International Finance 5:2, 2002: pp. 251–284

A New Design for Automatic Fiscal Policy*

Laurence S. Seidman and Kenneth A. Lewis
University of Delaware.

Abstract

We offer a new design for automatic fiscal policy that can strengthen its role as a complement to counter-cyclical monetary policy, and analyse it in the Fair macroeconometric model that has been estimated using quarterly data for the US economy. Our automatic fiscal policy consists of the triggering of a transfer (or income tax rebate) whenever real GDP is at least *X*% below normal, the amount of the transfer varying with the size of the GDP gap. The size of the transfer is set with the sole purpose of effectively combating a recession. By contrast, the magnitudes of current automatic stabilizers are unintended by-products of setting the ratio of tax revenue to GDP, the degree of progressivity of the tax system and the level of unemployment benefits. We generate a severe recession using historical data and simulate the impact of our automatic fiscal policy. We assume that the Federal Reserve adheres to a counter-cyclical monetary policy governed by the interest rate (Taylor) rule estimated from historical data. We find that the interest rate rule alone mitigates the severe recession only modestly, whereas our automatic fiscal policy (together with the interest rate rule) substantially reduces the severity of the recession while generating only a relatively small rise in the government debt/GDP ratio.

*We are grateful to Ray Fair for access to, and advice on using, his model, to Charles Steindel and Olivier Blanchard, discussants of our paper at the conference 'Stabilizing the Economy: What Roles for Fiscal and Monetary Policy?', Council on Foreign Relations, 11 July 2002 and to an anonymous referee for very helpful comments.

I. Introduction

Might monetary policy need help in combating a recession? In the 2001 US recession, the Federal Reserve cut the federal funds rate almost to its floor (from 6.50% to 1.75%). The Bank of Japan went to the floor in its attempt to combat the stagnation of the Japanese economy in the 1990s. We accept the dominant view that monetary policy should play an important counter-cyclical role, but believe it is essential to strengthen automatic counter-cyclical fiscal policy so as to reduce the risk that monetary policy will run out of ammunition fighting a recession. Although economists are justifiably sceptical that Congress can implement *discretionary* counter-cyclical fiscal policy in a timely and effective manner, most believe that *automatic* fiscal stabilizers are useful. In this paper, we offer a new design for automatic fiscal policy that can strengthen its role as a complement to counter-cyclical monetary policy. Our automatic fiscal policy consists of the triggering of a transfer (or income-tax rebate) whenever real GDP is at least X% below normal, the amount of the transfer varying with the size of the GDP gap.[1] The size of the transfer is set with the sole purpose of effectively combating a recession. By contrast, the magnitudes of current automatic stabilizers are unintended by-products of setting the ratio of tax revenue to GDP, the degree of progressivity of the tax system and the level of unemployment benefits.

Why an automatic policy? Discretionary fiscal policy often takes too long to move through the legislative process, although this is not always the case. In the 1975 recession, from the time Republicans shifted their top priority from inflation to recession (January 1975), thereby joining the Democrats, it took just three months for a tax cut stimulus package to be enacted, and cheques to households were sent out in the next three months. In the 2001 recession, Congress and the President enacted tax legislation in June, and tax rebate cheques were mailed to households in the next three months. However, even these two cases illustrate the importance of making the policy automatic. In 1975, an automatic policy would have sent cheques out beginning in January, rather than April. In 2001, action occurred in June because tax legislation that was aimed at long-run objectives, not recession, had been introduced at the beginning of 2001 by President Bush. As the economic slowdown became evident in mid 2001, it was easy for Congress to tack on a tax rebate at the last minute to a comprehensive tax bill that had been debated for a half year. In the fall of 2001, with the recession deepening, Republicans and Democrats deadlocked over the best way to further stimulate the economy. Experience therefore suggests that it is important to make counter-cyclical fiscal policy

[1]Fair (1999, 2001) considers automatic variation of the indirect business tax. Taylor (2000) considers a more complex rule involving variation of the actual budget surplus.

automatic. The automatic policy can always be over-ridden by discretionary action by Congress and the President. The automatic policy is simply a default position: if Congress fails to take discretionary action, stimulus is promptly triggered by the decline in the economy.

Whereas an automatic fiscal policy may prove essential in combating a severe recession, it would be desirable, even if not essential, in combating a moderate recession. We will present simulations that show that, even if the Federal Reserve cuts the interest rate to zero, it will not be enough to overcome a severe recession. By contrast, the Federal Reserve can, by itself, overcome a moderate recession by cutting the interest rate to near zero. However, an automatic fiscal policy is still desirable for three reasons:

1 Using transfers as well as interest rate cuts is likely to produce a more balanced sectoral response to the recession.
2 It avoids having the Federal Reserve use up virtually all its ammunition; if the Federal Reserve is compelled to cut interest rates to near zero to handle a moderate recession, the public may ask itself, 'What will happen now if the recession becomes severe?' and the obvious answer, that the Federal Reserve would be inadequate, may further weaken demand, converting a moderate recession into a severe one.
3 Placing all our eggs in the basket of monetary policy seems unwise when there is some uncertainty about the impact of the effectiveness of the monetary transmission mechanism in all circumstances.

Branson (1973), Feldstein (1976) and Modigliani and Steindel (1977) – and, recently, Feldstein (2001) and Blinder (2001) – have argued that a temporary consumption tax cut might be an effective instrument of counter-cyclical fiscal policy because it provides an incentive for consumers to spend before the temporary cut is terminated. We find their argument plausible and regard it is an important topic for future research. This policy could be implemented through the value-added tax (VAT).[2] We suspect that such an automatic temporary consumption tax cut would be a useful complement to the automatic transfer (tax rebate) analysed in this paper. In this paper, however, we propose and analyse an automatic transfer (or income-tax cut) because, despite the permanent income and life-cycle hypotheses, in our judgement, recent empirical studies show that there is sufficient short-run response of consumption to temporary changes in disposable income due to transfers or income-tax cuts to make such a policy sufficiently effective.

[2]We discuss the design of a temporary cut in a value-added tax (VAT) in Seidman and Lewis (2002). Unlike most other countries, the USA does not currently have a VAT. We show how a VAT can be made progressive by being coupled with VAT rebates implemented through the 15 April income tax.

II. Recent Empirical Studies

In the past decade, empirical studies have challenged the validity of the extreme versions of the permanent-income and lifecycle hypotheses. Although permanent or life cycle income remains important for predicting consumption, it appears that current disposable income does, after all, also have an important impact on consumer spending. Mankiw (2000, p. 120) reviews empirical studies on consumption behaviour and comments:

> A large empirical literature … has addressed the question of how well households intertemporally smooth their consumption. Although this literature does not speak with a single voice, the consensus view is that consumption smoothing is far from perfect. In particular, consumer spending tracks current income far more than it should.

Mankiw looks at empirical studies that examine whether households keep their consumption steady (smooth) despite fluctuations in their current disposable income or, instead, adjust their consumption to changes in their disposable income. For example, Campbell and Mankiw (1989) estimate that roughly half of income goes to households that consume according to current income, and half to households that consume according to permanent (normal) income. Parker (1999) examines income changes resulting from Social Security taxes and reports that the elasticity of expenditure on non-durable goods with respect to a decline in income is roughly one-half. Souleles (1999) studies the impact of predictable income tax refunds and concludes that consumption increases by at least 35% of a refund within three months.[3] Mankiw says that imperfect smoothing occurs because some consumers may not have rational expectations and may simply extrapolate their current income into the future because it is the only definite information available (Tversky and Kahneman 1973); and some may face borrowing constraints, as indicated by the finding that some engage in buffer-stock saving to prepare for emergencies (Carroll 1997), and by the fact that many households have virtually zero wealth (Wolff 1998). Mankiw concludes (p. 121):

> Reflecting on these facts, one cannot help but be drawn to a simple conclusion: many households do not have the financial wherewithal to do the intertemporal consumption-smoothing assumed by much modern macroeconomic theory … Acknowledging the prevalence of these low-wealth households helps explain why consumption tracks current income as strongly as it does.

[3]Souleles (2002) finds a similar result for the Reagan tax cut.

Poterba (1988) studies the impact of the 1975 tax rebate. He runs a regression to estimate the impact of the rebate on consumption spending in the month the rebate is received. He finds that, in the first month, consumption spending rises roughly 12–24 cents per dollar of temporary tax rebate. It must be emphasized that Poterba ignores any impact in future months; this omission implies that he underestimates the full impact of the rebate over several months. In contrast to Poterba's equation, it is common to include a distributed lag of disposable income, so that a change in disposable income this quarter is assumed to raise consumption spending over several quarters.

Souleles (1999) study is especially relevant to our automatic tax rebate because he uses micro data from the US Bureau of Labor Statistics' Consumer Expenditure Surveys from 1980 to 1991 to estimate the response of household consumption to income-tax refunds. His study *underestimates* the 1-year, or even ½-year, impact of refunds on consumption because it focuses exclusively on the 1-quarter impact. He finds that, in the first quarter, consumption increases by at least 35% (up to over 60%) of the refunds. He concludes that the macroeconomic effects of refunds are substantial.

III. The 2001 Tax Rebate

At first glance, the Shapiro and Slemrod (2002a) study of the 2001 rebate seems to run counter to the rest of the recent empirical literature, including their earlier study (Shapiro and Slemrod 1995). They ask survey questions to households in August and September about their plans for the tax rebate mailed by the US Treasury in July, August and September ($600 per family). They write (Shapiro and Slemrod 2002a, p. 1):

> We find that only 21.8% of those receiving the rebate reported that it would lead them to mostly increase spending. This propensity to spend is remarkably low, both from a theoretical perspective and when compared to previous estimates.

This statement may give the impression that respondents intended to spend 21.8% of their total rebate dollars, but this inference is unwarranted. To see why, examine the exact wording of their key question (Shapiro and Slemrod 2002a, p. 5):

> Earlier this year a Federal law was passed cutting income-tax rates and expanding certain credits and deductions. The tax cuts will be phased in over the next ten years. This year many households will receive a tax rebate cheque in the mail. In most cases, the tax rebate will be $300 for

> single individuals and $600 for married couples. Thinking about your (family's) financial situation this year, will the tax rebate lead you mostly to increase spending, mostly to increase saving, or mostly to pay off debt?

