Transfers Plus Open-Market Purchases:
A Remedy for Recession†

Laurence Seidman and Kenneth Lewis

January 2004

*http://www.be.udel.edu/economics/workingpaper.htm
†© 2004 by author(s). All rights reserved.
TRANSFERS PLUS OPEN-MARKET PURCHASES:
A REMEDY FOR RECESSION

Kenneth A. Lewis
Laurence S. Seidman
Department of Economics
University of Delaware
January 2004
Abstract

This paper simulates the use of transfers to households plus central-bank open-market purchases to generate a recovery of a low-interest-rate economy from a negative demand shock. Transfers to households are automatically triggered in recession; the prescribed anti-recession transfer ratio is proportional to the unemployment gap. Three alternative complementary monetary policies that the Federal Reserve might decide to implement are considered: standard, moderate, and aggressive. The simulations suggest that transfers plus open market purchases are likely to be an effective remedy for such a recession while limiting potential adverse impacts on inflation and government debt held by the non-central-bank public.
1. Introduction

Suppose an economy with a low nominal interest rate is subject to a negative demand shock that generates a recession. The recent “zero interest rate bound” literature has examined whether monetary policy alone would be sufficient to generate a recovery (Fuhrer and Sniderman, 2000). Although a few studies draw optimistic conclusions, others do not. Rather than put all our eggs in one basket, it therefore seems prudent to examine other remedies (Brainard, 1967). This paper examines and simulates the use of transfers to households plus central-bank open-market purchases to generate a recovery of the U.S. economy from a recession. The transfers would be automatically triggered by recession and detriggered by recovery.

Bernanke (2000, p162-63) recommended transfers plus open-market purchases as a remedy for Japan's recession:

"Money-Financed Transfers

...An alternative strategy...is money-financed transfers to domestic households— the real-life equivalent of that hoary thought experiment, the 'helicopter drop' of newly printed money...Of course, the Bank of Japan (BOJ) has no unilateral authority to rain money on the population. The policy being proposed— a money-financed tax cut— is a combination of fiscal and monetary measures. All this means is that some intra-governmental cooperation would be required...The willingness of the BOJ to purchase government securities equal to the cost of the tax cut would serve to reduce the net interest cost of the tax cut to government...By the way, I do not think that such cooperation would in any way compromise the BOJ's newly won independence, as some have suggested. In financing a tax cut, the BOJ would be taking voluntary action in pursuit of its legally mandated goal, the pursuit of price stability. Cooperation with the fiscal authorities in pursuit of a common goal is not the same as subservience."

Three objections to transfers plus open-market purchases can be raised: (1) “Transfers are ineffective in raising consumer spending in the short run”; (2) “It will increase government debt and impose a burden on future taxpayers”; (3) “It will be inflationary.” We consider each objection in turn.
First, are transfers ineffective in stimulating consumer spending in the short run? According to extreme versions of the permanent income and life-cycle hypotheses, such transfers should cause only a small increase in consumer spending in the short run. In the past decade, however, several empirical studies have challenged the validity of the extreme versions of these hypotheses. Although permanent income or life-time wealth remains important, current disposable income turns out to have an important short-run impact on consumer spending.

After surveying recent empirical studies, Mankiw (2000) writes (p. 120):

“...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.”

These studies find that many households do in fact promptly 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 nondurable goods with respect to a decline in income is roughly one-half. Souleles (1999) studies the impact of income-tax refunds and concludes that consumption increases by at least 35% of a refund within three months.¹ Mankiw says imperfect smoothing occurs because some consumers may not be "rational" and may simply extrapolate their current income into the future because it is the only definite information available, and some may face borrowing constraints, as indicated by the finding that some engage in buffer-stock saving to prepare for emergencies, and

¹Souleles (2001) finds a similar result for the Reagan tax cut.
by the fact that many households have virtually zero wealth. 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.”

A study by Shapiro and Slemrod reported in their two articles (2003a, 2003b) appears at first glance to run counter to the other studies as well as to their earlier study (Shapiro and Slemrod 1995). They analyze consumer surveys concerning the 2001 tax rebate ($600 per family, with checks mailed from the U.S. Treasury to households in July, August, and September) and assert that the short-run impact was small. Seidman and Lewis (2003), however, show that there are serious problems with their consumer surveys; they do not obtain any direct evidence on the marginal propensity to consume (MPC) out of the rebate; and even if their survey results were valid, simulations suggest that a tax rebate twice as large repeated for four quarters would have significantly mitigated the 2001 recession. According to a presentation by Parker (2003), preliminary results from his recent study with Souleles of the 2001 rebate finds a substantial short-run impact on consumption.

Second, will transfers plus open-market purchases increase government debt and impose a burden on future taxpayers? It is true that transfers will increase the issue of government debt—the treasury must borrow by selling new bonds when it raises transfers or cuts taxes. But the burden on future taxpayers can be kept less than the debt issued by the treasury. Though the treasury is prohibited from selling bonds directly to the central bank, the central bank can simultaneously buy Treasury securities from the public through open-market operations. The central bank can then exempt the treasury from paying interest or principal on the securities it
purchases (Seidman, 2001, p22-23). Then debt held by the public (excluding the central bank) will increase less due to these open-market purchases. To make sure the public understands this fact, the government should present official data on “government debt held by the public excluding the central bank.”

Third, will transfers plus open-market purchases to remedy a recession be inflationary? It is true that permanent continuous transfers plus open-market purchases would eventually be inflationary. But what is proposed is a temporary stimulus. The aim of the temporary transfers plus open-market purchases is to raise aggregate demand back to normal. The objective is to raise demand just enough so that output will be normal and prices stable (or rising slowly).

