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Is Fiscal Stimulus a Good Idea?

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The results in this paper, using a structural multicountry macroeconometric model, suggest that there is at most a small gain from fiscal stimulus in the form of increased transfer payments or increased tax deductions if the increased debt generated must eventually be paid back. *The gain in output and employment on the way up is roughly offset by the loss in output and employment on the way down as the debt from the initial stimulus is paid off. This conclusion is robust to different assumptions about monetary policy. To the extent that there is a gain, the longer one waits to begin paying the debt back the better. Possible caveats regarding the model used are that (1) monetary policy is not powerful enough to keep the economy at full employment, (2) potential output is taken to be exogenous, (3) possible permanent effects on asset prices and animal spirits from a stimulus are not taken into account, and (4) the model does not have the feature that in really bad times the economy might collapse without a stimulus.*
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The U.S. stimulus bill passed in February 2009 (the American Recovery and Reinvestment Act of 2009) was large by historical standards. The bill totaled about $750 billion over four years, with most of the stimulus in the form of increased transfer payments and decreased taxes. Only about 15 percent was in the form of increased government purchases of goods and services. There are considerable differences of opinion as to how effective the stimulus was, and the bill has stimulated research on estimating the size of government spending multipliers. Obviously, the larger the multipliers the larger is the short-run gain in output.

This paper is concerned with a more general question than simply the size of government spending multipliers or the effects of the stimulus bill. The question is whether fiscal stimulus is ever a good idea. A structural multicountry macroeconometric model, denoted the "MC" model, is used to analyze this question. The experiments use federal transfer payments as the government spending variable. The MC model has positive government spending multipliers, and so one might think that the answer to the question posed in this paper is obviously yes. It will be seen, however, that there is very little gain, if any, from an increase in transfer payments *if the increased spending must eventually be paid for.* The gain in output and employment on the way up is roughly offset by the loss in output and employment on the way down as the debt from the initial stimulus is paid off. It will be seen that the results are not sensitive to different monetary policy assumptions.

The use of transfer payments as the government spending variable covers many tax policies as well. Many tax changes are changes in what are sometimes called "tax expenditures"—changing loopholes, deductions, and so on—rather than changes in tax rates. Changes like these are essentially changes in transfer payments. Also, federal grants-in-aid to state and local governments can be considered transfer payments to the extent that state and local governments in turn transfer the money to households. The experiments in this paper thus encompass a fairly wide range of policy variables. This paper does not, however, consider government purchases of goods and services, which may have investment components. If government spending on, say, transportation pays for itself in the future through increased government revenue of various forms, there is no increase in the long-run debt and so no need to reverse anything in the future.

An experiment consists of increasing transfer payments from a baseline run for eight quarters, then either decreasing them immediately for eight quarters or waiting 16 quarters and decreasing them for eight quarters. The decreases are chosen to get the debt/GDP ratio back to baseline by 56 quarters after the

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initial quarter of the increase. The horizon is thus 14 years. Within this horizon, using a discount rate of 2 percent (vs. zero) makes little difference to the conclusions, as will be seen. Discounting would, of course, make a difference if one waited, say, 30 or 40 years before contracting. Waiting this long is close to just never paying the debt back. This paper is concerned with the case in which the debt must be paid back in a shorter amount of time.

1. Previous Literature

Ramey [2011] reviews the literature on estimating the size of the government spending multiplier, where government spending is purchases of goods (not transfer payments) and there are no spending decreases or tax increases later. She concludes that the multiplier is probably between 0.8 and 1.5, although the range is considerably higher than this.

Fair [2010] also compares multipliers from a few studies, both regarding an increase in government purchases of goods and an increase in transfer payments or a decrease in taxes. After four quarters for an increase in purchases of goods the multiplier is 1.44 for Romer and Bernstein [2009], 0.44 for Barro and Redlick [2011], 0.55 for Hall [2009], 1.96 for the MC model, and a range of 1.0 to 2.5 for the CBO [2010]. After four quarters for an increase in transfer payments or decrease in taxes, the multiplier is 0.66 for Romer and Bernstein [2009], 1.10 for Romer and Romer [2010], 1.1 for Barro and Redlick [2011], 0.99 for the MC model, and a range of 0.8 to 2.1 for the CBO [2010]. The Romer and Bernstein multiplier peaks at 0.99 after eight quarters, the Romer and Romer multiplier peaks at 3.08 after 10 quarters, and the MC multiplier peaks at 1.10 after six quarters. Again, there are no future spending decreases or tax increases for these results.

