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OVERCOMING THE ZERO INTEREST-RATE BOUND: A QUANTITATIVE PRESCRIPTION

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OVERCOMING THE ZERO INTEREST-RATE BOUND:

A QUANTITATIVE PRESCRIPTION

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Abstract

Using a macroeconometric model we provide a quantitative estimate of the cash transfer or tax cut that would achieve recovery from a severe recession when the central bank is unable to achieve full recovery because of the zero bound. We introduce an automatic transfer and simulate its triggering in the severe recession. We find that an automatic transfer that averages 3% of quarterly GDP repeated four times (quarterly) reduces the unemployment rate an additional full percentage point and thereby completes the recovery. We recommend that legislatures enact an automatic counter-cyclical fiscal policy that will assure adequate stimulus without generating a long-term debt problem.

1. Introduction

In this paper we analyze the use of an automatic counter-cyclical fiscal policy to help combat a severe recession when the central bank is constrained by the zero interest-rate bound. We provide a quantitative estimate of the cash transfer or tax cut that would achieve full recovery. Our estimate is obtained by adapting and simulating a macro-econometric model that has been recently econometrically estimated and has a short-run marginal propensity to consume out of transfers or tax cuts that is consistent with several recent empirical studies. We inject a substantial negative demand shock that generates a severe recession and find that the zero bound prevents even an aggressive monetary expansion from achieving a full recovery. However, when monetary expansion is assisted by a counter-cyclical transfer (or tax cut), full recovery is achieved. With the interest rate near zero, a cash transfer equal to 3% of quarterly GDP repeated four times (quarterly), or an equal tax cut sustained for four quarters, would reduce the unemployment rate nearly a full percentage point. We show how the appropriate transfer (or tax cut) can be triggered by a counter-cyclical fiscal policy rule so that the fiscal stimulus is automatically started with recession and terminated with recovery so that it does not lead to an undesirable accumulation of debt by the government. In the next section we examine the policy implications of our simulations. Subsequent sections describe and report on the simulations.

2. Policy Framework and Recommendation

The zero interest-rate bound has become a more serious and relevant obstacle to combating

recessions as central banks have become more effective at keeping inflation low.[1] Economic theory and empirical evidence suggest that low inflation economies will generally have low nominal interest rates. But this means that if the economy is hit with a significant negative demand shock, the central bank has fewer percentage points to work with to counter the recession.

When Japan was hit with a negative demand shock in the 1990s, the Bank of Japan cut short-term interest rates a few points and promptly bumped into the zero bound; thereafter the Japanese economy continued to stagnate with insufficient demand for a nearly decade. As Bernanke (2000) argued, the Bank of Japan needed help from expansionary fiscal policy to overcome the zero bound and sufficiently stimulate the economy. In its recession of 2001 the U.S. had a close call. Under Greenspan the Federal Reserve dropped the federal funds rate from 6.5% to 1.0%. Fortunately, the U.S. economy strengthened just in time because of fiscal stimulus from tax cuts and rebates. The Fed just barely avoided bumping into the zero bound. It is especially significant that U.S. Federal Reserve Chairman Bernanke, in two speeches (2002, 2003) as a member of the Board of Governors of the U.S. Federal Reserve System, made the case for using tax cuts or transfers to overcome the zero bound in a severe recession.

Two recent empirical studies of the 2001 U.S. recession published in the *American Economic Review* (Johnson, Parker, and Souleles, 2006; Shapiro and Slemrod, 2003a) imply that an old-fashioned Keynesian fiscal stimulus—a cash transfer ("tax rebate") or tax cut to households-- can overcome the zero interest-rate bound. The econometric model we use has a short-run marginal propensity to consume (MPC) that is roughly the same as Shapiro and Slemrod and roughly half of Johnson, Parker, and

[1] A useful introduction to the zero bound problem is the symposium of articles published in the *Journal of Money, Credit, and Banking*, November 2000 Part 2.

Souleles.