There is, of course, a risk that transfers plus open-market purchases will prove permanent, rather than temporary. There are two ways to minimize this risk. First, we propose that the transfers be automatically triggered by recession and detriggered by recovery as described elsewhere (Seidman and Lewis 2002) and below in this paper. While transfers can be implemented by discretionary action by Congress, we will assume in this paper that Congress has pre-enacted a formula for automatically triggering and detriggering the transfers according to the unemployment rate. Automatic detriggering reduces the risk of inflation.

Second, there should be an institutional separation of powers between the treasury and the central bank. It is crucial that the central bank be independent of the treasury, and that the treasury be prohibited from issuing money to finance its deficits. Historically, large budget deficits have indeed often led to inflation, even hyperinflation, when they have been money-financed for a sustained period. In these historical episodes, the treasury and central bank were usually consolidated into a single unit so that “the government” simply printed money to finance
its deficits. But with an independent central bank and a prohibition against printing money by the treasury, budget deficits need not lead to an excessive rise in aggregate demand.

To create a political climate receptive to transfers plus open-market purchases in a recession, a government should practice fiscal discipline whenever the economy is running normally, balancing its budget or even running surpluses, thereby achieving a low debt/GDP ratio (Seidman, 2001). An advocate of aggressive fiscal policy in a recession, rather than being indifferent to the deficits and debt in a normal economy, should be especially determined to maintain fiscal discipline during prosperity.²

The government’s credible public commitment to use transfers plus open-market purchases in a recession should help induce the private sector to maintain its spending in a recession. If the economy is hit with a negative demand shock that throws it into a recession, will households and business managers expect the economy to recover, or will they expect the recession to deepen or drag on? If they expect the government to act aggressively and effectively to stimulate recovery, they will continue to spend, and this behavior will sustain aggregate demand, and in itself help generate a recovery. On the other hand, if they expect the government

² To do this, Congress can enact a statute entitled NUBAR-- a “normal unemployment balanced budget rule” (Seidman 2003). NUBAR would state that Congress shall enact a planned budget for the coming fiscal year that technicians estimate will be balanced if the unemployment rate is normal. With NUBAR, if the economy has a normal unemployment rate, the budget will on average be roughly balanced. If the economy has a boom with a below-normal unemployment rate, the budget will run a surplus that can further pay down the national debt.
to be passive, they may cut their spending, thereby deepening or prolonging the recession.

Why transfers (or temporary tax cuts) rather than government purchases? After all, $50 billion of government purchases would have a stronger first round effect on aggregate demand than $50 billion of transfers because consumers spend transfers only gradually. On the other hand, transfers to households have a more even sectoral and geographical first-round effect on the economy—the first round effect would be spread across all sectors and regions instead of being concentrated in the military and construction sectors and locations. Thus, transfers and government purchases each have advantages and disadvantages. In this paper, we limit our analysis to transfers.

2. The Macroeconometric Model

We use the Fair US quarterly macroeconometric model estimated from 1952.1 through 2003.2 (the July 31, 2003 version). The Fair model is a mainstream traditional model with properties roughly similar to several other macroeconometric models. Fair makes his model accessible to other researchers, and we find its structure plausible and realistic. We estimate and simulate the Fair model using the Fair-Parke program (Fair 1996) downloaded from Fair’s

---

3 Klein (1991) reports a comparison of several models. For each of the following models the short-term interest rate was reduced 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]).

For monetary policy, the Fair model estimates an interest-rate reaction function based on the historical behavior of the Federal Reserve. The estimated reaction function implies that the Federal Reserve generally engages in counter-cyclical monetary policy, lowering the three-month Treasury-bill rate in response to a rise in the unemployment rate, and raising the bill rate in response to a rise in the inflation rate. In the model, a decline in the bill rate causes: (1) a decline in two long rates--the corporate bond rate and the mortgage rate--through term structure equations; (2) an increase in the demand for deposits plus currency by households and by firms, and in the demand for currency; and (3) an increase in the quantity of exports, a rise in the price of imports, and a reduction in the quantity of imports.4 Like other traditional models, the Fair model does 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, Tetlow, and Williams (1999)). However, because counter-cyclical transfers generate temporary rather than permanent deficits, rational financial market participants should not expect future deficits from our policy, so this omission is less relevant for our study.

We calculate that the Fair model gives the following estimates for the marginal propensity to consume (MPC) out of disposable income: one-quarter MPC = .20, two-quarter MPC = .36,

4 We follow Fair’s instructions for linking a reduction in the U.S. Treasury-bill rate to an endogenous rise in the quantity of exports, rise in the price of imports, and a reduction in the quantity of imports, so our simulations include an endogenous rise in net exports in response to expansionary monetary policy. See Fair’s website for details in a document entitled, “EX,PIM Endogenous.” The link is USModel/EXPIM Endog.
three-quarter MPC = .47, and four-quarter MPC = .55. We obtain these estimates as follows. In the Fair model, real per capita consumption this quarter \( (C_t) \) is a function of real per capita disposable income this quarter \( (YD_t) \) and real per capita consumption last quarter \( (C_{t-1}) \).