The CBO [2010] uses results from two commercial forecasting models and the FRB-U.S. model of the Federal Reserve Board to choose ranges for a number of government spending and tax multipliers on output. Romer and Bernstein [2009] follow a similar methodology. They use a commercial forecasting model and the FRB-U.S. model to choose government spending and tax multipliers on output.

Hall [2009], Barro and Redlick [2011], and Romer and Romer [2010] follow a reduced form approach. The change in real GDP is regressed on the change in the policy variable of interest and a number of other variables. The equation estimated is not, however, a true reduced form equation because many variables are omitted, and so the coefficient estimate of the policy variable will be biased if the policy variable is correlated with omitted variables. The aim using this approach is to choose a policy variable that seems unlikely to be correlated with the omitted variables. Hall [2009] and Barro and Redlick [2011] are concerned with government spending multipliers and focus on defense spending during wars.[1] Romer and Romer [2010] are concerned with tax multipliers and use narrative records to choose what they consider exogenous tax policy actions, that is, actions that are uncorrelated with the omitted variables.

Auerbach and Gorodnichenko [2012] use a structural VAR approach that allows for different multipliers in expansions and recessions to estimate government spending (on goods and services) multipliers. Their general result is that multipliers are larger in recessions than in expansions. Their experiments on ones with no future tax increases or spending decreases.

Coenen and others [2012] estimate government spending multipliers for nine DSGE models. The experiments consist of government spending or tax shocks from a steady state, where each model has a fiscal-policy rule that eventually returns the economy to the steady state, so there is no long-run increase in the debt/GDP ratio. The models have rational expectations, and so everyone knows that the initial increase in debt will be paid off eventually. The experiments are run under various assumptions about monetary accommodation. The experiments with these models differ from those reported above in that the debt/GDP ratio is forced back to the baseline (the steady state) in the long run. One might think that the fiscal multipliers would be small in these models because agents know that the extra spending will eventually be paid for. In fact, the short-run multipliers are fairly large in most cases and the sums of the output gaps over the entire period are generally positive. For government purchases of goods the short-run multipliers are between about 0.7 and 1.0 for the United States with no monetary accommodation and between about 1.2 and 2.2 with two years of monetary accommodation. The short-run multipliers are also fairly large for increases in transfer payments that are targeted to liquidity-constrained households, ranging from about 1.0 to 1.5 with two years of monetary accommodation. The tone of the Coenen and others [2012] article is that temporary fiscal stimulus can be very helpful, especially if there is monetary accommodation.

The general features of the DSGE models that lead to the above conclusion are the following. A government spending increase (or decrease in taxes) stimulates liquidity-constrained households to consume more. Given this increased demand, firms that are

[1] Barro and Redlick [2011] also estimate a tax multiplier.

allowed to change their prices raise them, but firms that are not allowed to change their prices are committed to sell all that is demanded at their current (unchanged) prices. The overall price level goes up, but there is also an output effect. All this happens even though agents in the model know that the increased government debt will eventually be paid back through lower future government spending or higher taxes. The initial (essentially constrained) output effect dominates. It is also the case that the mark-up falls for those firms that cannot change their prices. The increased inflation that is generated may lead the monetary authority to raise the interest rate, and so the results are sensitive to what is assumed about monetary policy.

There is finally a recent paper by DeLong and Summers [2012], which argues that there may be times in which fiscal expansions are self-financing—no long-run increase in the debt/GDP ratio. There are no estimated equations in this paper, no lagged effects of government spending on output, and some calibrated parameters that seem unrealistic or for which there is little empirical support. For example, the marginal tax-and-transfer rate is taken to be 0.33, which seems too high. In 2011 the ratio of federal government tax receipts (including social security taxes) and unemployment benefits to GDP was 0.17. This is an average rate and the marginal rate may be higher, but 37 percent of tax receipts are social security taxes, where the tax rate is flat and then zero at some income level. There is also a key hysteresis parameter in the model, also calibrated, which reflects the assumption that potential output depends on current output in depressed states of the economy. If current fiscal stimulus increases future potential output, there is obviously some effect large enough to generate enough extra future government revenue to pay for the stimulus.