Most of the zero interest-rate bound papers have ignored Keynesian fiscal stimulus (exceptions are Posen 1998, Bernanke 2000, Kuttner and Posen 2001, and Seidman 2001), preferring to examine whether monetary policy *alone* can revive the economy despite the zero bound (Eggertsson 2006; Auerbach and Obstfeld 2005, 2004; Bernanke, Reinhart, and Sack 2004; Bernanke and Reinhart 2004; Eggertsson and Woodford 2004, 2003; Coenen and Wieland 2004; Clouse, Henderson, Orphanides, Small, and Tinsley 2003; Svensson 2003, 2002; Fuhrer and Sniderman 2000; Reifschneider and Williams 2000; McCallum 2000; and Krugman 1998).[2] Moreover, these articles do not incorporate the results of the two recent empirical studies of the impact of the tax rebate in the 2001 recession. Finally, most of the recent zero bound papers do not use an econometrically estimated model (an exception is Reifschneider and Williams 2000, but their paper largely omits fiscal stimulus). By contrast, we obtain our quantitative estimates by adapting and simulating a macro-econometric model that has been recently econometrically estimated, updated, and statistically tested using U.S. time-series data (the historical context of the macro-econometric model is delineated in Valadkhani 2004). A recent exposition and application of this macro-econometric model is given by Fair (2005a).

We analyze the use of a new counter-cyclical fiscal policy that automatically triggers stimulus in a severe recession and terminates stimulus upon recovery in order to avoid an undesirable long-term accumulation of debt by the government. There are two advantages of making the policy automatic. First, it is risky to rely on legislatures to take prompt discretionary action. Second, an automatic counter-

[2] Feldstein (2002) proposes a new and different kind of fiscal stimulus—a temporary cut in a consumption tax rate—which would provide a price incentive to spend promptly. Though he regards his

cyclical policy anchors the expectations of economic agents in a way that leads to stabilizing behavior; if consumers and business managers know that fiscal stimulus will be automatically triggered in a recession, they will maintain their spending, confident that the recession will prove short-lived. The mechanism for triggering and detriggering the fiscal stimulus is based on real-time signals that would actually be available (the importance of real-time determinants of fiscal policy is emphasized in Golinelli and Momigliano 2006). If such an automatic counter-cyclical stimulus were enacted, it would make one component of fiscal policy endogenous (Perez and Hiebert 2004 analyze endogenous fiscal policy in macroeconomic models). This automatic counter-cyclical policy is fully consistent with fiscal policy rules that others have proposed and analyzed to prevent excessive long-term debt accumulation or excessive long-term deadweight loss (Bruck and Zwiener 2006, Tanner 2004, Johnson 2003) because the counter-cyclical transfer is automatically set to zero as long as the economy is not in recession.

Because central banks are likely to keep inflation, inflationary expectations, and nominal interest rates low, we recommend that legislatures enact an automatic counter-cyclical fiscal policy that will assure adequate stimulus in any severe recession despite the zero bound constraint on central banks. We judge this to be a prudent addition to the current arsenal of automatic stabilizers.

3. The Macroeconometric Model

We use the US quarterly macro-econometric model developed by Ray Fair of Yale University, which we modify to address the specific zero bound problem. The Fair model has been recently

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proposal as a substitute for cash transfers, it can also be viewed as a complement (Seidman 2003).

econometrically estimated, updated, and tested using U.S. times series data (Fair 2004). Two recent articles have reported studies that use the Fair model to provide estimates of the effectiveness of monetary policy (Fair 2005a) and the impact of monetary and fiscal policy on the 2001 recession (Fair 2005b). Fair (1994, 2004) empirically tests for rational expectations with negative results and therefore omits it from his model; he comments that if expectations are not rational, then the Lucas critique is not likely to be important. Fair makes his model accessible to other researchers. We respecify parts of the Fair model, and then estimate and simulate the modified Fair model using the Fair-Parke program (Fair 1996) downloaded from Fair=s website (http://fairmodel.econ. yale.edu). Detailed information on the Fair model is given by Fair (1994, 2003, 2004). The impact on the economy of transfers to households depends on the marginal propensity to consume (MPC); we note that the Fair model embodies the following estimates for the MPC out of disposable income: one-quarter MPC = .20, two-quarter MPC = .36, three-quarter MPC = .47, and four-quarter MPC = .55. How does this compare with the results of two recent empirical studies of the impact of the 2001 tax rebate?