Note that they do *not* ask the respondent what *percentage* of their rebate they intend to spend. Now consider a simple hypothetical example. Suppose every household intends to spend 40% of its rebate and use 60% to pay off debt. Then 0% would report that the rebate leads them 'mostly to increase spending', and 100% would report that the rebate leads them 'mostly to pay off debt'. Yet in this example, the percentage of total rebate dollars spent would be 40%, not 0%; the marginal propensity to consume of every household would be 40%, not 0%.[4] Because the percentage was not asked, the study does *not* obtain information on the percentage of total rebate dollars that respondents intend to spend (or on the marginal propensity to consume).

In a subsequent paper, Shapiro and Slemrod (2002b) concede that our point is correct – that they did not obtain direct information on the percentage of total rebate dollars spent. However, they say that they can infer total rebate dollars spent – the aggregate marginal propensity to consume (MPC) – by postulating a plausible hypothetical distribution of MPCs across individuals. They estimate that their survey results imply that about 35% (they give a range of 34–37%) of total rebate dollars were spent. Thus, their own estimate of the MPC is 35%. Similarly, in a footnote we offer another plausible example in which only 20% 'mostly spend', but 32% of total rebate dollars are in fact spent.[5]

They say they are surprised by the results of their survey (Shapiro and Slemrod 2002a, p. 22):

> The lower propensity to consume we find cannot be attributed to our survey methodology. In 1992, we fielded a similar survey question to measure the propensity to consume from the 1992 changes in income tax

[4]Symmetrically, suppose every household intends to spend 60% of its rebate and use 40% to pay off debt. Then 100% would report that the rebate leads them 'mostly to increase spending', and 0% would report that the rebate leads them 'mostly to pay off debt'. Yet, in this example, the percentage of total rebate dollars spent would be 60%, not 100%; the marginal propensity to consume of every household would be 60%, not 100%.

[5]Suppose the 20% who say they will 'mostly spend' actually spend 80% of the rebate, and the 80% who say they will 'mostly not spend' actually spend 20% of the rebate, then 32% of the total rebate dollars will be spent (because 0.2(80%) + 0.8(20%) = 32%). In fact, if all we know is that 20% say they will 'mostly spend', it is possible for the percentage of the total rebate dollars spent to be as high as 46% (if the 20% who 'mostly spend' actually spend 100%, and if the remaining 80% spend 33%, save 33% (34%), and use 34% (33%) to pay off debt, then 46% of total rebate dollars would be spent, because 0.2(100%) + 0.8(33%) = 46%); conversely, it is also possible that the percentage of total rebate dollars spent could be less than 20%.

withholding. Both the 1992 and 2001 survey questions were included as modules on the University of Michigan Survey Research Center's monthly Survey of Consumers, so the procedures for drawing the sample were the same in both surveys. For the 1992 withholding change, we find that over 40% of households would spend the extra current income from a reduction in withholding, despite the fact that the increase in take-home pay would be offset by either a lower tax refund or higher final payment (Shapiro and Slemrod, 1995). While that behaviour is inconsistent with unconstrained optimization, it is quite consistent with the broad range of evidence that a high fraction of income goes to households who act myopically or liquidity constrained with respect to changes in income. Because the methodology used to study the 2001 rebate closely mirrors that of the 1992 study, the surprising results of the 2001 study appear to represent a genuine departure from past behaviour and are not an artefact of our methodology or the specific details of the survey. We cannot, though, definitively rule out the possibility that subtle differences in wording between the surveys affected the responses.

There is, in fact, a potentially important difference in the wording of the key question that may have biased the 2001 study. Here is the exact wording of the 1992 key question (Shapiro and Slemrod 1995, p. 282):

> The federal government *has* recently changed the amount of income tax that is being withheld from paycheques. On average, the change in withholding should *increase* your take-home pay by about $25 per month, or by a total of about $250 for all of 1992. It also means that next year your tax refund will be about $250 less than otherwise, or you will have to pay about $250 more in taxes next year than otherwise. How do you think you will use the extra $25 per month – do you think you will *spend most* of it, *save most* of it, use *most* of it to *repay debts*, or what? (What do you think you will do with *most* of the extra money?)

The 2001 key question (see above) begins with the phrase, 'Thinking about your (family's) financial situation'. This phrase does not appear in the 1992 key question. This phrase may have influenced some respondents to answer either 'save' or 'pay off debt'. Suppose instead that the phrase had been 'Thinking about the needs of your family'. Such a phrase might do the reverse. On reflection, perhaps the question should have omitted the introductory phrase and simply have read: 'What percentage of the tax rebate will you spend? What percentage will you save? What percentage will you use to pay off debt?'[6]

[6]Also, another difference between the 1992 and 2001 wording may have influenced some respondents not to answer 'increase spending', but instead to answer 'pay off debt'. The 2001 question

Another problem with the 2001 question is the phrase 'this year'. Because the survey was conducted in August, September and October 2001, some respondents may have interpreted 'this year' to mean 'before the end of this calendar year'. If these respondents planned to spend it in early 2002, they may not have answered 'spend'. In retrospect, perhaps the question should have been: 'What percentage do you intend to spend *within a* year?'

In a revision (June 2002) of their paper, Shapiro and Slemrod (2002a) also report on a follow-up survey conducted in March and April 2002 as a module in the University of Michigan Survey Research Centre's monthly Survey of Consumers. They state (p. 17) that 'the survey has a partial panel structure, where 40% of respondents each month are re-interviewed six months later'. They give the exact wording of the key question (pp. 16–17):

> Last year a Federal law was passed cutting income-tax rates and expanding certain credits and deductions. Some tax cuts took effect last year and others will be phased in over the next nine years. Last year many households received a tax rebate cheque in the mail. In most cases, the tax rebate was 300 dollars for single individuals and 600 dollars for married couples. Did the tax rebate lead you mostly to increase spending, mostly to increase saving, or mostly to pay off debt?

They state (p. 16):

> In this survey, 24.9% of the respondents reported spending the rebate.

Note that once again they do *not* ask respondents what *percentage* they spent, so we cannot infer the percentage of the total rebate dollars spent. They are, however, neutral in presenting the three options (there is no longer the introductory phrase, 'Thinking about your [family's] financial situation').

Nevertheless, the question they ask is very difficult for any respondent to answer accurately. Suppose you were asked what you did with your 2001 rebate? How would you figure it out? You probably remember depositing the rebate cheque in your bank. Then what? You may recall the moment you wrote a cheque to pay down your home equity loan and think, 'That's what I did with the rebate'. Or you may recall the moment you used your credit card to buy a new TV and think, 'That's what I did with the rebate'. Or was it the

---

asks whether the respondent will mostly 'increase spending', whereas the 1992 question asks whether the respondent will 'spend most of it'. The word 'increase' appears in the 2001 question but not the 1992 question. We wonder whether some 2001 respondents might have thought, 'I don't plan to use the rebate to *increase* spending, just to *maintain* spending despite the recession' and, consequently, did not select 'increase spending'. It is true that, in the 2001 question, the word 'increase' also appears with saving, but it does *not* appear with 'pay off debt'.

morning you went shopping on Fifth Avenue in New York? Was that your rebate? To answer the question accurately, you must compare your actual spending to a hypothetical – what you would have spent had there been no rebate. You may recall the moment you think you used the rebate for activity X, but the real issue is how much more did you spend, having received the rebate, than you would have spent had you not received the rebate. To give the correct answer, you have to know what you would have done had there been no rebate. Are you sure you know this?

We believe, then, that the jury is still out on the impact of the 2001 tax rebate. A decision must await the kind of empirical studies of behaviour described in the preceding section.

IV. Has Japan Tried Fiscal Stimulus?

It is sometimes contended that Japan tried fiscal stimulus in the 1990s and 'it didn't work'. Is this true? Posen (1998) provides a detailed analysis of Japanese fiscal policy in that decade. In a chapter entitled 'Fiscal Policy Works When It Is Tried', he writes (pp. 29–30):

> The reality of Japanese fiscal policy in the 1990s is less mysterious and, ultimately, more disappointing. The actual amount injected into the economy by the Japanese government – through either public spending or tax reductions – was about a third of the total amount announced. This limited quantity of total fiscal stimulus was disbursed in insufficiently sized and inefficiently administered doses, with the exception of the 1995 stimulus package. That package did result in solid growth in 1996, demonstrating that fiscal policy does work when it is tried. As on earlier occasions in the 1990s, however, the positive response to fiscal stimulus was undercut by fiscal *contraction* in 1996 and 1997. On net, the Japanese fiscal stance in the 1990s was barely expansionary.

Posen concludes (pp. 147–48):

> The economic performance of Japan in the 1990s is the perfect illustration that discretionary counter-cyclical policy is appropriate under certain circumstances. In short, not only is the business cycle not dead in Japan, it has turned deadly. The usual reasons for avoiding discretionary fiscal policy clearly do not apply. The recession has gone on for so long that there is no danger that the lags of decision making and implementation will outlast the downturn. … The willingness to engage in discretionary fiscal policy in a clearly identifiable economic

> emergency must not be lost in the rush to meet arbitrary budget rules … any more than the driver who normally follows the speed limit must not forgo the possibility of accelerating well beyond 55 miles an hour in certain rare circumstances for safety's sake.

In their paper on Japan's 'Great Recession' of the 1990s, Kuttner and Posen (2001a) write in their introduction (pp. 4–5):

> Our conclusions may be largely unsurprising to the core audience of this journal [*Brookings Papers on Economic Activity*], but will likely come as something of a surprise to the more casual observers of the Japanese economic situation: despite the persistent stagnation, the Japanese economy has behaved much as the textbooks would have predicted. … Fiscal stimulus, whether in the form of tax cuts or public works spending, is stimulative, though in Japan, tax cuts gave a bigger 'bang for the yen' than public works spending. … In short, the basic lesson of Japan's Great Recession for policymakers is to trust what you learned in intermediate macroeconomics class: even under difficult economic circumstances, and even in institutional contexts far removed from the places in which they were developed, the stabilization policy framework of the mainstream textbooks still applies.