2. The MC Model

The MC model uses the methodology of structural macroeconometric modeling, sometimes called the "Cowles Commission" (CC) approach, which goes back at least to Tinbergen [1939]. I have gathered my research in macroeconomics in one document, *Macroeconometric Modeling, November 11, 2013* (*MM*), on my website, and this document contains a complete description and listing of the MC model. *MM* is written using the current version of the MC model (November 11, 2013), where published results using earlier versions of the model have been updated.[2] The MC model is not explained in this paper, and one should think of *MM* as an appendix to this paper. When appropriate, I have indicated in this paper in brackets the sections in *MM* that contain relevant discussion. This paper is thus not self contained. It is too much to try to put all the relevant information in one paper, hence the use of *MM* as an appendix. The methodology of the CC approach is also discussed and defended in *MM* [1.1].

There are 39 countries in the MC model for which stochastic equations are estimated. There are 25 stochastic equations for the United States and up to 13 each for the other countries. The total number of stochastic equations is 310, and the total number of estimated coefficients is about 1,300. In addition, there are 1,379 bilateral trade share equations estimated, so the total number of stochastic equations is 1,689. The total number of endogenous and exogenous variables, not counting various transformations of the variables and the trade share variables, is about 2,000. Trade share data were collected for 59 countries, and so the trade share matrix is 59 × 59.

The estimation periods begin in 1954 for the United States and as soon after 1960 as data permit for the other countries. Data permitting, they end as late as 2013:Q3. The estimation technique is 2SLS except when there are too few observations to make the technique practical, where ordinary least squares is used. The estimation accounts for possible serial correlation of the error terms. When there is serial correlation, the serial correlation coefficients are estimated along with the structural coefficients.

To get an idea of the properties of the MC model, Table 1 presents transfer payment multipliers for the period 1992:Q1–2005:Q4. The level of real transfer payments is permanently increased by 1.0 percent of potential real GDP from its baseline values. This is an experiment in which nothing is paid for: no changes to any exogenous variable were made except for transfer payments. The table shows that the peak multiplier for output is 0.96 after seven quarters. The multiplier settles down to about 0.7 after about 16 quarters. By 2005:Q4 the debt/GDP ratio has risen by 11.85 percentage points.

3. The Experiments

The results in this paper are based on actual data through 2013:Q3 (data available as of November 11, 2013). Values for the 2013:Q4–2022:Q4 period are used for some of the experiments, and these values are

[2] Users can work with the MC model online or can download the model and related software to work with it on their own computer. If the model is downloaded, it can be modified and reestimated. Many of the results in *MM* can be duplicated online.

Table 1. Transfer Payment Multipliers using the MC Model Deviations from Baseline in Percentage Points

Qtr	*Y*	*UR*	*P*	*R*	*D*
1992:Q1	0.17	−0.04	0.03	0.03	0.14
1992:Q2	0.40	−0.11	0.10	0.11	0.22
1992:Q3	0.60	−0.20	0.18	0.21	0.28
1992:Q4	0.76	−0.29	0.26	0.30	0.34
1993:Q1	0.87	−0.37	0.34	0.38	0.44
1993:Q2	0.93	−0.42	0.42	0.44	0.55
1993:Q3	0.96	−0.46	0.50	0.49	0.69
1993:Q4	0.95	−0.47	0.58	0.52	0.85
1994:Q1	0.92	−0.47	0.62	0.54	1.05
1994:Q2	0.89	−0.45	0.67	0.54	1.26
1994:Q3	0.84	−0.42	0.71	0.53	1.48
1994:Q4	0.80	−0.41	0.74	0.53	1.72
1995:Q1	0.77	−0.37	0.77	0.52	1.97
1995:Q2	0.75	−0.33	0.79	0.49	2.22
1995:Q3	0.73	−0.32	0.79	0.48	2.47
1995:Q4	0.73	−0.31	0.81	0.47	2.72
1996:Q4	0.71	−0.29	0.87	0.46	3.68
1997:Q4	0.70	−0.29	0.95	0.46	4.67
1998:Q4	0.72	−0.29	1.02	0.46	5.61
1999:Q4	0.73	−0.29	1.11	0.46	6.52
2000:Q4	0.73	−0.30	1.17	0.46	7.48
2001:Q4	0.79	−0.31	1.24	0.47	8.64
2002:Q4	0.74	−0.32	1.31	0.48	9.69
2003:Q4	0.73	−0.32	1.34	0.47	10.43
2004:Q4	0.71	−0.31	1.37	0.45	11.17
2005:Q4	0.77	−0.35	1.40	0.48	11.85

Y = real GDP. *GDPR* in *MM*.
UR = unemployment rate. *UR* in *MM*.
P = GDP deflator. *GDPD* in *MM*.
R = three-month Treasury bill rate. *RS* in *MM*.
D = nominal federal debt/nominal GDP. *AGZGDP* in *MM*.
Percent deviations for *Y* and *P*, absolute deviations for *UR*, *R*, and *D*.