Suppose an increment in real per capita disposable income occurs in quarter 1 only: Without the increment,
YD would have been YD₁' and with the increment YD is YD₁, so the increment is \( \Delta YD₁ / YD₁ \). This increment will raise quarter 1 consumption directly through the YD₁ term in the equation, and will also raise consumption in subsequent quarters through the Ct₁ term. Let \( Cᵢ \) be real per capita consumption in quarter i following \( \Delta YD₁ \), and \( Cᵢ' \) be real per capita consumption in quarter i had there been no \( \Delta YD₁ \). Then \( \Delta Cᵢ / Cᵢ - Cᵢ' \) is the increment in consumption in quarter i due to \( \Delta YD₁ \), and \( \Sigma_{i=1}^{J} \Delta Cᵢ \) is the cumulative increment in consumption over J quarters due to \( \Delta YD₁ \). The marginal propensity to consume (MPC) in one quarter—“the one-quarter MPC”-- is defined as \( \Delta C₁ / \Delta YD₁ \), and “the J-quarter MPC” is defined as \( (\Sigma_{i=1}^{J} \Delta Cᵢ) / \Delta YD₁ \).

Note that the time period—the number of quarters—of an MPC must always be indicated. The Fair model has an estimated consumption equation for each of the following three components of real per capita consumption spending: consumer durables, consumption of services, and consumption of non-durables. To obtain the J-quarter MPC out of disposable income for the Fair model, we calculate \( (\Sigma_{i=1}^{J} \Delta Cᵢ) / \Delta YD₁ \) for each equation using its estimated coefficients. Then summing over the three components gives the J-quarter MPC.⁵

3. The Recession

Before introducing the recession, we describe Fair's baseline (non-recession) forecast which, in his July 31, 2003 version of the model, begins in 2003.3. The baseline Fair forecast for the fourth quarter (2004.2) is shown in column 0 of Table 1, and for the eighth quarter (2005.2) in

⁵ Details of the calculation are given in Seidman and Lewis (2003).
column 0 of Table 2. Under the Fair forecast, in the fourth quarter, the unemployment rate (U) is

<table>
<thead>
<tr>
<th></th>
<th>Fair Baseline</th>
<th>Recession Standard</th>
<th>Aggressive M</th>
<th>Standard M and F[0.5%,2]</th>
<th>Moderate M and F[0.5%,2]</th>
<th>Aggressive M and F[0.5%,2]</th>
</tr>
</thead>
<tbody>
<tr>
<td>U</td>
<td>5.7%</td>
<td>7.9%</td>
<td>7.8%</td>
<td>7.5%</td>
<td>7.1%</td>
<td>7.1%</td>
</tr>
<tr>
<td>%P</td>
<td>2.3%</td>
<td>0.8%</td>
<td>0.9%</td>
<td>1.1%</td>
<td>1.4%</td>
<td>1.4%</td>
</tr>
<tr>
<td>RS</td>
<td>2.1%</td>
<td>2.1%</td>
<td>0.3%</td>
<td>0.0%</td>
<td>0.7%</td>
<td>0.0%</td>
</tr>
<tr>
<td>RB</td>
<td>4.9%</td>
<td>4.9%</td>
<td>4.0%</td>
<td>2.2%</td>
<td>4.4%</td>
<td>3.9%</td>
</tr>
<tr>
<td>RM</td>
<td>5.3%</td>
<td>5.3%</td>
<td>4.3%</td>
<td>2.3%</td>
<td>4.6%</td>
<td>4.2%</td>
</tr>
<tr>
<td>B/Y</td>
<td>32.4%</td>
<td>36.4%</td>
<td>36.1%</td>
<td>31.8%</td>
<td>37.4%</td>
<td>37.2%</td>
</tr>
<tr>
<td>D/Y</td>
<td>3.2%</td>
<td>5.1%</td>
<td>4.9%</td>
<td>4.6%</td>
<td>7.7%</td>
<td>7.5%</td>
</tr>
<tr>
<td>R/Y</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2.9%</td>
<td>2.8%</td>
</tr>
<tr>
<td>R%Base</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>33.2%</td>
<td>32.3%</td>
</tr>
<tr>
<td>ΔB₄</td>
<td>$261.9</td>
<td>$382.9</td>
<td>$369.7</td>
<td>$-69.6</td>
<td>$580.8</td>
<td>$571.3</td>
</tr>
<tr>
<td>ΔH₄</td>
<td>$47.4</td>
<td>$41.5</td>
<td>$48.5</td>
<td>$471.0</td>
<td>$48.8</td>
<td>$50.6</td>
</tr>
<tr>
<td>%ΔB₄</td>
<td>84.7%</td>
<td>90.2%</td>
<td>88.4%</td>
<td>-</td>
<td>92.2%</td>
<td>91.9%</td>
</tr>
<tr>
<td>%ΔH₄</td>
<td>15.3%</td>
<td>9.8%</td>
<td>11.6%</td>
<td>-</td>
<td>7.8%</td>
<td>8.1%</td>
</tr>
</tbody>
</table>

Table 1: Simulation Results for the Fourth Quarter (2004.2)

Dollar Entries in Billions
Table 2: Simulation Results for the Eighth Quarter (2005.2)

