuts. Fiscal stance is broadly neutral.	Neutral
1992	More concrete signs of slowing appear. Equity prices fall sharply in mid-1992.	• Original budget is neutral but front-loading of public works and automatic stabilizers on the revenue side lead to an expansionary fiscal stance. • Supplementary budget is announced in August (but passed in December) of 2 ½ percent of GDP (including public investment by 1 ¼ percent of GDP).	Expansionary Demand Management
1994	Signs of economy bottoming out with strong growth in 93Q4 and 94Q1 from increased private consumption.	• Large fiscal package is announced in February including temporary 20 percent reduction in PIT (costing 1 ¼ percent of GDP) and higher spending. • Later in year temporary tax cut is replaced with permanent upward shift in PIT brackets. • Increase in consumption tax is planned for 1997. • Concerns are raised about effectiveness and efficiency of public investment.	Expansionary Demand Management

Year	Economic Developments	Fiscal Policy Developments	Stimulus Category
1995	Weak recovery in 1994 shows signs of strengthening in early 1995 but by mid-year Kobe earthquake, appreciating yen, and terrorist attack in Tokyo lead to signs of weakening.	• Public investment program falls off sharply in 95Q1 as supplements unwind. • Kobe earthquake leads to supplement of ½ percent of GDP in May. • Major increase in public investment (of 1 ½ percent of GDP) is passed in September, much of which spills over into 1996.	Reduction in Stimulus
1996	Private consumption picks up in late 1996 and economy appears to be in recovery.	Public investment program contributes strongly to growth during year.	Strong Stimulus
1997	• Early in year signs of recovery appear. • By late year it becomes clear the economic momentum is insufficient to absorb consolidation and economy reenters slowdown.	• Focus of fiscal policy turns to consolidation although there is some concern about the ability of the economy to weather withdrawal of stimulus. • FSRA is passed in November. • There is a 10 percent real decline in public investment as stimulus unwinds. • Consumption tax increases 2 percent • Some temporary tax cuts expire. • Household medical insurance co-payments increase.	Consolidation
1998	Severity of downturn becomes apparent.	• Initial budget is for tight spending in line with FSRA. • April stimulus package of 2 ½ percent of GDP of public investment and tax relief (including direct rebates to income taxpayers) are introduced. • Large November package of 5 percent of GDP cuts personal and corporate income tax, increases credit guarantees for SME, provides temporary consumption vouchers and boosts public works spending.	Strong and Rising Stimulus
1999	Economy continues in recession.	• Surge in public investment supports activity in later part of 1998 and 1999. Concerns that fiscal multipliers are low and fiscal policy less effective demand a management tool. • Focus in financial markets on the sustainability problem increases. • Local governments reduce investment due to statutory borrowing limits. • November 1999 supplement of 1 ½ percent of GDP in public works passes, and makes permanent some of the temporary tax reductions of 1998. • Welfare spending rises with higher unemployment.	Strong and Rising Stimulus

III. GERMANY: QUALITATIVE SUMMARY OF FISCAL POLICY, 1990–99

	Economic environment	Policy Measures	Stance
1990	There is high real growth in West but precipitous fall in output in East.	• January income tax reform reduces tax burden by 1 percent of GDP. • Three supplementary budgets expand expenditure on East Germany. • Array of regional investment incentives is introduced.	Strong Expansion
1991	Economy slows in mid-1991 with private consumption slowdown (as a response to tax and social security increases).	• Spending measures (0.5 percent of GDP) include reduced defense spending, deferral of investment outlays to partially offset increased spending on East. • Revenue measures (1 ¼ percent of GDP in 1991 and 1 percent of GDP in 1992) include an increase in unemployment insurance contribution rates, increased contributions from federal post office, an increase in indirect tax on mineral oil, insurance premiums, and tobacco, and a 7 ½ percent PIT and CIT surcharge.	
1992	• Activity in second half shows pronounced weakening with consumer and business confidence turning down sharply; manufacturing particularly hard hit. • Monetary conditions in 92Q4 ease.	• 1992 budget includes real cuts in spending. • Solidarity surcharge expires in mid-year. • Estimated withdrawal of stimulus at general government level follows strongly expansionary stance in 1990–91.	Strong Contraction
1993	• DM appreciates. • Weak economic outlook continues with contraction in domestic demand and weak demand in Europe. • Downturn bottoms out in second-half of year.	• VAT increases 1 percent. • Withholding tax on interest income is introduced. • Transfers to lower levels of government are reduced. • Solidarity Pact is concluded with a fiscal consolidation program and an agreement on splitting unification costs between federal and lower level governments; it becomes effective in 1995.	Mild Contraction