Experiment is a sustained increase in real transfer payments (*TRGHQ* in *MM*) of 1.0 percent of potential real GDP (*YS* in *MM*).

from a forecast I made on November 11, 2013 using the MC model. These values are on my website.[3]

Three 56-quarter periods are considered, beginning respectively in 1975:Q1, 1992:Q1, and 2009:Q1. When the MC model is solved for a given period with all the residuals set to their estimated values and the actual values of all the exogenous variables used, a perfect tracking solution is obtained. The baseline run for each of the three periods is taken to be this solution, namely just the actual values of all the variables. The estimated residuals are added to the equations and treated as exogenous for all the experiments. The experiments thus run off the perfect tracking solution. Each experiment consists of increasing real transfer payments for the first eight quarters of the period from their baseline values. As a percentage of a measure of potential output in the model, the increases are per quarter 0.5, 1.0, 1.5, 2.0, 2.0, 2.0, 2.0, and 2.0. The increases are thus phased in for the first year and then held at 2.0 percent for the second year. The first quarter of each period was chosen to be a quarter of high unemployment.

For experiment "NOWAIT" the decreases begin in the ninth quarter, where as a percentage of potential output they are per quarter 0.5λ, 1.0λ, 1.5λ, 2.0λ, 2.0λ, 2.0λ, 2.0λ, and 2.0λ. λ is chosen to be the smallest value that results in the debt/GDP ratio returning to its baseline value sometime before the end of the 56-quarter period.[4] Experiment "WAIT" is the same as experiment NOWAIT except that the decreases begin in quarter 25. For quarters 9 through 24 (and after quarter 32) the transfer payment values are the baseline values. Experiment WAIT thus has a 4-year gap before the decreases begin.

Regarding monetary policy, the estimated U.S. interest rate rule—*MM* [3.6.10]—is used for one set of experiments, denoted "RULE." This equation has the property that the interest rate generally rises during the stimulus stage and falls during the de-stimulus stage. The Federal Reserve is estimated to "lean against the wind." For the second set of experiments, denoted "NORULE," the interest rate rule is dropped and the interest rate is taken to be exogenous. Its value for each quarter is the baseline value. This is the case in which the Federal Reserve does not raise interest rates on the way up, but also does not lower them on the way down. It "accommodates" the fiscal policy changes. For the period beginning in 2009:Q1, RULE is not used, because for part of this period the interest rate was at a zero lower bound. The estimated rule is not necessarily reliable in this case. The NORULE case keeps the interest rate at the zero lower bound when it was in fact at the zero lower bound.

The following tables present the results for five variables: real GDP (*Y*), the total number of jobs in the economy (*J*), the total number of people unemployed (*U*), the GDP deflator (*P*), and the federal government

[3]For countries other than the United States data were not available as late as 2013:Q3, and the overall forecast began earlier than 2013:Q4, with actual values used for the United States until 2013:Q4.

[4]As will be seen, the MC model cycles somewhat, including values of the debt/GDP ratio, and the stopping value of λ was taken to be the first time the debt/GDP ratio came within 0.0005 of its baseline value (0.05 percentage points).

Table 2. Estimated Effects for the 1975:Q1–1988:Q4 Period

Experiment	$\sum Y$	$\sum J$	$\sum U$	P end	D end	$\sum \beta Y$	$\sum \beta J$	$\sum \beta U$	λ
NOPAY, RULE	172.1	10.79	−5.19	0.18	2.26	142.7	8.98	−4.33	—
NOWAIT, RULE	−11.6	−0.82	0.02	−0.08	0	−11.4	−0.86	0.04	1.00
WAIT, RULE	58.2	3.76	−1.97	0.02	0	41.5	2.68	−1.50	0.70
NOPAY, NORULE	179.9	11.34	−5.05	0.34	1.59	145.2	9.17	−4.09	—
NOWAIT, NORULE	21.1	1.23	−0.84	0.06	0	16.2	0.88	−0.69	0.90
WAIT, NORULE	59.3	2.89	−1.74	0.10	0	41.9	1.71	−1.31	0.65

Y = real GDP, billions of 2009 dollars. *GDPR* in *MM*.
J = total number of jobs, millions of jobs. $JF + JG + JM + JS$ in *MM*.
U = total unemployment, millions of people. U in *MM*.
P = GDP deflator. *GDPD* in *MM*.
D = nominal federal debt/nominal GDP. *AGZGDP* in *MM*.
λ, see text.
$\sum$ = sum of deviations from baseline over the 56 quarters.
$\sum \beta$ = discounted sum of deviations from baseline over the 56 quarters, 2 percent discount rate.
P end = percent deviation of P from baseline in last quarter, percentage points.
D end = absolute deviation of D from baseline in last quarter, percentage points.