Dollar Entries in Billions

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fair</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>5.5%</td>
<td>7.9%</td>
<td>7.4%</td>
<td>6.7%</td>
<td>6.5%</td>
<td>6.3%</td>
<td>5.9%</td>
</tr>
<tr>
<td>Recession</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>2.5%</td>
<td>1.3%</td>
<td>1.7%</td>
<td>2.2%</td>
<td>2.1%</td>
<td>2.3%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Aggressive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>2.7%</td>
<td>2.7%</td>
<td>0.5%</td>
<td>0.0%</td>
<td>1.5%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>M and F[0.5%,2]</td>
<td>4.9%</td>
<td>4.9%</td>
<td>3.5%</td>
<td>0.9%</td>
<td>4.1%</td>
<td>3.3%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Moderate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M and F[0.5%,2]</td>
<td>5.5%</td>
<td>5.5%</td>
<td>4.0%</td>
<td>0.9%</td>
<td>4.6%</td>
<td>3.7%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Aggressive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M and F[0.5%,2]</td>
<td>33.1%</td>
<td>39.2%</td>
<td>38.3%</td>
<td>35.7%</td>
<td>41.2%</td>
<td>40.6%</td>
<td>37.8%</td>
</tr>
<tr>
<td>B/Y</td>
<td>3.4%</td>
<td>5.5%</td>
<td>5.1%</td>
<td>4.4%</td>
<td>6.3%</td>
<td>5.9%</td>
<td>4.6%</td>
</tr>
<tr>
<td>D/Y</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.5%</td>
<td>1.2%</td>
<td>0.4%</td>
</tr>
<tr>
<td>R/Y</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>16.9%</td>
<td>14.2%</td>
<td>4.9%</td>
</tr>
<tr>
<td>R%Base</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>∆B8</td>
<td>$556.7</td>
<td>$868.7</td>
<td>$815.8</td>
<td>$593.3</td>
<td>$1245.6</td>
<td>$1195.8</td>
<td>$908.5</td>
</tr>
<tr>
<td>∆H8</td>
<td>$95.0</td>
<td>$80.4</td>
<td>$96.1</td>
<td>$240.7</td>
<td>$95.6</td>
<td>$103.0</td>
<td>$240.7</td>
</tr>
<tr>
<td>%∆B8</td>
<td>85.4%</td>
<td>91.5%</td>
<td>89.5%</td>
<td>71.1%</td>
<td>92.9%</td>
<td>92.1%</td>
<td>79.1%</td>
</tr>
<tr>
<td>%∆H8</td>
<td>14.6%</td>
<td>8.5%</td>
<td>10.5%</td>
<td>28.9%</td>
<td>7.1%</td>
<td>7.9%</td>
<td>20.9%</td>
</tr>
</tbody>
</table>
5.7%, the three-month Treasury bill rate (RS) is 2.1%, the corporate bond rate (RB) is 4.9%, and the mortgage rate (RM) is 5.3%. In the eighth quarter, the unemployment rate is 5.5%, the bill rate is 2.7%, the bond rate is 4.9%, and the mortgage rate is 5.5%.⁶

We introduce a negative demand shock beginning in 2003.3 that generates a recession. We adjust (generally downward) the individual constant terms for eight quarters (2003.3-2005.2) in each of five equations: the equations for consumer expenditure for services, nondurables, and durables, as well as the equations for residential housing investment and business capital stock (which thereby reduces non-residential fixed investment). If (hypothetically) monetary policy is adjusted to keep the bill rate on its baseline path (projected by Fair's forecast), then in the fourth quarter, 2004.2, as shown in column 1 in Table 1, the unemployment rate is 7.9%, and in the eighth quarter, 2005.2, as shown in column 1 in Table 2, the unemployment rate is 7.9%.⁷ We will refer to column 1 as “the recession.”

4. Monetary Policies

---

⁶ The Treasury bill rate is the auction average, the bond rate is the Aaa corporate bond rate, and mortgage rate is the FHA secondary market mortgage rate. All three rates are quarterly averages of monthly data.

⁷ This simulation uses the “addfact” and the “exogenous variable=RS” commands in Fair-Parke.
Suppose 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. The simulation generated by adherence to this interest rate rule equation we call the *standard* monetary policy simulation. With standard monetary policy, the bill rate in the fourth quarter is 0.3% (versus 2.1% in the recession simulation) as shown in Table 1, column 2, and in the eighth quarter is 0.5% (versus 2.7% in the recession) as shown in Table 2, column 2. But this standard monetary policy reduces the unemployment rate only to 7.8% in the fourth quarter (Table 1, column 2) versus 7.9% in the recession (column 1), and to 7.4% in the eighth quarter (Table 2, column 2) versus 7.9% in the recession. Note that through the models's term structure equations, this standard monetary policy reduces long rates as follows: in the fourth quarter, the bond rate is 4.0% (versus 4.9% in the recession) and the mortgage rate is 4.3% (versus 5.3% in the recession); and in the eighth quarter, the bond rate is 3.5% (versus 4.9% in the recession) and the mortgage rate is 4.0% (versus 5.5% in the recession).

---

8 We drop the “exogenous variable=RS" command but retain the “addfact" commands in Fair-Parke.
Now suppose the Fed is more aggressive: the Fed goes beyond the expansion prescribed by its historic interest rate rule and increases its expansion of open-market purchases more than enough to reduce the bill rate to zero— that is, we assume the Fed injects a quantity of high-powered money that exceeds the amount needed to reduce bill rate to zero. We assume the Fed achieves a smooth rise in bank reserves (relative to its path under the standard monetary policy) over roughly five quarters which the Fed then gradually reverses over the next three quarters (in the Appendix we present the details of how we modify the Fair model to simulate the aggressive monetary policy). We set the bill rate exogenously to zero wherever it appears in the model and modify the equations for the demand for deposits plus currency by households and by firms, and the demand for currency, so that each increases with the monetary expansion. We assume that this large expansion of open-market purchases collapses the term structure of interest rates, bringing down long rates even though the bill rate cannot fall below zero. We model this collapse by introducing an autoregressive equation for each long rate.\footnote{The discussion in Fair's (2003a) Table A.8: Solutions under Alternative Monetary Policy Assumptions is a useful guide for the modifications to the Fair model that are made for this simulation (in particular, the column for UBR exogenous). Because the path of the exogenous bank reserves push the equilibrium Treasury bill rate below zero, however, it is necessary to modify the material in Table A.8.} We caution, however, that it is far from certain that this collapse would be achieved. For example, if financial market participants believe the Fed's expansion signals future inflation, long rates may not come down.