In their conclusion, they write (p. 66):

> Fiscal policy works pretty much the way Keynes suggested it does, with contractionary contractions and expansionary expansions, with even wasteful public spending having a clear multiplier (although disadvantageous in other ways). The structure and distribution of the tax burden do matter, however, and tax cuts targeted to the more liquidity constrained are likely to have larger effects.

They continue (p. 68):

> This points to some policy guidance for Japan today, as well as for other large economies at risk of deepening recessions from a combination of asset price declines and external shocks. First and foremost, our results encourage a positive view of active counter-cyclical policy, particularly on the monetary side – the inflationary risks of quantitative easing appear to be non-existent precisely because near or at zero nominal short-term interest rates it is extremely difficult for the central bank to raise inflation expectations. Second, our analysis indicates that discretionary fiscal policy can get maximum bang-for-the-yen by increasing the average household's

disposable income, and by recognizing that the budget deficit alone is not an adequate measure of fiscal stimulus.

In a recent paper, Kuttner and Posen (2001b) explain why the huge run up of government debt in the 1990s does not mean that Japan tried aggressive fiscal policy (p. 2):

> 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 behaviour by Japanese savers. The highly visible and rapid more-than-doubling of Japanese public debt in less than a decade speaks for itself to a surprising number of observers: the fiscal deficit has grown sharply, yet the economy has continued to stagnate, so fiscal stabilization failed. No less an economist that Milton Friedman [2001] 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.'
>
> But it is easy to demonstrate from just charting publicly available data that the bulk of the increase in Japanese public debt is due to a plateau in tax revenue rather than to increased public expenditure or even discretionary tax cuts. This, of course, reflects the inverse cyclical relationship between output and tax revenue. If one applied a plausible tax elasticity of 1.25 to reasonable measures of the widening output gap – e.g. those estimated in Kuttner and Posen (2001a) – 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% a year all but eliminates the non-social security portion of the deficit. Moreover, as measured by the fiscal shocks derived from our estimates in this paper, fiscal policy has been generally contractionary since 1997.

V. A Proposed Automatic Fiscal Policy: Design and Practical Implementation

In this paper, we present a new design for an automatic, counter-cyclical fiscal policy and analyse it in the Fair macroeconometric model that has been estimated using quarterly data for the US economy through 2001.1. Our automatic fiscal policy consists of the triggering of a transfer (or 'income-tax

rebate') in response to a decline in the output of the economy of particular magnitude. We begin by generating a severe recession and simulate the impact of our automatic fiscal policy. We assume that the Federal Reserve adheres to a counter-cyclical monetary policy governed by the interest rate (Taylor) rule estimated on historical data in the Fair model. We find that this interest rate rule alone mitigates the severe recession only modestly, whereas our automatic fiscal policy (together with the interest rate rule) substantially reduces the severity of the recession while generating only a relatively small rise in the government debt/GDP ratio. We also simulate a false alarm of a severe recession, a supply shock due a sharp increase in import prices, three past recessions (1975, 1982 and 1991), and a severe hypothetical recession beginning in 2001. The automatic fiscal policy performs well over all simulations.

Current automatic stabilizers – for example, see Cohen and Follette (2000) and Auerbach and Feenberg (2000) – are unintended by-products of setting the ratio of tax revenue to GDP, the degree of progressivity of the tax system and the level of unemployment benefits. Hence, the magnitude of the stabilizing impact is held hostage to these objectives. We introduce an automatic fiscal policy with the sole objective of combating recession, and can therefore set the magnitude solely for the purpose of stabilization (Seidman 2001). This automatic fiscal policy was once called 'formula flexibility' to distinguish it from automatic stabilizers. In his monograph on public finance, Musgrave devotes a section to 'formula flexibility' (1959, p. 512):

> Formula flexibility refers to an arrangement whereby changes in tax rates and/or expenditure levels are legislated in advance, to go into effect if and when specified changes in income occur. For instance, it might be legislated that income tax rates be reduced or public expenditures raised by *x*% if income falls by *y*%.

Studies of formula flexibility were done by Phillips (1954), Pack (1968) and Duggal (1975).

Our automatic fiscal policy does not attempt to restrain demand when demand is excessive. That task is left to monetary policy because we suspect that Congress may be more willing to pre-enact fiscal stimulus than to pre-enact fiscal restraint. Although our policy is automatically triggered by the state of the economy, Congress must pre-enact the automatic policy – it must be willing to vote for a bill that would trigger a fiscal change according to the state of the economy. It may be more willing to vote to trigger a tax cut to counter recession than to vote to trigger a tax increase to counter inflation.[7]

[7]For example, the 1968 tax surcharge to counter inflation took much longer to enact than the 1975 tax rebate to counter recession.

Although our policy is asymmetric, it is fully compatible with a long-run fiscal strategy of, on average, running a balanced unified budget. For example, if Social Security and Medicare are moved off budget and on average run surpluses, and each year the budget (excluding Social Security and Medicare) is set to be balanced if GDP is normal, then the unified budget (including Social Security and Medicare) would, on average, be balanced if the deficits generated in recession by our automatic fiscal policy are offset by the surpluses in Social Security and Medicare.

Our policy provides an automatic transfer whenever real GDP is at least X% below *normal* (discussed below), and the amount of the transfer varies with the size of the GDP gap. The formula for the transfer R is

$$R/Y_n = \alpha[Y_{\text{gap}} - X]_{-1} \tag{1}$$

where

R = the *new counter-cyclical* real transfer from the federal government to households
Y_n = normal real GDP
R/Y_n = the transfer ratio
Y_{gap} = percentage gap of real GDP below normal real GDP[8]
X = the percentage threshold that must be exceeded before the transfer is triggered
α = the *power* coefficient

If the right-hand side of (1) is negative, then R is set equal to zero.

Congress must pre-enact the numerical values of X and α. Consider three pairs as shown in Table 1. To illustrate, suppose last quarter's Y_{gap} was 4% (Y was 4% below Y_n). Then, for each of the three policies, this quarter's transfer ratio (R/Y_n) would be as shown in the right-hand column of Table 1.

We also consider modifying the policy for inflation. Under this modification, R is given by the above equation, (1), except that R is reduced according

Table 1:

	X	α	$\alpha\,[Y_{\text{gap}} - X]_{-1} = R/Y_n$
Policy F1	2%	0.5	0.5(4% – 2%) = 1%
Policy F2	2%	1.5	1.5(4% – 2%) = 3%
Policy F3	0%	1.5	1.5(4% – 0%) = 6%

[8] $[Y_{\text{gap}}] \equiv (Y_n - Y)/Y_n$, where Y_n is normal real output and Y is actual real output.

to the excess of last quarter's inflation (p_{-1}) above its target (p^*). Under the modified policy, R might equal Z% of the transfer prescribed by (1) where

$$Z = [100\% - \beta(p_{-1} - p^*)] \tag{2}$$

where $\beta > 0$. Suppose $p_{-1} - p^*$ equals 5% and β is 8. Then the modified transfer equals 60% of the unmodified transfer. If the right-hand side of (2) is negative, then Z is set equal to zero, so the transfer R is zero.

Note that (1) assumes that it is administratively feasible to trigger a transfer, this quarter, based on GDP data for the preceding quarter. What would be involved in implementing the policy with a lag of only one quarter? First, the transfer would have to be based on the US Department of Commerce's preliminary estimate for the preceding quarter's GDP, which is issued approximately one month after the end of the quarter. We propose using this preliminary estimate to trigger the automatic transfer rather than waiting for subsequent revisions.

Second, an estimate of the preceding quarter's normal GDP would also need to be issued in the same time frame for it to be utilized to compute the real GDP gap for that quarter. We recommend that this estimate of normal GDP be provided by technicians in the Congressional Budget Office (CBO) and that, every quarter, the CBO technicians re-estimate normal GDP so as to keep the estimate up-to-date. One way for the technicians to estimate normal real GDP would be to estimate what real GDP would be if the unemployment rate were normal. The normal unemployment rate might be defined as the average unemployment rate over the preceding decade. Alternatively, it might be defined as the unemployment rate estimated to usually keep the inflation rate constant (the estimated NAIRU). A particular unemployment rate implies a particular level of employment in a given quarter. Combining this level of employment with the level of the capital stock (and assuming a normal capacity utilization rate), CBO technicians can use an aggregate production function to provide an estimate of normal real GDP. It is important that the normal unemployment rate, and the aggregate production function, be subject to a quarterly re-estimation by CBO technicians. Such quarterly re-estimation would keep the official measure of Y_{gap} up-to-date and relevant to the current economy.[9]

Third, the cheques must be mailed out in the second and third month. The US Treasury can have the addresses ready to go in advance. The dollar amount

[9]Olivier Blanchard noted in his comments the importance of periodic re-estimation of normal GDP. We recognize, as pointed out by Orphanides and van Norden (1999), that there will be some measurement error in estimating normal GDP, just as there is likely some error in the Commerce Department's preliminary estimate of actual GDP.

of each transfer to each household would have to be stamped on each cheque before it could be mailed. The aggregate dollar amount would be determined one month into the quarter when the preliminary GDP estimate is provided by the Commerce Department. Congress would need to specify, in advance, how this aggregate is translated into the dollar amount on individual cheques, just as it did for the 1975 and 2001 rebates. In 2001, Congress specified that each household would receive the same dollar amount ($600) whereas, in 1975, Congress specified that the dollar amount would vary across households (between $0 and $200 according to household income). The experience of the 2001 $600 tax rebate shows that cheques can be mailed quickly. When the tax bill was being debated in the spring of 2001, considerable scepticism was expressed about the ability of the US Treasury to mail out cheques with sufficient speed. President Bush signed the tax bill into law on 7 June. Even though this was a brand new programme implemented for the first time, the US Treasury was able to mail out all the cheques over ten weeks between 23 July and 24 September. This speed was achieved despite the fact that a mass mailing of rebate cheques had not been attempted for several decades.[10]

VI. Testing the Policy in a Macroeconometric Model

Ideally, the policy should be tested in a variety of macroeconometric models. This paper tests it in one particular model: the Fair US quarterly model, estimated from 1952.1 through 2001.1. The Fair model is a mainstream traditional macroeconometric model. Its properties are roughly similar to other mainstream traditional models.[11] These traditional models generally do not incorporate the impact of expected future deficits on current long-term interest rates the way most new macroeconometric models do – for example, the Federal Reserve model, described in Reifschneider et al. (1999). However, because our automatic fiscal policy generates temporary, not permanent, deficits, rational financial market participants should not expect future deficits from our policy, so this omission is less relevant to our study. Fair (1994,

[10]Just as with ordinary income tax refunds, some of the rebate cheques would be returned if an address is obsolete, and as Charles Steindel noted in his comments, this would entail some follow-up cost.