4. Two Recent Empirical Studies on the Cash Transfer (Tax Rebate) in the 2001 Recession

Two empirical studies of the cash transfer (tax rebate) in the 2001 recession—one by Shapiro and Slemrod (2003a, 2003b), the other by Johnson, Parker, and Souleles (2006)— provide estimates of the impact of the transfer on consumer spending. We briefly review each in turn. A fuller discussion is given in Seidman and Lewis (2006).

Through a module in the University of Michigan Survey Research Center's monthly Survey of

Consumers, in March 2002 (roughly two and a half quarters after households received their $600 tax rebate) Shapiro and Slemrod asked a sample of consumers what they did with the $600 rebate they received from the U.S. Treasury in the summer of 2001.[3] Based on their survey results, they estimated (2003b) that the marginal propensity to consume (MPC) the rebate (over the two and a half quarters) was between 0.34 and 0.37. Recall that at the end of the last section we reported that the Fair model has a two-quarter MPC of 0.36 and a three-quarter MPC of 0.47. Thus, the MPC in the Fair model is roughly comparable to the MPC estimated by Shapiro and Slemrod.

Johnson, Parker, and Souleles (2006) estimate an impact much larger than Shapiro and Slemrod or the Fair model. They write:

"Under the Economic Growth and Tax Relief Reconciliation Act of 2001, most U.S. taxpayers received a tax rebate between July and September 2001. The week in which the rebate was mailed was based on the second-to-last digit of the taxpayer's Social Security number, a digit that is effectively randomly assigned. Using special questions about the rebates added to the Consumer Expenditure Survey, we exploit this historically unique experiment to measure the change in consumption expenditures caused by receipt of the rebate…"

Each week from July through September a fraction of households received the rebate. The order in which they received it was random because the timing of the mailing of each rebate was based on the second-to-last digit of the recipient's Social Security number. The authors emphasize that this random assignment was critical to their study. Also critical to their study was the insertion of a special module with questions about the timing and amount of their tax rebate in the Bureau of Labor Statistics' Consumer Expenditure Survey. The authors worked with the staff of the BLS to construct the module. The authors were able to estimate how a household's spending was affected by the actual receipt of the rebate,

[3] Congress enacted the $600 rebate in May (the President signed the law in June) to counter the recession

because households received the same rebate check in different weeks that were randomly assigned. The authors report:

"We find that households spent about 20-40 percent of their rebates on non-durable goods during the three-month period in which their rebates were received, and roughly another third of their rebates during the subsequent three month period. The implied effects on aggregate consumption demand are significant. The estimated responses are largest for households with relatively low liquid wealth and low income, consistent with liquidity constraint."

Low-income households spent a much larger fraction of their rebate—about 75 percent-- during the three month period of receipt than middle-income households. Also, households with few liquid assets spent a significantly greater share of their rebates.

Over the two quarters following receipt of the rebate, households spent about two-thirds of their rebate on nondurable consumption goods. Thus, their study implies a magnitude of spending that is roughly twice as great as Shapiro/Slemrod or the Fair model.

To summarize: Based on these two empirical studies, our use of the Fair model probably understates the impact of rebates because the model has a short-run MPC that is roughly the lower estimate of these two studies.

5. The Recession

The baseline Fair forecast for the unemployment rate for eight quarters (2003.3 through 2005.2) is shown in the U_B column of Table 1. We introduce a negative demand shock beginning in 2003.3 that generates a recession. If monetary policy were adjusted to keep the Treasury three-

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as part of a larger tax package.

month bill rate[4] on its baseline path (projected by Fair=s forecast), then the path the unemployment rate would follow is shown in the U_R column. For example, in the eighth quarter of recession the unemployment rate would be 7.9% (versus 5.5% on the Fair baseline path).[5] We will refer to the U_R column as A*the recession*≅ path of the unemployment rate.