In column 3, we report what would happen if long rates do come down so that monetary policy is more powerful. Table 1, column 3 reports a fourth quarter unemployment rate of 7.5\% (versus 7.8\% under standard monetary policy), and Table 2, column 3 reports an eighth quarter unemployment rate of 6.7\% (versus 7.4\% under standard monetary policy). Under the collapse of
the term structure, the bond rate is reduced to 2.2% in the fourth quarter (versus 4.0% under standard monetary policy) and 0.9% in the eighth quarter (versus 3.5%); and the mortgage rate is reduced to 2.3% in the fourth quarter (versus 4.3%) and 0.9% in the eighth quarter (versus 4.0%). We emphasize that this collapse may not occur; hence, column 3 may give an over-optimistic view of what aggressive monetary policy alone can accomplish.

5. Counter-Cyclical Transfers to Households

While transfers can be implemented by discretionary action by Congress, we will assume in this paper that Congress pre-enacts a transfer rule that prescribes an automatic triggering of a new cash transfer to households in response to a high unemployment rate— in particular, the rule prescribes a “transfer/GDP ratio” that is proportional to the “unemployment gap.” Specifically, the aggregate new anti-recession transfer \( R \) would be given by

\[
R/Y_{-1} = s[U_{-1} - (U^N + T)], \quad R > 0,
\]

where \( R/Y_{-1} \) is the “transfer ratio” and \( [U_{-1} - (U^N + T)] \) is the “unemployment gap”; \( U_{-1} \) is last quarter's unemployment rate, \( U^N \) is the NAIRU (the non-accelerating inflation rate of unemployment), \( T \) is a threshold above the NAIRU, \( s \) is the strength parameter, \( R \) is the aggregate transfer, and \( Y_{-1} \) is last quarter's GDP. Hence, the transfer rule prescribes a transfer/GDP ratio that is proportional to the unemployment gap. The Congressional Budget Office would provide an estimate of the NAIRU. Based on the advice of technical staff, Congress would pre-enact the values of \( T \) and \( s \).
The CBO's most recent estimate of the NAIRU is 5.2%. Suppose T is set equal to 0.5%. Then the transfer would be triggered whenever the unemployment rate exceeds 5.7%. Suppose s is set equal to 2. For example, if last quarter's unemployment rate \( U_{\text{-}1} \) was 7.2%, so 
\[
[U_{\text{-}1} - (U^N + T)] = 1.5%,
\]
then applying the formula above, \( R/Y_{\text{-}1} = 2[7.2\% - (5.2\%+0.5\%)] = 3.0\%,
\]
so the aggregate transfer that would be triggered this quarter would equal 3% of last quarter's GDP-- we will say that the prescribed transfer/GDP ratio is 3%. We will refer to \( [U_{\text{-}1} - (U^N + T)] \) as the unemployment gap (or \( U \) gap), which in this example, is 1.5%. With s=2, the transfer ratio would be twice the unemployment gap. Congress could also specify in advance that the amount of cash transfer would be automatically scaled down if inflation is high; for example, the transfer might be reduced by a given percent for each percentage point that the inflation rate exceeds a threshold (Seidman and Lewis 2002). Congress would also have to specify how the aggregate transfer is distributed to individual households.

We assume it is administratively feasible to trigger a transfer this quarter based on the unemployment rate \( U_{\text{-}1} \) and GDP \( Y_{\text{-}1} \) for the preceding quarter. The Bureau of Labor Statistics announces its estimate of last month's unemployment rate on the first Friday of this month. The Department of Commerce issues a preliminary estimate for the preceding quarter's GDP one month after the end of the quarter. To mail the checks out in the second and third month, the Treasury can have the addresses ready to go in advance and can enter the dollar amount per check as soon as the Commerce Department's GDP estimate is available.10 The actual experience with

10 Just as it did for the 1975 and 2001 rebates, Congress would indicate how the aggregate amount converts into specific dollar amounts on individual checks. In 2001, each two-adult households received $600, whereas in 1975 the dollar amount varied between $0 and $200 based on income.
the 2001 $600 tax rebate— enacted in June, and mailed out in July, August, and September— shows that implementing the transfer policy with a one-quarter lag is feasible. Similar speed of implementation was achieved in the summer of 2003 in the advanced payment of a recently enacted increase in the child tax credit.

We introduce into the Fair model a new endogenous transfer from the federal government to households through the transfer rule.\(^\text{11}\) The new endogenous transfer is included in the Fair model as follows. The real transfer is \(R_t\) (and real GDP in the preceding quarter is \(Y_{t-1}\)). The total nominal transfer from federal government to households is \(TRGH_t = TRGH_{bt} + (PH_t)R_t\), where \(TRGH_{bt}\) is Fair’s nominal exogenous transfer and \((PH_t)R_t\) is the nominal anti-recession transfer (\(PH_t\) is a consumer price deflator). Implementing the transfer rule involves solving the Fair model successively with the Fair-Parke program.\(^\text{12}\)

Recall that we reported above that the Fair model gives the following estimates for the marginal propensity to consume (MPC) out of disposable income: one-quarter MPC = .20, two-

\(^{11}\) Another endogenous transfer which is already included in the Fair model is nominal state and local unemployment insurance benefits. Fair (2003b) presents simulations of the Fair model modified to include a fiscal policy rule for indirect business taxes.