[11]A useful source for comparing the Fair model with other mainstream traditional macroeconometric models is provided in Klein (1991) which reports the results of a conference focused on a comparison of these models. Each of the models performed the experiment of reducing the short-term interest rate 1 percentage point (100 basis points) below the baseline path. For the fourth quarter, the models predicted the following percentage increase in GDP: BEA, 0.89%; DRI, 0.31%; MICH, 0.67%; WEFA, 0.44%; FRB, 0.57%; FAIR, 0.43% (source: Klein 1991, Table A2.5, [2B]).

pp. 1–16) provides a careful discussion of the relationship of his model to the Lucas critique and rational expectations. For these reasons, although our use of the Fair model is only illustrative, it is likely that most other empirically based models would yield similar results.

We use the Fair model for illustration because Fair makes his model accessible to other researchers, and because we judge its basic structure to be realistic and plausible (Fair 1994). We estimate and simulate the Fair model using the Fair–Parke program downloaded from Fair's website. The data and model files are also provided by Fair on his website. We could not simply use the interactive version of the model because of the need to introduce interest rate floors and fiscal rules such as our policy.

We give a brief overview of the Fair US quarterly model. More comprehensive expositions are given by Fair (1994, 2000b). The model consists of 30 stochastic equations, econometrically estimated by two-stage least squares, 101 identities, 131 endogenous variables, slightly over 100 exogenous variables and many lagged endogenous variables. The model has six sectors: household, firm, financial, federal government, state and local government, and foreign. For monetary policy, the Fair model estimates an interest rate reaction function based on the historical behaviour of the Federal Reserve. The estimated equation implies that the Federal Reserve generally engages in counter-cyclical monetary policy, lowering the interest rate (specifically, the 3-month Treasury bill rate, RS) in response to a rise in the unemployment rate (UR), and raising the interest rate in response to a rise in the inflation rate.

For our study of a counter-cyclical fiscal policy implemented through automatic transfers to households, the key equations are the four household expenditure equations explaining consumption of services (CS), non-durables (CN), durables (CD) and investment in residential housing (IHH). In all four, real disposable income is a right-hand variable. Transfers enter the consumption equations through disposable income.

The Fair model makes these estimates of the short-run marginal propensity to consume (MPC): one-quarter, 0.24; two-quarters, 0.41. The MPC is the increase in spending on the four categories listed above (CS, CN, CD and IHH) in response to an increase in disposable income; hence, if disposable income increases $100 this quarter, then the model estimates an increase in spending (CS+CN+CD+IHH) of $24 this quarter and an additional $17 next quarter (for a cumulative 2-quarter increase of $41).[12] This 1-quarter MPC of 0.24

[12]The equations for CS and CN are in double-log form so the coefficient of disposable income is the one-quarter elasticity, and the one-quarter MPC equals the elasticity times the ratio of that component of consumption to disposable income; the equations for CD and IHH are not in log form. All four equations contain a lagged dependent variable (the CN equation also has a change in the lagged dependent variable) which generates further increases in consumption in subsequent quarters. The calculations are based on the September 2000 version of the model (Fair 2000b).

is less than Souleles' (1999) estimate, based on his analysis of micro data, of a one-quarter MPC out of income-tax refunds of 0.35.

The Fair model implicitly assumes that the response of consumption to a change in disposable income is the same regardless of the source of that change (e.g. a change in wage income, a temporary transfer or tax cut, or a permanent transfer or tax cut). The consumption equations estimate the coefficient of disposable income; no attempt is made to estimate one coefficient for gross labour earnings and another for temporary transfers and/or tax cuts. How realistic is this assumption? Distinguish two situations: under the first, gross labour earnings are growing normally, but a transfer jumps disposable income abruptly above its normal growth path; under the second, gross labour earnings grow slower than trend, but the transfer reduces the decline in disposable income below trend, thereby keeping the growth path of disposable income closer to normal. In the first case, the transfer bumps disposable income above its normal growth path; here it seems plausible that consumers might raise consumption less than if gross labour earnings had risen. In the second case, the transfer helps to keep disposable income nearer to its normal growth path; here it seems plausible that consumers might continue normal spending in response to the transfer. For example, suppose that due to the recession a $50,000 employee receives a 2.8% pay increase instead of a 4% pay increase; this 1.2% shortfall would reduce the employee's pay $600 below normal growth. A transfer of $600 (as occurred in the 2001 recession) would restore this employee to normal salary growth. The objective of our counter-cyclical transfer is to keep disposable income growing at its normal trend rate despite the recession. It therefore seems plausible that the Fair model might provide an accurate estimate of the impact on consumption of our counter-cyclical transfer that attempts to keep disposable income on its normal growth path. However, if the Fair model overstates the impact of a temporary transfer on consumption, then a larger temporary transfer (resulting in a larger temporary deficit) would be required to generate the simulation results we present below. For example, if the true response to a transfer is half as large as the Fair model estimates, then a transfer twice as large would be needed to generate the simulation results we report; hence, the simulation would correspond to a value of α in (1) that is twice as great as we report (1.0 instead of 0.5, or 3.0 instead of 1.5) and the short-run deficits would be correspondingly larger.

Our policy introduces a new endogenous transfer from the federal government to households. In the Fair model, TRGH_t is the exogenous nominal transfer from the federal government to households in quarter t. We re-label Fair's transfer by adding a b subscript as TRGH_{bt}. We introduce the real counter-cyclical transfer R_t (from our equation (1) above), so that $(\mathrm{PH}_t)R_t$ is the nominal counter-cyclical transfer (where PH_t is the price deflator for consumer expenditures for services, non-durables, durables and residential investment,

inclusive of indirect business taxes). Thus, the total nominal transfer from federal government to households is $TRGH_t = TRGH_{bt} + (PH_t)R_t$.[13]

We determine the quantitative impact of transfers on GDP in the Fair model. Under the tax act of 2001, a transfer of about $40 billion was paid by government to households in one quarter (July–September), 2001.3. Hence, at an annual rate, the transfer in that quarter was $160 billion. We therefore consider a transfer of $160 billion. We assume the Federal Reserve adheres to the interest rate reaction function estimated by the Fair model. The transfer of $160 billion is 1.55% of the base value of nominal GDP ($10,335) and 19.2% of the base value of transfers ($832 billion) in the first quarter. That transfer raises nominal GDP 0.35% above its base value in the first quarter. If that transfer is sustained for two quarters, then nominal GDP is 0.78% above its base value in the second quarter. If that transfer is sustained for three quarters, then nominal GDP is 1.17% above its base value in the third quarter. If that transfer is sustained through eight quarters, then nominal GDP is 1.86% above its base value in the eighth quarter.

In the policy simulations that follow, we adopt the standard procedure of first adding historical residuals to the constant term of each equation so that the model tracks history perfectly over the simulation period.

VII. Automatic Fiscal Policy in Response to a Severe Recession

A severe recession is generated beginning in 1986.1, a convenient period of relative macroeconomic tranquillity, as follows. The constant term is reduced by a fixed amount for eight quarters (1986.1–1987.4) in each of the following five behavioural equations: consumer expenditure for services (CS), consumer expenditure for non-durables (CN), consumer expenditure for durables (CD), residential housing investment (IHH) and business capital stock (KK) which thereby reduces non-residential fixed investment (IKF). Following Fair's (2000a) analysis of a fall in the stock market, we reduce the constant term in the behavioural equation for the capital gain (loss) on corporate stock in the first quarter only (1986.1); the magnitude of our adjustment is scaled down from Fair's because of the difference in the level of the stock market (measured by the S&P 500 index) in 1986.1 versus the period he uses in his article (1999.3).

These changes generate a severe recession. We focus on three variables shown in the three panels of Figure 1. Figure 1a shows the path over twelve quarters (1986.1 through 1988.4) of the unemployment rate; 1b, the interest

[13]An endogenous transfer from state and local government to households is nominal unemployment insurance benefits (UB), which also enters disposable income.

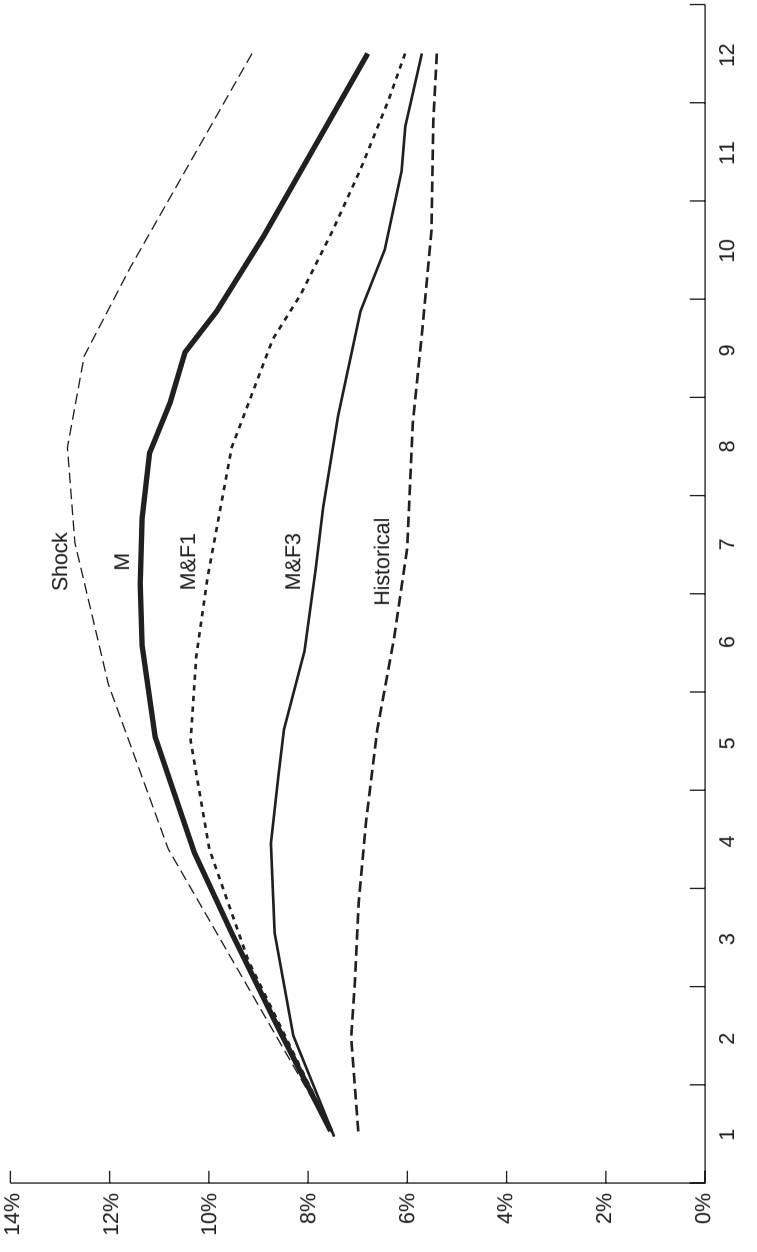

Figure 1a: Unemployment rate (1986.1–1988.4)