6. Aggressive Monetary Policy

We assume the Fed conducts an aggressive monetary policy: it expands its open-market purchases enough to reduce immediately the three-month Treasury bill rate to zero and also collapse the term structure, eventually reducing the corporate bond rate and the mortgage rate to near zero. This is more aggressive than the estimated Taylor rule in the Fair model, so to implement the simulation, we suspend the estimated Taylor rule in the Fair model and replace it with the aggressive monetary policy (details of how we re-specified the model are given in the Appendix). Under the collapse of the term structure, both the bond rate and the mortgage rate are reduced to about 2.2% in the fourth quarter and 0.9% in the eighth quarter.[6] The U_M column of Table 1 shows the path of the unemployment rate under

[4] The Treasury bill rate RS is the monthly auction average for the quarter.

[5] This simulation uses the Aaddfact≅ and the Aexogenous variable=RS≅ commands in Fair-Parke. 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).

[6] The bond rate RB is the Aaa corporate bond rate, and mortgage rate RM is the FHA secondary market mortgage rate. Both are quarterly averages of monthly data.

this monetary policy. For example, the eighth quarter unemployment rate would be 6.7% (versus 7.9% without aggressive monetary policy).

7. Counter-Cyclical Fiscal Policy: Cash Transfers to Households

In this paper the fiscal stimulus is cash transfers to households, but the results would be similar if the fiscal stimulus were income tax cuts 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 (automatic transfer rules are discussed in Seidman 2001, Seidman and Lewis 2002, and Seidman 2003) 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 Atransfer/GDP ratio≅ that is proportional to the Aunemployment gap.≅ Congress would specify the aggregate transfer and also how the aggregate transfer is distributed to individual households (for example, an equal dollar amount per household). Specifically, the aggregate new anti-recession quarterly real transfer R would be given by

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

where R/Y_{-1} is the Atransfer ratio≅ and $[U_{-1} - (U^N + T)]$ is the Aunemployment 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 quarterly real transfer, and Y_{-1} is the quarterly real GDP of the last quarter. 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. In this paper for illustration , we will use T=0.5%, s=2, and NAIRU=5.2% (based on CBO=s recent estimate). Hence, in our simulations, a transfer is triggered whenever the unemployment rate exceeds 5.7%. For example, in the first quarter of the recession in Table 1 the unemployment rate is 6.7%, so applying the formula above, $R/Y_{-1} = 2[6.7\% - (5.2\%+0.5\%)] = 2\%$. Thus, the aggregate transfer that would be triggered this quarter would equal 2% of last quarter=s GDP-- we will say that the prescribed *transfer/GDP ratio* is 2%. The unemployment gap in this example is 1.0%. With s=2, the transfer ratio would be twice the unemployment gap.

It is administratively feasible to trigger a transfer this quarter based on the unemployment rate (U_{-1}) and GDP (Y_{-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.[7] The actual experience with the 2001 $600 tax rebateX 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 with an advanced payment of the

[7] 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.

child tax credit.

We introduce into the Fair model a new endogenous transfer from the federal government to households through the transfer rule.[8] 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.[9]

The $U_{M\&F}$ column of Table 1 shows the path of the unemployment rate under the transfer rule combined with a monetary policy that achieves the same interest rate path as would have been achieved with the aggressive monetary policy described above. The transfer rule substantially improves the performance of the economy. It reduces the unemployment rate of the economy by nearly a full percentage point: the unemployment rate in the eighth quarter is 5.9% versus 6.7% with monetary policy only; the improvement in the unemployment rate is shown in the $?U_F$ column (for example, -0.8% in the eighth quarter).

Table 2 shows the magnitude of the transfers and the resulting government deficit and debt over the eight quarters. The A*transfer ratio*≅ R/Y is the ratio of the new anti-recession quarterly

[8]Another endogenous transfer which is already included in the Fair model is nominal state and local unemployment insurance benefits.

[9] 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.

real transfer to quarterly real GDP. The R/Y column shows the path of the transfer ratio under the transfer rule combined with the monetary policy that achieves the same interest rate path (as would have been achieved with the aggressive monetary policy described above): the quarterly transfer as a percent of that quarter=s GDP begins at 1.9% in the second quarter,[10] peaks at 2.7% in the third quarter, declines to 1.5% in the sixth quarter, and to 0.4% in the eighth quarter; the sum of the percentages in the R/Y column--*Athe cumulative transfer percentage*@X is roughly 12% of a quarter=s GDP. This is the fiscal stimulus required to reduce the unemployment rate by nearly a full percentage point (from 6.7% to 5.9%).