\(^{12}\) Initially, the variable TRGH is treated endogenously (utilizing the GENR command); the TRGH path and the U gap path are solved simultaneously. In successive rounds the TRGH path is treated as exogenous from the previous round and the model is solved for the endogenous U gap path. The transfer rule is then used to solve for the implied TRGH path. Iteration continues until the TRGH path is roughly the same in consecutive rounds.
quarter MPC = .36, three-quarter MPC = .47, and four-quarter MPC = .55. Suppose consumers respond to an anti-recession transfer the way they respond to other disposable income. Then the Fair model estimates that 20% of the transfer would “be spent” by the end of the first quarter, 36% by the end of the second quarter, 47% by the end of the third quarter, and 55% by the end of the fourth quarter (i.e. 55% of the transfer is spent within a year).

The simulations that are reported in the tables are based on the assumption that consumers treat anti-recession transfers like other disposable income. We find this plausible for the following reason. Contrast two scenarios. First, a transfer bumps disposable income abruptly above its normal growth path. Second, there is a recession, and a transfer keeps the growth path of disposable income closer to normal. It seems plausible that consumers might spend more of the transfer in the second scenario than in the first. To illustrate the second scenario, suppose a $50,000 employee receives a 2% pay increase due to recession instead of a normal 4% pay increase; this 2% shortfall would reduce the employee’s pay $1,000 below normal growth. A transfer of $1,000 would restore this employee to normal salary growth. Consumers might well respond to a $1,000 rebate that sustains normal growth in the same way they would have responded to $1,000 of normal growth if there been no recession.

Column 4 in Tables 1 and 2 shows what would happen if the transfer rule were enacted just prior to the onset of the recession and the Federal Reserve were to respond 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). Specifically, suppose the transfer rule threshold $T$ is 0.5% and the strength parameter $s$ is 2. Hence, the column 4 label is standard M and F[0.5%,2]).
Given the CBO estimate of the NAIRU of 5.2%, the transfer rule formula is $R/Y_{-1} = 2[U_{-1} - (5.2\% + 0.5\%)]$. The recession begins in 2003.3, but because of the one-quarter implementation lag, the initial transfer occurs in 2003.4. The transfer rule (along with Fed's interest rate rule) reduces the unemployment rate to 7.1% in the fourth quarter (Table 1, column 4) versus 7.9% in the recession (column 1), 7.8% under standard monetary policy alone (column 2), and 7.5% under aggressive monetary policy alone (column 3). In the eighth quarter, the unemployment rate is reduced to 6.5% (Table 2, column 4) versus 7.9%, 7.4%, and 6.7%. The transfer rule (with standard monetary policy) achieves a better path for the unemployment rate than reported in column 3 for aggressive monetary policy alone.

---

13 Note that the interest rates in column 4 are somewhat greater than those column 2. Even though both columns assume the identical interest rate rule, the transfers leads to a lower unemployment rate; in essence, some of the pressure to lower the unemployment rate has been taken off the Fed.
The transfer rule, however, generates a larger rise in government debt held by the public (excluding the central bank). The transfer rule raises the “debt ratio” (B/Y)-- the ratio of government debt held by the public (excluding the central bank) to GDP\textsuperscript{14} -- to 41.2% in the eighth quarter (Table 2, column 4) versus 33.1% in Fair's baseline (column 0), and 39.2% under the recession (column 1). While the rise in the debt ratio due to the recession itself (from 33.1% to 39.2%) is larger than the rise due to the transfer rule (from 39.2% to 41.2%), the transfer rule does worsen the rise in the debt ratio.

How does this rise in the debt ratio due to the transfer rule come about? The transfer rule raises the “deficit ratio” (D/Y)-- the ratio of the government deficit to GDP\textsuperscript{15}. For example, in the fourth quarter (Table 1) the deficit ratio is 7.7% (column 4) versus 3.2% in Fair's baseline (column 0) and 5.1% in the recession (column 1). The cumulative effect of such deficits generates the rise in the debt ratio by the eighth quarter reported above.

How large are the transfers? The transfer rule (with strength parameter s=2) generates a “transfer ratio” (R/Y)-- the ratio of the new anti-recession transfer to GDP\textsuperscript{16}-- in the fourth quarter (Table 1) of 2.9% (column 4) and in the eighth quarter (Table 2) of 1.5% (column 4), so the new

\textsuperscript{14} The debt ratio is the ratio of the value of government securities outstanding (outside the federal government including the Fed) deflated by the GDP deflator, to annual real GDP.

\textsuperscript{15} The deficit ratio is the ratio of the NIPA nominal federal deficit deflated by the GDP deflator, to real GDP.

\textsuperscript{16} The transfer ratio is the ratio of the real anti-recession transfer R to real GDP.
transfer is 33.2% of Fair's exogenous baseline transfer (R%Base) in the fourth quarter, and 16.9% of Fair's exogenous baseline transfer in the eighth quarter.

6. Transfers Plus Open Market Purchases

To reduce the debt and deficit ratios that result from the transfer rule, the Fed can increase its open market purchases beyond the amount prescribed by its historic interest rate rule. The Fed would buy more treasury securities, so less government debt would be held by the public. The additional monetary stimulus would strengthen the economy, automatically increasing tax revenue and reducing the amount of the triggered transfer, thereby reducing both the deficit and debt ratios.