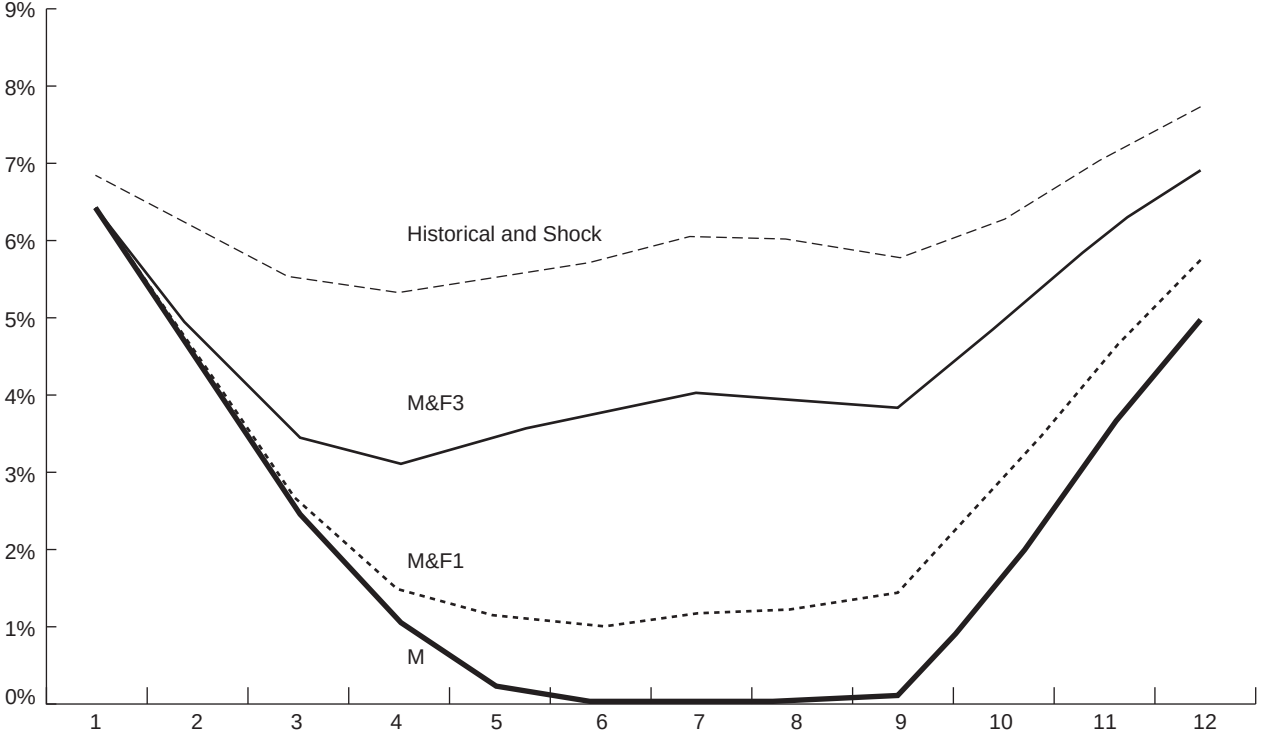

Figure 1b: Three-month treasury bill rate (1986.1–1988.4)

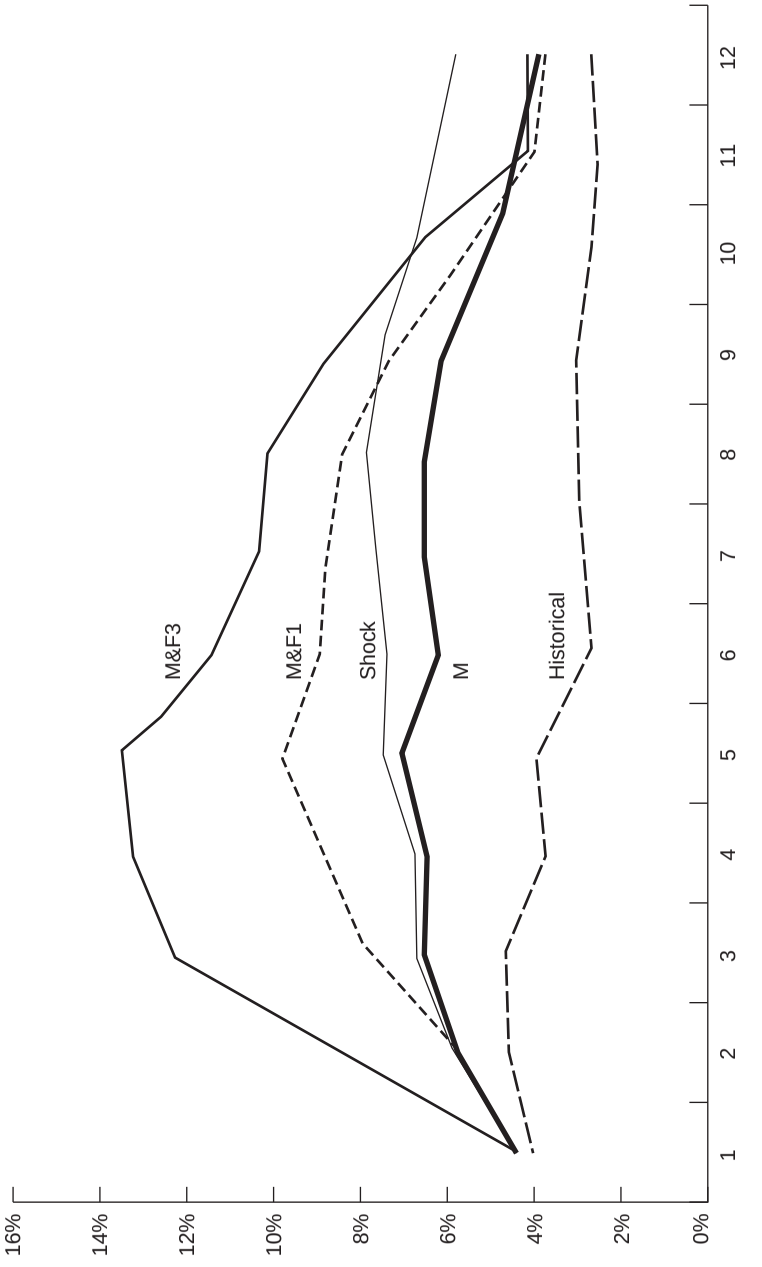

Figure 1c: Deficit ratio (1986.1–1988.4)

rate (the 3-month treasury bill rate); and 1c, the deficit ratio (the ratio of the NIPA nominal deficit (–SGP), deflated by the GDP deflator, to normal real GDP) beginning in 1986.1 under several alternative policy responses.

How severe would the recession be if the Federal Reserve were to keep the short-term interest rate constant at its historical value in each quarter (instead of cutting the interest rate below its historical path as it usually would in response to a recession) and there were no fiscal policy other than the current automatic stabilizers due to the current tax and transfer system? We call this the shock simulation and label it 'shock' in Figure 1. In Figure 1a, the shock unemployment rate path is well above its historical path. In Figure 1b, the shock interest rate path coincides with the historical path because of our assumption of Federal Reserve behaviour. In Figure 1c, the shock deficit ratio path is above the historical path because the recession automatically reduces tax revenue.

Now suppose instead that the Federal Reserve responds as it usually does historically to changes in the unemployment rate and inflation rate. Recall that the Fair model contains an estimated interest rate rule equation for the historical period, indicating how monetary policy usually responds to these changes. We recognize that the Federal Reserve's response to a severe recession might differ from an equation estimated on data with smaller changes in the unemployment rate. We also recognize that the Federal Reserve's responsiveness may have increased in recent years (Taylor 1999), so that the Fair model's interest rate rule, which is estimated on historical data from the mid 1950s to the present, might underestimate the response. The simulation generated by adherence to this interest rate rule equation we call the monetary policy simulation and label it M in Figure 1.

In Figure 1a, the M unemployment rate path is below the shock path (note that the gap between the two paths opens up gradually) but still well above the historical path. In Figure 1b, the M interest rate path is well below the shock path (which is the same as the historical path) – indeed, the interest rate hits the floor of zero for several quarters, beginning in the sixth quarter. In these quarters, the estimated interest rate rule equation generates a negative value for the 3-month Treasury bill rate, RS, which implies that the Federal Reserve would set the interest rate to zero. In the simulation algorithm, we suspend the interest rate equation for these quarters and set RS equal to zero. In Figure 1c, the M deficit ratio path is below the shock path because the recession is not so deep and the fall in tax revenue is not so great; but the M deficit ratio path is still well above the historical path. It should be noted that if the Federal Reserve has become more responsive in recent years than the Fair model's estimated rule, then the interest rate would hit the floor sooner. It seems unlikely, however, that the Federal Reserve would choose to cut the interest rate from 6% to 0% in less than four quarters because of the

psychological impact that precipitous cuts might have on the business and financial community and the general public.