Table 3. Estimated Effects for the 1992:Q1–2005:Q4 Period

Experiment	$\sum Y$	$\sum J$	$\sum U$	P end	D end	$\sum \beta Y$	$\sum \beta J$	$\sum \beta U$	λ
NOPAY, RULE	273.4	13.51	−6.35	0.20	2.62	223.0	11.09	−5.19	—
NOWAIT, RULE	8.9	0.40	−0.43	−0.02	0	2.3	0.06	−0.25	1.00
WAIT, RULE	37.7	2.56	−2.13	−0.04	0	16.9	1.36	−1.54	1.00
NOPAY, NORULE	285.2	14.35	−6.40	0.26	1.88	228.3	11.56	−5.11	—
NOWAIT, NORULE	5.1	0.04	−0.25	−0.04	0	−0.6	−0.27	−0.10	1.00
WAIT, NORULE	48.5	2.78	−2.33	−0.02	0	24.5	1.36	−1.68	0.90

See notes to Table 2.

debt/GDP ratio (D). Y is at a quarterly rate. Two values are presented for each of the first three variables and each experiment. The first is the sum of the deviations of the variable from its baseline value over the 56 quarters, denoted $\sum I$, where I is the variable. The second is the discounted sum using a discount rate of 2 percent at an annual rate, denoted $\sum \beta I$. Also presented are the values of P and D at the end of the period, where the value for P is the percent deviation from baseline and the value for D is the absolute deviation from baseline (in percentage points). The values of λ are also presented. The full MC model is solved for each experiment except that the estimated US interest rate rule is dropped for the NORULE experiments.

4. Results

Summary results are presented in Tables 2, 3, and 4 for the three periods. The experiments using the interest rate rule are presented first in each table except for Table 4, where the rule is not used. The first experiment of each set of three experiments is the case where there is no future de-stimulus, denoted "NOPAY." NOPAY is always stimulative. For example, in Table 3 the sum of the output deviations from baseline over the 56 quarters is \$273.4 billion for RULE and \$285.2 billions for NORULE. The sums of the jobs deviations are 13.51 and 14.35 million workers, respectively. The sums of the number of people unemployed are −6.35 and −6.40 million, respectively. The debt/GDP ratio at the end of the period for RULE is larger by 2.62 percentage points. For NORULE it is larger by 1.88 percentage points. The GDP deflator is larger at the end of the period in both cases, but the effect is very small.

Turning to the cases where there is de-stimulus, it is always true that WAIT is more stimulative than NOWAIT. Loosely speaking, by waiting 4 years before de-stimulating, the economy has time to build on the initial stimulus, which lessens the cost of getting

Table 4. Estimated Effects for the 2009:Q1–2022:Q4 Period

Experiment	$\sum Y$	$\sum J$	$\sum U$	P end	D end	$\sum \beta Y$	$\sum \beta J$	$\sum \beta U$	λ
NOPAY, NORULE	346.7	12.59	–5.87	0.17	2.22	274.8	10.08	–4.65	—
NOWAIT, NORULE	–12.3	–0.50	–0.07	–0.03	0	–18.3	–0.74	0.06	0.95
WAIT, NORULE	22.3	1.31	–1.53	–0.08	0	–4.9	0.14	–0.97	0.90

See notes to Table 2.

the debt/GDP ratio back to baseline. In fact, except for NOWAIT, NORULE in Table 2, NOWAIT is never stimulative. The sums are negative or close to zero, even when discounting. The sums for WAIT, while all positive, are very small in Tables 3 and 4. Only in Table 2 would one say that the effort might be worth it. In Table 2 the output sum for WAIT, RULE is \$58.2 billion, compared with \$172.1 billion in the NOPAY, RULE case. The MC model is nonlinear, and this is the main reason for the differences across tables.