Specifically, we simulate the path of the economy under the same transfer rule (with $s=2$), but with a more expansionary monetary policy. We consider two options for more expansionary monetary policy. Under the first, which we will call “moderate” monetary policy, open-market purchases are increased just enough to reach a bill rate of zero; the impact of transfers plus moderate monetary is shown in column 5. Under the second, monetary policy is the same as the one that generated the results in column 3, which we call “aggressive” monetary policy. Here the Fed increases its expansion of open-market purchases more than enough to reduce the bill rate to

---

17 This simulation uses the Fair-Parke command, “exogenous variable=RS.” Otherwise it is the same as the simulation reported in column 4 (with the transfer rule).
zero. The impact of transfers plus aggressive monetary policy is shown in column 6.\textsuperscript{18}

Complementing the transfer rule with moderate monetary policy reduces interest rates. For example, in column 5 Table 2 in the eighth quarter, the bill rate is 0.0% (versus 1.5% with standard monetary policy), the bond rate is 3.3% versus 4.1%, and the mortgage rate is 3.7% versus 4.6%. Consequently, the economy slightly strengthens: the unemployment rate is 6.3% in the eighth quarter versus 6.5% under standard monetary policy. Moderate monetary policy somewhat reduces the rise in the debt ratio— the ratio of government debt held by the public (excluding the central bank) to GDP: the debt ratio B/Y is 40.6% in the eighth quarter (column 5) versus 41.2%.

Column 6 uses the same aggressive monetary policy that generated the results in column 3. Recall from our discussion of column 3 above that this large expansion of open market purchases is assumed to collapse the term structure of interest rates, bringing down long rates even though the bill rate cannot fall below zero. Complementing the transfer rule with aggressive monetary policy further strengthens the economy: the unemployment rate is 6.9% in the fourth quarter (Table 1, column 6) versus 7.1% under standard monetary policy (column 4); and 5.9% in the eighth quarter (Table 2, column 6) versus 6.5%.

Complementing the transfer rule with aggressive monetary policy reduces the rise in the

\textsuperscript{18} This simulation combines the elements of the simulation reported in column 4 (with the transfer rule) and the simulation reported in column 3 (with bank reserves exogenous plus additional modifications). Details of the aggressive monetary policy were described earlier when the column 3 results were presented.
debt ratio: the transfer rule with standard monetary policy would cause the debt ratio to rise to 41.2% in the eighth quarter (Table 2, column 4), but with aggressive monetary policy the debt ratio would rise only to 37.8% (column 6).

Complementing the transfer rule with aggressive monetary policy results in a stronger economy and therefore a smaller deficit ratio: the deficit ratio is 6.9% with aggressive monetary policy in the fourth quarter (Table 1, column 6) versus 7.7% with standard monetary policy (column 4). Because of the stronger economy, the dollar value of the counter-cyclical transfers is less with aggressive monetary policy: the fourth quarter transfer ratio is 2.5% (column 6) versus 2.9% with standard monetary policy (column 4); the eighth quarter transfer ratio is 0.4% versus 1.5%.

It is important to note, however, that transfers plus aggressive monetary policy, triggered in recession and detriggered by recovery, cause only a modest increase in inflation. In the eighth quarter, the inflation rate (%P) is 2.5% (Table 2, column 6) versus 1.7% with no transfers and standard monetary policy (column 2).

The bottom rows of Tables 1 and 2 provide insight into the extent of monetization present when the transfer rule is complemented with aggressive monetary policy. In each quarter of each simulation, there is a budget deficit requiring the Treasury to sell securities. The Treasury sells the securities to the public, but the Fed buys some of these securities from the public through open-market purchases, thereby injecting high-powered money. The amount of securities sold by the Treasury therefore equals the increase in the debt held by the public plus the increase in high-powered money.

Row ∆B₄ in Table 1 is the cumulative increase in debt held by the public through the fourth
quarter; and row $\Delta B_8$ in Table 2 is the cumulative increase in debt held by the public through the eighth quarter. With aggressive monetary policy complementing the transfers, the cumulative increase in debt held by the public is smaller: in the fourth quarter, it is $128.0$ billion (Table 1, column 6) versus $580.8$ billion with standard monetary policy (column 4); and in the eighth quarter, it is $908.5$ billion (Table 2, column 6) versus $1,245.6$ billion.

With aggressive monetary policy, the Fed injects high-powered money $H$ into the economy for several quarters, and then gradually withdraws this excess high-powered money. Row $\Delta H_4$ in Table 1 is the cumulative increase in high-powered money through the fourth quarter; and row $\Delta H_8$ in Table 2 is the cumulative increase in high-powered money through the eighth quarter. With aggressive monetary policy complementing the transfers, the cumulative increase in high-powered money is larger: in the fourth quarter, it is $471.0$ billion (Table 1, column 6) versus $48.8$ billion with standard monetary policy (column 4); and in the eighth quarter, it is $240.7$ billion (Table 2, column 6) versus $95.6$ billion.

In the first four quarters, aggressive monetary policy causes a larger percentage of federal deficits to be financed by an increase in high-powered money, and a smaller percentage, by an increase in debt held by the public. The amount of securities sold by the Treasury to finance its deficits equals the increase in debt held by the public plus the increase in high-powered money ($\Delta B_4 + \Delta H_4$). The percentage of the deficits financed by an increase in debt held by the public ($\% \Delta B_4$) is $21.4\%$ (Table 1, column 6) versus $92.2\%$ with standard monetary policy (column 4), and equivalently the percentage financed by an increase in high-powered money ($\% \Delta H_4$) is $78.6\%$ (column 6) versus $7.8\%$.

In the last four quarters, much of the excess high-powered money is withdrawn by the Fed,
but still at the end of the eighth quarter, it remains true that aggressive monetary policy still results in a somewhat larger percentage of deficits financed by an increase in high-powered money, and a somewhat smaller percentage, by an increase in debt held by the public. The percentage of the deficits financed by an increase in debt held by the public ($\%\Delta B_8$) is 79.1% (Table 2, column 6) versus 92.9% with standard monetary policy (column 4), and equivalently the percentage financed by an increase in high-powered money ($\%\Delta H_8$) is 20.9% (column 6) versus 7.1%.