What would happen if an automatic fiscal policy were in effect when the recession occurs? We consider three automatic fiscal policies that respond to the level of the real GDP gap in the previous quarter.[14] The first (F1) is both the most cautious and the least powerful policy; the third (F3) is both the least cautious and the most powerful. Under automatic fiscal policy 1 (F1), a transfer is triggered only when the percentage GDP gap exceeds 2.0% – hence, the policy is cautious – and the power coefficient α is only 0.5. Under fiscal policy 3 (F3), a transfer is triggered as soon as the GDP gap exceeds 0% – hence, the policy is not cautious – and the power coefficient α is 1.5 so that the transfer equals one and a half times the GDP gap of the previous quarter. Although the shock hits the economy in 1986.1, with F1 the transfer does not occur until 1986.3 because of the 2.0% threshold, and because we assume there is a one-quarter implementation lag (i.e. the threshold is exceeded in 1986.2 and the transfer goes into effect in 1986.3). With F3, the transfer occurs in 1986.2 because the threshold is 0% but there is still the one-quarter implementation lag. We assume that the Federal Reserve adheres to its interest rate rule. Thus, the simulation generated by the Federal Reserve's monetary policy and an automatic fiscal policy we call the monetary/fiscal policy simulation and label it M&F.[15]

In Figure 1, we show two alternative fiscal policies – 1 (the weakest policy) and 3 (the strongest policy) – and label the monetary/fiscal policies M&F1 and M&F3. In Figure 1a, the M&F1 unemployment rate path is below the M unemployment rate path (once the fiscal policy is implemented); the M&F3 path is lower still. In Figure 1b, the M&F1 interest rate path is above the M interest rate path and the M&F3 interest rate path is higher still: although the Federal Reserve adheres to the same interest rate *rule* (an equation that varies

[14]For the purpose of this study, we estimate the real GDP gap in each quarter as follows. Fair provides data on actual real GDP, chain-weighted 1996$. To obtain normal (natural) real GDP, chain-weighted 1996$, we use Gordon's (2000) natural real GDP series in fixed weighted 1992 dollars. In each quarter, Gordon provides a ratio of natural to actual GDP. We use this ratio to compute natural real GDP, chain-weighted $1996; specifically, Y_n = (realGDP1996$) (Gord$Y_n$ / realGDP1992$Gord).

[15]To implement these automatic fiscal policies in the Fair US Quarterly Model, we solve the model successively using the Fair–Parke program (Fair 1996). On the first pass, we treat TRGH (the total nominal transfer from federal government to households) as an endogenous variable (using the Fair–Parke GENR command) to solve simultaneously for the TRGH path and the real GDP gap (Y_{gap}) path. On successive passes, we treat the TRGH path from the previous round as exogenous, solve the Fair model for the endogenous Y_{gap} path, and outside the model use formula (1) perhaps modified by (2) to solve for the implied TRGH path. We iterate until the TRGH path is approximately the same (to a very small tolerance) in two consecutive rounds.

the interest rate according to the unemployment rate and the inflation rate), the M&F interest rate paths are higher than the M interest rate path because the automatic fiscal policy mitigates the recession and keeps the unemployment rate lower. In Figure 1c, the M&F1 deficit ratio path is above the M deficit ratio path and the M&F3 deficit ratio path is higher still (through the tenth quarter).

Whereas Figure 1 shows the path of the unemployment rate, the 3-month Treasury bill rate and the deficit ratio over twelve quarters, Table 2 focuses on the numerical values in the eighth quarter (1987.4) of each simulation, roughly the trough of the recession. The historical column gives the historical values for the unemployment rate (UR), the 3-month Treasury bill rate (RS), the deficit ratio (D/Y_n) and the debt ratio (B/Y_n) – the ratio of nominal debt (-AG) deflated by the real GDP deflator, to normal real GDP (Y_n). We begin with the shock column. Under the shock, the shortfall in real GDP would be 12.7% – that is, real GDP would be 12.7% below its historical value, UR would be 12.9% (compared with a historical value of 5.9%) and RS would be at its historical value of 6.0%. Note that the deficit ratio (D/Y_n) is 7.9% (compared to its historical value of 3.0%) and the debt ratio (B/Y_n) is 41.4% (compared to its historical value of 33.4%). It is important to emphasize that, without our counter-cyclical fiscal policy, the recession itself causes deficits each quarter and, therefore, a significant increase in the debt ratio.

If the Federal Reserve follows its interest rate rule, it would react by cutting RS to 0.0%, as shown in the M column; as a consequence, the shortfall in real GDP would be reduced to 9.3%, and UR, to 11.1%. With the M policy, the deficit ratio is reduced to 6.5% (from 7.9% under the shock) for two reasons: the economy is stronger generating more tax revenue; and the interest rate is lower, thereby reducing government spending for debt service. Even with monetary policy providing some help, though, the recession remains deep enough so that the debt ratio still rises to 39.7% (compared to its historical value of 33.4%).

Table 2: Eighth Quarter (1987.4)

	Historical	Shock	M	M&F1	M&F2	M&F3
Alpha				0.5	1.5	1.5
Threshold				2%	2%	0%
Shortfalls from Historical						
GDP		12.7%	9.3%	6.4%	4.3%	3.2%
Simulation values						
UR	5.9%	12.9%	11.1%	9.5%	8.2%	7.6%
RS	6.0%	6.0%	0.0%	1.2%	3.0%	3.9%
R/Y_n				2.4%	3.2%	4.5%
D/Y_n	3.0%	7.9%	6.5%	8.5%	8.8%	10.0%
B/Y_n	33.4%	41.4%	39.7%	42.5%	45.0%	46.8%

With combined monetary and fiscal policy, the shortfall in GDP, and UR, would be reduced still further. The table shows three alternative fiscal policies (F1, F2 and F3), where F2 is intermediate in strength between F1 and F3; F2 has the same threshold as F1 (2%) so it is as cautious, but it has the same power coefficient α as F3 ($\alpha = 1.5$) so it is as powerful as F3 once the threshold is surpassed. Together with monetary policy, the weakest fiscal policy (M&F1) reduces the GDP shortfall to 6.4% (instead of to 9.3% with monetary policy alone), and UR, to 9.5% (instead of to 11.1%), requiring a cut in RS to 1.2% (instead of to 0.0%), whereas the strongest fiscal policy (M&F3) reduces the GDP shortfall to 3.2%, and UR, to 7.6%, requiring a cut in RS only to 3.9%.

However, the stronger the fiscal policy, the greater is the counter-cyclical transfer ratio (R/Y_n) – the ratio of the counter-cyclical real transfer (R) to normal real GDP (Y_n); the greater is the deficit ratio (D/Y_n); and the greater is the debt ratio (B/Y_n). Table 2 shows simulation results for these ratios for the eighth quarter. The transfer ratio (R/Y_n) ranges from 2.4% for M&F1, to 4.5% for M&F3. The transfer ratio (R/Y_n) peaks at 3.1% in the sixth quarter under M&F1 and at 7.2% in the fourth quarter under M&F3 (not shown in Table 1). The deficit ratio (D/Y_n) ranges from 8.5% under M&F1 to 10.0% under M&F3. As is evident in Figure 1c, under both M&F1 and M&F3, the deficit ratio actually peaks in the fifth quarter (9.8% under M&F1 and 13.4% under M&F3).

Thus, strengthening fiscal policy reduces the severity of the recession and reduces the required cut in the interest rate, but raises the deficit ratio and the debt ratio. For example, in the eighth quarter, relative to the shock path, M&F3 reduces the unemployment rate 5.3 percentage points (from 12.9% to 7.6%), while raising the deficit ratio 2.1 percentage points (from 7.9% to 10.0%) and raising the debt ratio 5.4 percentage points (from 41.4% to 46.8%). This relatively small rise in the debt ratio is reassuring. By contrast, over the decade-long Japanese recession, the debt ratio rose from below 50% to well over 100%; much of the rise was due to the recession itself, and only part was due to discretionary fiscal stimulus (Kuttner and Posen 2001b).

VIII. Automatic Fiscal Policy in Response to a False Alarm

Our automatic fiscal policy works well in response to a prolonged severe recession. Suppose, though, that there is a false alarm of a severe recession – a sudden plunge that appears ominous, but that suddenly reverses, launching a recovery that mushrooms into a boom. Does our automatic fiscal policy overreact to this false alarm, thereby overheating the booming economy and generating significant inflation?

To answer this question, we generate a false alarm in the model – details are given in Seidman and Lewis (2002). We find that, even with our strongest

fiscal policy, a false alarm would raise the inflation rate in the boom by only one percentage point at its peak impact, and this increment disappears in a few quarters.

IX. Automatic Fiscal Policy in Response to a Supply Shock

A supply shock presents a dilemma for policy-makers: it simultaneously generates a recession and inflation. The automatic fiscal policy we have examined so far focuses solely on recession. The policy provides the same stimulus in response to a given GDP gap, whether that gap is generated by a demand shock or a supply shock. It can be argued, however, that, if the gap is generated by a supply shock, so that inflation is simultaneously worsened, then the fiscal stimulus should be moderated. In this section, we consider such a modification of our automatic fiscal policy.

Under this modification, R_t is given by (1), except that R_t is reduced according to the excess of inflation above its target $(p_t - p^*)$ according to (2). We assume $\beta = 8$ and use an inflation target $p^* = 2\%$.

We generate a supply shock in the model. We introduce the shock into the equation of the domestic price level which is a function of an exogenous import price and several other variables. Our shock consists of a sudden increase in the exogenous import price. We use the import price shock of the 1970s as a rough guide for magnitudes (that shock was generated by an increase in oil prices, but a sudden depreciation of the dollar could also be the source of an import price shock). In the first quarter, 1986.1, we raise the import price by roughly 80%. In subsequent quarters, we gradually roll back the increase in the import price until it settles (beginning about the ninth quarter) at a level roughly 20% above its historical path.