Comparing WAIT, RULE with WAIT, NORULE, NORULE is slightly more stimulative. When RULE is in effect, the Federal Reserve increases interest rates as the stimulus is taking place, which, among other things, increases federal interest payments and thus the federal debt. Six years after the beginning of the stimulus the debt is larger than it otherwise would be because of the increased interest rates. It thus takes a little more work to get the debt/GDP ratio back to baseline than it would if interest rates never increased (from baseline), as in the NORULE case. In the RULE case interest rates do fall during the de-stimulus, which helps lower interest payments, but the net effect is for slightly more overall expansion in the NORULE case.

None of the conclusions are changed by discounting. If anything, the argument against stimulating may be a little stronger with discounting. As there are endogenous cycles in the MC model because of physical stock effects—*MM* [3.6.11]—this means that after de-stimulus has taken place (five to nine years out) physical stocks are sometimes lower than baseline, which, other things being equal, leads to increased investment in the future. So for the last few years of the 14-year period, the output gaps can be positive. If these gaps are discounted, the overall gain from the experiment is thus smaller than if they are not discounted, other things being equal.

The long-run effects on the GDP deflator are always small, as would be expected given that the sums of the output deviations are small. λ, which measures the size of the de-stimulus needed to get the debt/GDP ratio back to baseline, is larger (with one tie) for NOWAIT vs. WAIT. It is also larger for RULE vs. NORULE (with one tie). The range is from 0.65 to 1.05.

Table 5 gives more detailed results for the WAIT, RULE experiment in Table 3. The values in Table 5 are deviations from baseline for each of the 56 quarters. The first column is for real transfer payments, which is the exogenous spending variable. The remaining variables are endogenous. Two physical stock variables are presented, excess capital (*EXK*) and the housing stock (*KH*), to give a sense of the physical stock effects in the model. The table shows that five quarters after the end of the de-stimulus, the output deviations are positive, reflecting in part the physical stock effects. The debt/GDP deviations reach a peak at 2.78 four quarters before the de-stimulus and then gradually fall to zero. (This experiment used a value of λ of 1.00. Using a value of 0.95 did not result in any of the debt/GDP deviations falling below 0.05 percentage points.) The Federal Reserve raised the interest rate during and somewhat after the stimulus and then lowered it during the de-stimulus.

5. Caveats

It may be surprising that a model in the Cowles Commission tradition like the MC model suggests that fiscal stimulus is not very effective. Keynes famous statement that "in the long run we are all dead" is consistent with ignoring any increases in the debt/GDP ratio that may result from fiscal stimulus, in which case stimulus is effective. The relevant statement for the present experiments, on the other hand, is "in the long run the debt must be paid off," admittedly not quite as catchy.

A key question when considering a fiscal stimulus is thus whether the long run can be ignored. In periods of low debt/GDP ratios, like much of the postwar period until about 2008, permanently raising the debt/GDP ratio may not have been much of a worry. At the present time (2014), however, the debt/GDP ratio is high and rising, and it is a worry to many people. One concern is that at some (unpredictable) time there will be negative asset market reactions.

Table 5. More Detailed Results for WAIT, RULE in Table 3 Absolute Deviations from Baseline