Under this particular policy of transfers plus open-market purchases, over the eight quarters, the difference in the increase in high-powered money turns out to be 38.6% of the cumulative transfers. We obtain 38.6% as follows. Recall in Table 2, the cumulative increase in high-powered money ($\Delta H_8$) is $240.7$ billion with aggressive monetary policy (column 6) versus $95.6$ billion with standard monetary policy (column 4); hence, with aggressive monetary policy complementing the transfers, the increase in high-powered money over the eight quarters is $145.1$ billion greater ($240.7-95.6=145.1$) under the aggressive monetary policy. The cumulative transfers over the eight quarters (not shown in the table) is $375.7$ billion. Then $145.1/375.7$ equals 38.6%.

7. Conclusions

We simulate the impact of transfers plus open-market purchases in response to a recession using the Fair quarterly macroeconometric model of the U.S. economy. The transfers to households are pre-enacted by Congress to be triggered automatically in response to an unemployment gap, and the open-market purchases are conducted at the discretion of an
independent Federal Reserve.

We generate a recession beginning in 2003.3. Initially we assume that the Federal Reserve decides to adhere to a standard counter-cyclical monetary policy governed by the interest rate (Taylor) rule estimated on historical data in the Fair model. We find that this standard monetary policy alone mitigates the recession only modestly; by the eighth quarter, the unemployment rate is 7.4% (instead of 7.9% in the absence of this standard monetary policy and 5.5% in the absence of the recession). We then consider a more aggressive monetary policy in which the Fed decides to sharply increase bank reserves and succeeds in driving the short-term interest rate to zero and in collapsing the term structure of interest rates. Even with the collapse of the term structure, this aggressive monetary policy still leaves unemployment high; by the eighth quarter, the unemployment rate is 6.7%. Moreover, this policy may not succeed in collapsing the term structure, in which case, the unemployment rate would be still higher.

To more effectively and reliably counter the recession, we introduce transfers to households that are automatically triggered in recession and detriggered in recovery. Specifically, the prescribed anti-recession transfer ratio is proportional to the unemployment gap. Recent empirical studies suggest that, despite the permanent income and life-cycle hypotheses, there is still a substantial short-run response of consumption to disposable income. We consider three alternative complementary monetary policies that the Federal Reserve might decide to implement: a \textit{standard} monetary policy (resulting from Fair's estimated interest rate rule based on historical data); a \textit{moderate} monetary policy that expands open-market purchases just enough to reduce to the short-term interest rate to zero while maintaining Fair's estimated term structure equations to determine long-term interest rates; an \textit{aggressive} monetary policy that expands open-market
purchases more than enough to drive the short-term interest rate to zero and collapse the term structure.

Even with standard monetary policy, the automatic transfers reduce the unemployment rate to 6.5% in the eighth quarter. The transfers, however, exacerbate the deficit and debt problem created by the recession. In the eighth quarter, without recession the debt ratio––the ratio of government debt held by the public (excluding the central bank) to GDP––would have been 33.1%; the recession itself would have raised it to 39.2%; and the transfers with standard monetary policy would raise it to 41.2%. To reduce the debt ratio, we consider two alternative monetary policies that the Fed might decide to implement: moderate monetary policy, and aggressive monetary policy. Raising open market purchases strengthens the economy which in itself reduces the deficit ratio and the debt ratio, and withdraws debt from the public, thereby further reducing the ratio of debt held by the public (excluding the central bank) to GDP. Transfers plus the moderate monetary policy reduce the unemployment rate to 6.3% and the debt ratio to 40.6%, and transfers plus aggressive monetary policy reduces the unemployment rate to 5.9% and the debt ratio to 37.8%. Yet the transfers plus aggressive monetary policy cause only a modest increase in inflation (in the eighth quarter, the inflation rate, %P, is 2.5% versus 1.7% with standard monetary policy and no transfers).

These simulations suggest that transfers plus open market purchases are likely to be an effective remedy for recession while limiting potential adverse impacts on inflation and government debt held by the non-central-bank public.
References


_____.


_____.


_____.


_____.


_____.

Souleles, Nicholas S. “The Response of Household Consumption to Income-tax Refunds.”


Appendix

1. The Fair model uses a historically-estimated interest rate rule for RS (stochastic equation 30). We suppress equation 30 and set exogenous RS equal to (essentially) zero.

2. We set the path for BR exogenously. BR rises and falls smoothly from $80 billion to $152 billion in the fifth quarter to $104 billion in the eighth quarter.

3. In the Fair model, BR is determined from MB by identity, equation 57. Since BR is now exogenous, we invert identity 57 to solve for MB.

4. In the Fair model, MB is determined from MH, MF, and CUR by identity, equation 71. Since MB is now determined by identity 57, we invert identity 71 to solve for MH (given values for MF and CUR, determined as explained below). The Fair model uses stochastic equation 9 for MH. Since MH is now determined by identity 71, it is necessary to suppress equation 9.

5. In the Fair model, MF is determined by stochastic equation 17. We suppress equation 17. We solve for MF as follows: MF = 0.84[-MB]. The coefficient 0.84 is the approximate average value of MF/[−MB] under the standard monetary policy.

6. In the Fair model, CUR is determined by stochastic equation 26. We suppress equation 26. We solve for CUR as follows: CUR = 0.80[−MB]. The coefficient 0.80 is the approximate average value of CUR/[−MB] under the standard monetary policy.

7. In the Fair model, RB is determined by stochastic equation 23. We suppress equation 23. We solve for RB as follows: RB = 0.8RB[-1].

8. In the Fair model, RM is determined by stochastic equation 24. We suppress equation 24. We solve for RM as follows: RM = 0.8RM[-1].