In Figure 2a, the shock path shows for eight quarters (1986.1–1987.4) the unemployment rate in the absence of policy (meaning the Federal Reserve keeps the interest rate at its historical value in each quarter and there is no fiscal policy other than the current automatic stabilizers due to the current tax and transfer system). The unemployment rate rises gradually and the economy falls into recession. In Figure 2b, the shock path shows the sharp jump in the inflation rate and then its gradual decline so that it is back to the historical path in about seven quarters.

Now suppose, instead, that the Federal Reserve responds as it usually does historically. Since its interest rate rule causes the Federal Reserve to stimulate (cut the interest rate) in response to recession, but restrain (raise the interest rate) in response to inflation, it is not obvious whether the Federal Reserve's policy will raise or lower the unemployment rate; it depends on the weights the Federal Reserve gives to fighting recession versus fighting inflation and the

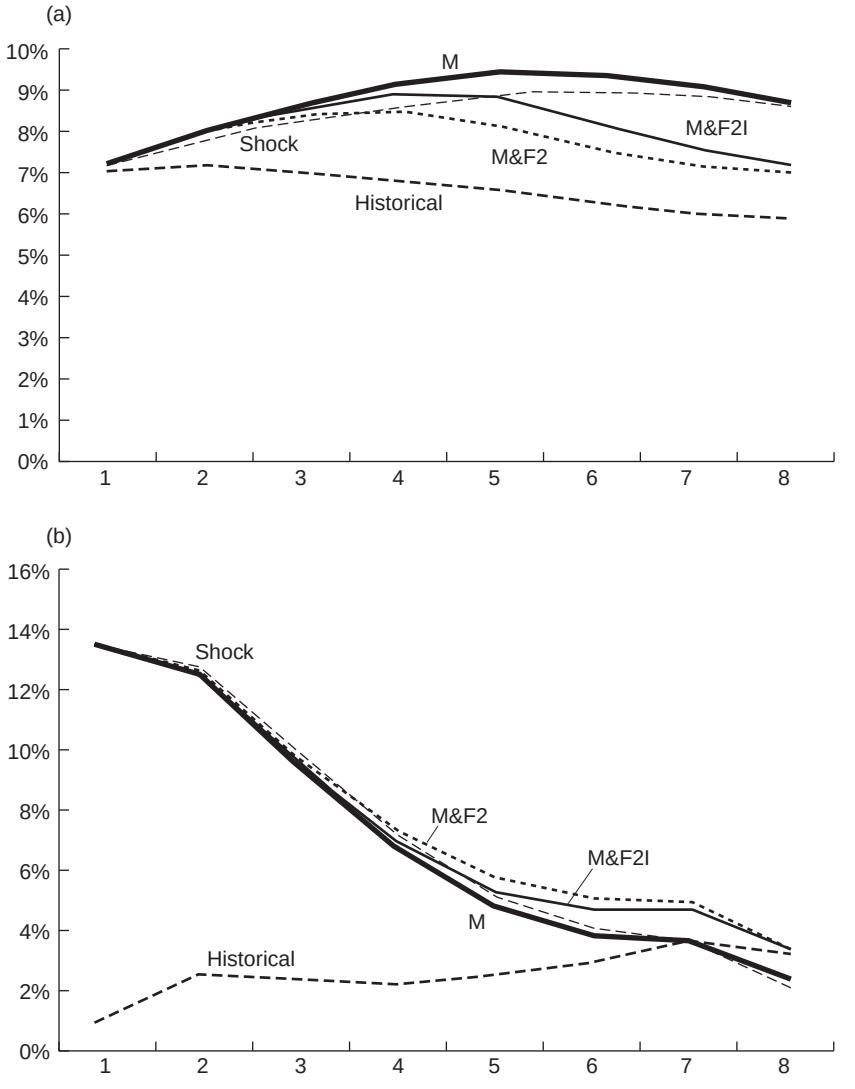

Figure 2: (a) Unemployment rate; (b) inflation rate (1986.1–1987.4)

magnitude of inflation and unemployment that it faces. Given the weights and magnitudes of the estimated interest rate rule in the Fair model, apparently the Federal Reserve initially gives higher priority to fighting inflation and, therefore, restrains the economy in response to the supply shock because, in Figure 2a, the M policy raises the unemployment rate above the shock path for eight quarters. This is perhaps not surprising given the huge initial jump in inflation (from a historical value of 1% to over 13%). Eventually, once

inflation comes down significantly but the recession lingers, the Federal Reserve's M policy shifts its priority to reducing unemployment so after the eighth quarter, the M unemployment rate path is below its value along the shock path.

What would happen if an automatic fiscal policy were in effect when the recession occurs (and the Federal Reserve continues to adhere to its interest rate rule)? We consider only the intermediate (cautious but powerful) fiscal policy, F2, and the modification described in (2) with $\beta = 8$ that scales down the anti-recession fiscal stimulus in proportion to the simultaneous inflation, F2I. In Figure 2a, the M&F2 unemployment rate is below the M&F2I unemployment rate (once the fiscal policies take effect); in the fifth quarter, the M&F2 unemployment rate is 8.2% whereas the M&F2I unemployment rate is 8.8%. On the other hand, in Figure 2b, the M&F2I inflation rate is below the M&F2 inflation rate; in the fifth quarter, the M&F2 inflation rate is 5.8% whereas the M&F2I inflation rate is 5.3%.

X. Automatic Fiscal Policy in Four Historical US Recessions

When would our policy have come into play during the past several decades? There were four recessions. What would have happened in the four recessions that occurred in the USA over the past quarter century (1975, 1982, 1991 and 2001 recessions) if our automatic fiscal policy had been put in place just prior to the onset of each recession? We begin by considering the first three recessions.[16] Policy M&F3 would have caused a significant reduction in the unemployment rate in all three recessions. Policy M&F2 would have caused a somewhat smaller reduction in the unemployment rate in the 1975 and 1982 recessions but, due to its 2% threshold, would not have been activated in the milder 1991 recession.

In the 2001 recession, whether even F3, our least cautious policy with a 0% threshold, would have been activated depends on the values projected for normal real GDP (Y_{nt}) in each quarter following our estimation period which ends in 2001.1. Because the economy was very strong just prior to the recession (in 2001.1 actual real GDP was 2.2% *greater* than normal real GDP and the unemployment rate was only 4.2%), real GDP would have had to decline to normal real GDP to trigger our least cautious policy F3, and to 2% below normal real GDP to trigger our more cautious policies F1 or F2 which have a threshold of 2%. If Y_{nt} were projected to grow at its average quarterly growth rate over the last six quarters of our estimation period (1999.4–2001.1), then even M&F3 would by a narrow margin not be triggered (actual real GDP

[16]Details are given in Seidman and Lewis (2002).

would still be 0.1% greater than projected normal real GDP). However, if Y_{nt} were projected to grow at its average quarterly growth rate over the last twelve quarters of our estimation period (1998.2–2001.1), then M&F3 would by a narrow margin be triggered for one quarter – actual real GDP would be 0.2% below projected normal real GDP in 2001.4 so a small transfer would occur in 2002.1 – but the transfer would be terminated in the next quarter (2002.2) because of the quick recovery of GDP.

XI. Automatic Fiscal Policy in Response to a Severe Recession that Begins in 2001

A severe recession is generated beginning in 2001.2 (the quarter following the end of the estimation period).[17] Under this recession, the shortfall in real GDP in the eighth quarter of the simulation would be 10.1%; i.e. real GDP would be 10.1% below its baseline value, and UR would be 9.4% (compared with the baseline value of 4.8%). What would happen if an automatic fiscal policy were in effect when the recession occurs? Policy M&F3 reduces the GDP shortfall in the eighth quarter to 3.4%, and UR, to 6.3%, while raising the deficit ratio 2.6 percentage points (from 1.0% to 3.6%) and raising the debt ratio 4.3 percentage points (from 23.8% to 28.1%). The small rise in the debt ratio is again reassuring.

Although the shock hits the economy in 2001.2, it takes several quarters for the transfers to go into effect. With M&F3, the transfer barely goes into effect in the third quarter (2001.4). There are two reasons for the lag of several quarters. First, in 2001.2, the baseline of the economy was strong: output was high and the unemployment rate was low; had there been no shock, on the baseline path actual output would have been well above normal output and the unemployment rate would have been only 4.2%. Second, there is a one-quarter implementation lag.

In fact, the US Congress implemented a rebate in 2001.3, sooner than our policy F3. The actual rebate in 2001.3 generated a counter-cyclical transfer ratio (R/Y_n) of 1.4%. One reason for the speed of implementation is that the rebate was one component of a long-debated large tax bill originally proposed a year earlier by candidate Bush during the presidential campaign. Congress was working on the tax bill in the first half of 2001; it enacted the bill, including the rebate, in June 2001. If a tax bill, aimed primarily at long-term issues, had not been in progress, it is doubtful that Congress would have enacted a rebate as promptly in response to the economic downturn. Nevertheless, it

[17]A more detailed account is given in Seidman and Lewis (2002).

should be emphasized that, if our automatic fiscal policy had been in place, Congress would have been free to move more quickly at its discretion because our automatic policy is a default position which can always be over-ridden by Congress.

It should be noted that, if the 2001 downturn had turned into as deep a recession as the one we consider, F3 eventually generates much larger counter-cyclical transfer ratios than the 1.4% enacted by Congress and implemented in 2001.3. With F3, the peak transfer ratio is 5.2%, which occurs in the fifth quarter of the simulation (2002.2).

XII. Conclusions

We have presented a new design for an automatic fiscal policy and analysed it in a macroeconometric model that has been estimated using quarterly data for the US economy. Our automatic fiscal policy consists of the triggering of a transfer (or income tax rebate) whenever real GDP is at least *X*% below normal; the amount of the transfer varies with the size of the GDP gap. The size of the transfer is set with the sole purpose of effectively combating a recession. We propose and analyse an automatic transfer (or income tax cut) because, despite the permanent income and life-cycle hypotheses, in our judgement recent empirical studies suggest that there is sufficient short-run response of consumption to temporary changes in disposable income due to transfers or income tax cuts to make such a policy sufficiently effective.