1994	Beginnings of an export-led recovery appear.	• Petroleum tax is increased. • Low public sector wage is increased. • Replacement ratio for unemployment benefits is reduced and family assistance programs are streamlined (0.7 percent of GDP). • Some tax shelters and loopholes (0.1 percent of GDP) are eliminated.	Strong Contraction
1995	• In first half economy continues a steady recovery with output above prerecession peak. • Recovery is derailed in second half by sharp real exchange rate appreciation and large wage increases. • Monetary easing occurs towards end-year.	• 7 ½ percent solidarity surcharge is reimposed on CIT and PIT (amounting to ¾ percent of GDP). • Wealth and insurance taxes (0.1 percent of GDP) increase. • Expenditure savings are made on interest investment and others (¼ percent of GDP). • Previously off-budget (Treuhand and housing sector) debt is brought on budget (adds about ½ percent of GDP to the deficit). • There is an unanticipated federal corporate revenue shortfall due to lagged effect of 1992–93 recession and use of east German investment allowances.	
1996	• First half is effected by harsh winter's hitting construction, slow export growth. • Second half sees a resumption of growth as the real exchange rate weakens. • Private consumption remains stalled due to unemployment rate's hitting record high and flat disposable income.	• Government complies with constitutional court ruling to exempt subsistence income from taxation (costs ½ percent of GDP). • Child benefits are increased (by 0.1 percent of GDP). • Court outlaws levy on electricity to pay for coal subsidies (costs 0.2 percent of GDP). • Government takes over previously extrabudgetary pension and debt obligations of railways (adds ¼ percent of GDP to deficit). • Plan is introduced to offset tax losses with personnel reduction, cuts in transport sector investment, and restrictions on unemployment assistance (¼ percent of GDP). • Special East German investment allowance is phased out.	Mild Contraction
1997	• Economic recovery remains export-dependent. • Unemployment rate further increases.	• 1 ½ percent of GDP expenditure savings are made, including wage restraint and reductions in government employment, reduced spending on active labor market policies, lower subsidies for coal and agriculture, reduced sick pay, curtailed spa visits paid from health insurance, increase in minimum age for receiving unemployment insurance. • There is a 1 percent cut in solidarity surcharge, abolition of wealth tax on business trading capital, modifications to local CIT rules, and changes to inheritance and gift tax (combination of which are revenue neutral). • To meet Maastricht, one-off measures with discretionary spending are frozen (saving 0.1 percent of GDP) and hospital spending is reduced (saving ¼ percent of GDP). • Childcare is changed from expenditure to tax allowance (reducing spending and revenue by 0.6 percent of GDP).	Strong Contraction

1998	• Recovery becomes stronger and more balanced. • Unemployment declines mainly due to increase in active labor market programs. • Growth stalls in late-98 due to Russia crisis.	• In April there is a 1 percent increase in VAT and 2 percent reduction in solidarity surcharge (net revenue measures of 0.8 percent of GDP). • There is a Bundesbank transfer from the revaluation of forex holdings.	Mild Contraction
1999	• Monetary conditions are eased. • Economic upswing is seen by mid-1999.	• In March PIT rate cut provides tax relief for households. • In April taxes on energy use are introduced. • In June the tax on retained profits is reduced and the shift away from imputation begins. • Combination of base broadening and rate reductions is revenue neutral.	Neutral

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