Qtr	*TR*	*Y*	*J*	*U*	*R*	*EXK*	*KH*	*D*
1992:Q1	10.7	1.7	0.02	−0.02	0.01	−8.3	0.4	0.06
1992:Q2	21.6	5.8	0.10	−0.09	0.06	−27.3	1.6	0.16
1992:Q3	32.6	12.1	0.24	−0.20	0.16	−56.1	3.8	0.28
1992:Q4	43.8	20.1	0.44	−0.37	0.29	−91.8	7.0	0.43
1993:Q1	44.1	27.5	0.69	−0.55	0.44	−122.7	10.9	0.56
1993:Q2	44.4	33.3	0.95	−0.74	0.59	−144.1	15.1	0.71
1993:Q3	44.9	37.3	1.19	−0.89	0.72	−155.1	19.4	0.89
1993:Q4	45.3	39.6	1.40	−0.99	0.82	−157.0	23.4	1.10
1994:Q1	0.0	33.1	1.45	−0.97	0.83	−116.0	25.3	1.17
1994:Q2	0.0	23.1	1.37	−0.79	0.73	−59.3	25.5	1.36
1994:Q3	0.0	12.9	1.17	−0.55	0.56	−3.7	24.3	1.62
1994:Q4	0.0	4.6	0.91	−0.33	0.41	41.0	22.2	1.88
1995:Q1	0.0	−1.7	0.65	−0.09	0.27	73.1	19.5	2.13
1995:Q2	0.0	−5.7	0.41	0.11	0.13	92.5	16.6	2.34
1995:Q3	0.0	−7.8	0.21	0.22	0.03	101.3	13.6	2.55
1995:Q4	0.0	−8.6	0.05	0.29	−0.03	102.2	10.7	2.66
1996:Q1	0.0	−8.2	−0.05	0.32	−0.07	97.2	8.2	2.74
1996:Q2	0.0	−7.2	−0.11	0.31	−0.08	88.8	6.0	2.75
1996:Q3	0.0	−5.8	−0.14	0.28	−0.08	78.2	4.1	2.77
1996:Q4	0.0	−4.2	−0.14	0.23	−0.08	67.0	2.7	2.78
1997:Q1	0.0	−2.6	−0.13	0.18	−0.06	56.4	1.6	2.77
1997:Q2	0.0	−1.3	−0.10	0.13	−0.04	47.0	0.7	2.76
1997:Q3	0.0	−0.2	−0.06	0.08	−0.02	38.7	0.2	2.74
1997:Q4	0.0	0.8	−0.03	0.04	0.00	31.7	−0.1	2.74
1998:Q1	−13.4	−0.7	−0.03	0.03	0.00	35.8	−0.8	2.67
1998:Q2	−27.1	−5.2	−0.08	0.07	−0.04	53.5	−2.3	2.56
1998:Q3	−41.0	−12.7	−0.22	0.18	−0.12	83.6	−5.0	2.40
1998:Q4	−55.3	−22.3	−0.43	0.34	−0.24	122.3	−9.0	2.17
1999:Q1	−55.8	−31.3	−0.69	0.54	−0.38	156.0	−13.8	1.98
1999:Q2	−56.3	−38.0	−0.97	0.71	−0.51	177.0	−19.0	1.75
1999:Q3	−57.0	−42.5	−1.21	0.84	−0.62	186.2	−24.4	1.48
1999:Q4	−57.6	−45.1	−1.42	0.93	−0.70	185.7	−29.5	1.17
2000:Q1	0.0	−35.8	−1.46	0.85	−0.68	131.0	−32.0	1.11
2000:Q2	0.0	−23.2	−1.33	0.65	−0.56	62.4	−32.2	0.96
2000:Q3	0.0	−10.4	−1.08	0.40	−0.41	−4.3	−30.9	0.78
2000:Q4	0.0	−0.5	−0.79	0.17	−0.27	−55.6	−28.4	0.61
2001:Q1	0.0	6.3	−0.51	−0.05	−0.15	−89.8	−25.2	0.47
2001:Q2	0.0	10.5	−0.26	−0.22	−0.04	−109.7	−21.6	0.34
2001:Q3	0.0	12.4	−0.05	−0.32	0.04	−117.6	−17.9	0.25
2001:Q4	0.0	12.9	0.09	−0.38	0.09	−117.3	−14.3	0.17
2002:Q1	0.0	12.5	0.19	−0.39	0.11	−112.4	−11.0	0.12
2002:Q2	0.0	11.3	0.25	−0.37	0.12	−103.5	−8.0	0.08
2002:Q3	0.0	9.8	0.28	−0.34	0.12	−92.8	−5.4	0.06
2002:Q4	0.0	8.2	0.28	−0.30	0.12	−81.6	−3.2	0.04
2003:Q1	0.0	6.7	0.27	−0.25	0.11	−70.9	−1.4	0.03
2003:Q2	0.0	5.3	0.24	−0.21	0.09	−61.1	0.0	0.03
2003:Q3	0.0	4.0	0.21	−0.16	0.08	−52.2	1.1	0.03
2003:Q4	0.0	2.9	0.18	−0.13	0.06	−44.1	1.9	0.04
2004:Q1	0.0	2.1	0.15	−0.10	0.05	−37.2	2.5	0.04
2004:Q2	0.0	1.3	0.12	−0.07	0.04	−31.2	2.9	0.05
2004:Q3	0.0	0.8	0.10	−0.05	0.03	−26.2	3.2	0.06
2004:Q4	0.0	0.3	0.07	−0.03	0.02	−22.0	3.3	0.06
2005:Q1	0.0	0.1	0.05	−0.02	0.02	−18.6	3.3	0.07
2005:Q2	0.0	−0.1	0.04	−0.01	0.02	−15.9	3.2	0.07
2005:Q3	0.0	−0.2	0.03	−0.01	0.02	−13.6	3.1	0.07
2005:Q4	0.0	−0.3	0.02	−0.01	0.02	−11.4	2.9	0.08

See notes to Table 2 for *Y*, *J*, *U*, and *D*.
TR = real transfer payments, billions of 2009 dollars. *TRGHQ* in *MM*.
R = three-month Treasury bill rate, percentage points. *RS* in *MM*.
EXK = excess capital, billions of 2009 dollars. *KK–KKMIN* in *MM*.
KH = stock of housing, billions of 2009 dollars. *KH* in *MM*.