We offer our automatic fiscal policy as a complement to counter-cyclical monetary policy. In the current US recession, the Federal Reserve has cut the federal funds rate from 6.50% to 1.75%. We accept the dominant view that monetary policy should play an important counter-cyclical role, but believe that it would be useful to strengthen automatic counter-cyclical fiscal policy.

We propose an automatic policy because discretionary fiscal policy often takes too long to move through the legislative process. In the fall of 2001, with the recession deepening, Republicans and Democrats deadlocked over the best way to further stimulate the economy. Experience therefore suggests that it is important to make counter-cyclical fiscal policy automatic. The automatic policy can always be over-ridden by discretionary action by Congress and the President. The automatic policy is simply a default position: If Congress fails to take discretionary action, then stimulus is promptly triggered by the decline in the economy.

Current automatic stabilizers are unintended by-products of setting the ratio of tax revenue to GDP, the degree of progressivity of the tax system and the level of unemployment benefits. Hence, the magnitude of the stabilizing impact is held hostage to these objectives. We introduce an automatic fiscal

policy with the sole objective of effectively combating recession and can, therefore, set the magnitude solely for the purpose of stabilization.

We generate a severe recession (beginning in 1986) and simulate the impact of our automatic fiscal policy using historical data for several years. We assume that the Federal Reserve adheres to a counter-cyclical monetary policy governed by the interest rate (Taylor) rule estimated on historical data in the Fair model. We find that this interest rate rule alone mitigates the severe recession only modestly, whereas our automatic fiscal policy (together with the interest rate rule) substantially reduces the severity of the recession while generating only a relatively small rise in the government debt/GDP ratio. We simulate a false alarm of a severe recession and find that our automatic fiscal policy generates very little rise in inflation. In response to a supply shock due a sharp increase in import prices, our automatic fiscal policy moves less aggressively against the recession because of the concern for inflation, but our simulation shows that our policy still mitigates the recession with only a small rise in inflation. Simulating the policy in the 1975, 1982 and 1991 recessions, we find that the strongest version of our policy causes a significant reduction in the unemployment rate in all three recessions (while a weaker policy that is not activated unless the GDP gap exceeds 2% causes a somewhat smaller reduction in the unemployment rate in the 1975 and 1982 recessions, and is not activated in the milder 1991 recession). In the 2001 recession, based on projections of normal GDP, even the least cautious version of our policy would have been triggered for only one quarter.

We simulate a severe recession beginning in 2001. Our automatic policy makes a substantial improvement in mitigating the recession while causing only a small increase in the government debt/GDP ratio. It should be noted that if the actual 2001 recession had turned into as deep a recession as the one we simulated, our policy would have generated much larger counter-cyclical transfer ratios than the income tax rebate recently enacted by Congress and implemented in 2001.3.

A promising avenue for future research would be to analyse an automatic fiscal policy that involves a temporary consumption tax cut, rather than a transfer (or income tax rebate). This policy could be implemented through the value added tax (VAT). Such a policy might be a useful complement to the automatic tax rebate that we investigate in this paper.

Laurence S. Seidman
Department of Economics
University of Delaware
Newark, DE 19716
USA
SeidmanL@be.udel.edu

Kenneth A. Lewis
Department of Economics
University of Delaware
Newark, DE 19716
USA
LewisK@udel.edu

References

Auerbach, Alan J., and Daniel Feenberg (2000), 'The Significance of Federal Taxes as Automatic Stabilizers', *Journal of Economic Perspectives*, 14(3), Summer, 37–56.

Blinder, Alan S. (2001), 'The Economic Stimulus We Need', op ed page article in the *New York Times*, 28 September.

Branson, William H. (1973), 'The Use of Variable Tax Rates for Stabilization Purposes', in Richard A. Musgrave (ed.), *Broad-Based Taxes: New Options and Sources*, Baltimore, MD: Johns Hopkins University Press, 267–85.

Campbell, John Y., and N. Gregory Mankiw (1989), 'Consumption, Income, and Interest Rates: Reinterpreting the Times Series Evidence', in *NBER Macroeconomics Annual: 1989*, Cambridge, MA: MIT Press, 185–216.

Carroll, Christopher D. (1997), 'Buffer-Stock Saving and the Life-Cycle/Permanent Income Hypothesis', *Quarterly Journal of Economic*s, 112(1), February, 1–55.

Cohen, Darrel, and Glenn Follette (2000), 'The Automatic Fiscal Stabilizers: Quietly Doing Their Thing', *Federal Reserve Bank of New York Economic Policy Review*, 6(1), April, 35–67.

Duggal, Vijaya G. (1975), 'Fiscal Policy and Economic Stabilization', in Gary Fromm and Laurence R. Klein (eds), *The Brookings Model: Perspective and Recent Developments*, Amsterdam: North Holland.

Fair, Ray C. (1994), *Testing Macroeconometric Models*. Cambridge, MA: Harvard University Press.

Fair, Ray C. (1996), 'The Fair–Parke Program for the Estimation and Analysis of Nonlinear Econometric Models: User's Guide', available at Fairmodel.econ.yale.edu.

Fair, Ray C. (1999), 'A Fiscal Policy Rule for Stabilization', unpublished working paper, Cowles Foundation, February.

Fair, Ray C. (2000a), 'Fed Policy and the Effects of a Stock Market Crash on the Economy', *Business Economics*, 35(2), 7–14.

Fair, Ray C. (2000b), 'The US Model Workbook', available at Fairmodel.econ.yale.edu.

Fair, Ray C. (2001), 'Estimates of the Effectiveness of Monetary Policy', unpublished working paper, Cowles Foundation, May.

Feldstein, Martin (1976), 'Taxing Consumption', *The New Republic*, 28 February, 14–17.

Feldstein, Martin (2001), 'Japan Needs to Stimulate Spending', editorial page article, *Wall Street Journal*, 16 July.

Friedman, Milton (2001), 'No More Economic Stimulus Needed', *Wall Street Journal*, 10 October, A17.

Gordon, Robert J. (2000), *Macroeconomics*, 8th edn. Reading, MA: Addison-Wesley.

Klein, Lawrence R. (ed.) (1991), *Comparative Performance of U.S. Econometric Models*. New York: Oxford University Press.

Kuttner, Kenneth N., and Adam S. Posen (2001a), 'The Great Recession: Lessons for Macroeconomic Policy from Japan', *Brookings Papers on Economic Activity*, 2, 93–160.

Kuttner, Kenneth N., and Adam S. Posen (2001b), 'Passive Savers and Fiscal Policy Effectiveness in Japan', paper prepared for CEPR-CIRJE-NBER Conference on Issues in Fiscal Adjustment, Tokyo, Japan, December.

Mankiw, N. Gregory (2000), 'The Savers–Spenders Theory of Fiscal Policy', *American Economic Review Papers and Proceedings*, 90(2), May, 120–5.

Modigliani, Franco, and Charles Steindel (1977), 'Is a Tax Rebate an Effective Tool for Stabilization Policy?', *Brookings Papers on Economic Activity*, 1, 175–203.

Musgrave, Richard A. (1959), *The Theory of Public Finance*. New York: McGraw-Hill.

Orphanides, Athanasios, and Simon van Norden (1999), 'The Reliability of Output Gap Estimates in Real Time', Federal Reserve Board of Governors Working Paper, August.

Pack, Howard (1968), 'Formula Flexibility: A Quantitative Appraisal', in Albert Ando, E. Cary Brown and Ann Friedlaender (eds), *Studies in Economic Stabilization*, Washington DC: Brookings Institution.

Parker, Jonathan (1999), 'The Response of Household Consumption to Predictable Changes in Social Security Taxes', *American Economic Review*, 89(4), September, 959–73.

Phillips, A. W. (1954), 'Stabilisation Policy in a Closed Economy', *Economic Journal*, 64, June, 290–323.

Posen, Adam S. (1998), *Restoring Japan's Economic Growth*. Washington DC: Institute for International Economics.

Poterba, James M. (1988), 'Are Consumers Forward Looking? Evidence from Fiscal Experiments', *American Economic Review Papers and Proceedings*, 78(2), May, 413–18.

Reifschneider, David, Robert Tetlow and John Williams (1999), 'Aggregate Disturbances, Monetary Policy, and the Macroeconomy: The FRB/US Perspective', *Federal Reserve Bulletin*, January.

Seidman, Laurence S. (2001), 'Reviving Fiscal Policy', *Challenge*, 44(3), 17–42.

Seidman, Laurence S., and Kenneth A. Lewis (2002), 'Automatic Fiscal Policy: A New Design', paper presented at the conference 'Stabilizing the Economy: What Roles for Fiscal and Monetary Policy?' Council on Foreign Relations, 11 July, 2002.

Shapiro, Matthew D., and Joel Slemrod (1995), 'Consumer Response to the Timing of Income: Evidence from the Change in Tax Withholding', *American Economic Review*, 85(1), March, 274–83.

Shapiro, Matthew D., and Joel Slemrod (2002a), 'Consumer Response to Tax Rebates', University of Michigan and NBER, 25 June.

Shapiro, Matthew D., and Joel Slemrod (2002b), 'Did the 2001 Tax Rebate Stimulate Spending? Evidence from Taxpayer Surveys', paper prepared for the NBER Tax Policy and the Economy conference, September.

Souleles, Nicholas S. (1999), 'The Response of Household Consumption to Income tax Refunds', *American Economic Review*, 89(4), September, 947–58.

Souleles, Nicholas S. (2002), 'Consumer Response to the Reagan Tax Cuts', *Journal of Public Economics*, 89(4), July, 99–120.

Taylor, John B. (1999), 'A Historical Analysis of Monetary Policy Rules', in John B. Taylor (ed.), *Monetary Policy Rules*, Chicago: University of Chicago Press.

Taylor, John B. (2000), 'Reassessing Discretionary Fiscal Policy', *Journal of Economic Perspectives*, 14(3), Summer, 21–36.

Tversky, Amos, and Daniel Kahneman (1973), 'Availability: A Heuristic for Judging Frequency and Probability', *Cognitive Psychology*, 5(2), September, 207–32.

Wolff, Edward N. (1998), 'Recent Trends in the Size Distribution of Household Wealth', *Journal of Economic Perspectives*, 12(3), Summer, 131–50.