Given the constraint that any stimulus must eventually be paid for, why might the conclusion that there is little gain from fiscal stimulus be wrong? Regarding monetary policy, it has modest effects in the MC model —*MM* [4.4]. The policy of NORULE, which is the accommodating policy, gives slightly better results than RULE, but the differences are not large. If the model is wrong and monetary policy is powerful enough to keep the economy at full employment, then fiscal stimulus is unnecessary, making the question posed in this paper uninteresting.

The conclusion could be sensitive to the treatment of potential output, which is taken to be exogenous in the model. If, as in the DeLong and Summers [2012] story, potential output is positively affected by stimulus measures, this would increase the case for fiscal stimulus. The main possibility in the MC model would be a permanent increase in long-run labor or capital productivity (upward shifts of peak-to-peak interpolations in the model—*MM* [6.3.9]). This possible effect is hard to estimate and probably second order, but it has been ignored here. Remember that the fiscal stimulus tool used here is the level of transfer payments or tax expenditures. The conclusion does not pertain to government purchases of goods and services, which in many cases are partly investment and may have positive rates of return.

Another feature of the MC model is that changes in asset prices are either exogenous or only slightly affected by the economy—*MM* [4.3]. A stimulus, for example, does not lead to large changes in stock prices. If it is instead the case that a stimulus leads to large and permanent increases in asset prices, which would in the model have positive effects on consumption and investment, the economy could grow fast enough to lead to only a small increase in the debt/GDP ratio, which could be paid off with a small de-stimulus. As changes in asset prices are roughly random walks with drift, it is unlikely that effects of stimulus measures on asset prices could be estimated.

If stimulus measures permanently increase animal spirits (consumer and investor confidence and the like), this could increase consumption and investment demand beyond what the model estimates. Again, the economy might grow fast enough to lead to only a small increase in the debt/GDP ratio, which could easily be paid off. This effect is also hard to estimate. There are also possible *negative* animal spirits from a stimulus in periods where the debt/GDP is high. There is recent work (see, for example, Bloom [2009]) examining the effects of uncertainty on the economy, where an increase in uncertainty may decrease aggregate demand. If a stimulus increases uncertainty because of expected future increases in the debt/GDP ratio, this could have a negative effect on consumption and investment demand.

There is an interesting "collapse" argument in Coenen and others [2012]. They argue that in really bad times, like 2008, without stimulus measures the economy might go into a downward spiral "where collapses in different sectors start to feed on each other due to balance sheet and demand interdependencies between multiple sectors." (p. 31) They point out that their DSGE models do not capture these extreme effects. Neither does the MC model. Although the collapse argument could be true, it is not really possible to test.

Finally, a general criticism of the present results is that the MC model is so badly misspecified that none of the estimates are trustworthy. A different conclusion is reached using the DSGE models in Coenen and others [2012], and one might trust these models more. However, the MC model is more empirically based than are DSGE models, which tend to be heavily calibrated. The key property of DSGE models, namely that there are gains to short run fiscal stimulus, relies on price-setting restrictions, usually Calvo pricing, liquidity-constrained households, and rational expectations, all of which have limited empirical backing. The MC model is more empirically grounded and thus possibly more trustworthy. But at a minimum the use of a model in the Cowles Commission tradition provides an alternative way of estimating the effects of fiscal stimulus—a reality check if you will on DSGE results.

6. Conclusion

The results in this paper suggest that there is at most a small gain from fiscal stimulus in the form of increased transfer payments or increased tax deductions if the increased debt generated must eventually be paid back. This conclusion is robust to different assumptions about monetary policy. To the extent that there is a gain, the longer one waits to begin paying the debt back the better.

Possible caveats regarding the MC model are that (1) monetary policy is not powerful enough to keep the economy at full employment, (2) potential output is taken to be exogenous, (3) possible permanent effects on asset prices and animal spirits from a stimulus are not taken into account, and (4) the model does not have the feature that in really bad times the economy might collapse without a stimulus.

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