The A*deficit ratio*≅ (D/Y) in Table 2 is the ratio of the government deficit to GDP.[11] The $[D/Y]_M$ column shows the path of the deficit ratio under the aggressive monetary policy, and the $[D/Y]_{M\&F}$ column shows the path under the transfer rule combined with the monetary policy that achieves the same interest rate path (as would have been achieved with the aggressive monetary policy). The $[?D/Y]_F$ column shows the difference between the two paths: $[?D/Y]_F$ rises to a peak of 2.7% in the third quarter, declines to 1.1% in the sixth quarter, and to 0.2% in the eighth quarter. Note that after the third quarter, $[?D/Y]_F$ is less than R/Y because the fiscal stimulus has strengthened the economy and generated endogenous tax revenue that reduces the deficit.

The A*debt ratio*≅ (B/Y) in Table 2 is the ratio of government debt held by the public (excluding

[10] The transfer is 1.9% of *this* quarter=s GDP and 2% of *last* quarter=s GDP (as prescribed by the transfer rule formula with U_{-1} =6.7%).

[11] The deficit ratio is the ratio of the NIPA nominal federal deficit deflated by the GDP deflator, to real GDP.

the central bank) to GDP.[12] The $[B/Y]_M$ column shows the path of the debt ratio under the aggressive monetary policy, and the $[B/Y]_{M\&F}$ column shows the path under the transfer rule combined with the monetary policy that achieves the same interest rate path (as would have been achieved with the aggressive monetary policy). The $[?B/Y]_F$ column shows the difference between the two paths: $[?B/Y]_F$ rises gradually to 2.1% in the eighth quarter. Note that the aggressive monetary policy mitigates the increase in B/YX the ratio of government debt held by the public (*excluding the central bank*)--because the Fed absorbs some of the government securities sold by the Treasury to finance the deficits.

8. Conclusions

We provide a quantitative estimate of the cash transfer or tax cut that would achieve recovery from a severe recession when the central bank is constrained by the zero interest rate bound. We adapt and simulate a macro-econometric model that has been recently econometrically estimated and has a marginal propensity to consume that is roughly consistent with two recent empirical studies of cash transfers in the 2001 U.S. recession published in the *American Economic Review*. We provide a quantitative estimate of the cash transfer that would achieve recovery from a severe recession when confronted with the zero bound.

In the simulation, even an aggressive monetary policy is unable to achieve full recovery because of the zero bound. We introduce an automatic transfer and simulate its triggering in the severe recession.

[12] 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.

We find that an automatic transfer that averages 3% of quarterly GDP repeated four times (quarterly) reduces the unemployment rate an additional full percentage point and thereby completes the recovery.

We recommend that legislatures enact an automatic counter-cyclical fiscal policy that will assure adequate stimulus in any severe recession despite the zero bound constraint on central banks and without generating a long-term debt problem. We judge this to be a prudent addition to the current arsenal of automatic stabilizers.

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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.[13]

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 interest rate rule.

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[13] The discussion in Fair=s (2003) 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.

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 interest rate rule.

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].

Table 1: Simulation Results for the Unemployment Rate (U) for the First Eight Quarters
Entries are Percentages

Quarter	U_B	U_R	U_M	$U_{M\&F}$	$?U_F$
1	6.2	6.7	6.7	6.7	0.0
2	6.0	7.3	7.2	7.1	-0.1
3	5.9	7.6	7.3	7.0	-0.3
4	5.7	7.9	7.5	6.9	-0.6
5	5.6	7.9	7.3	6.4	-0.9
6	5.5	7.9	7.1	6.1	-1.0
7	5.5	7.9	6.8	5.9	-0.9
8	5.5	7.9	6.7	5.9	-0.8

Table 2: Simulation Results for the First Eight Quarters
Entries are Percentages

Quarter	R/Y	$[D/Y]_M$	$[D/Y]_{M\&F}$	$[?D/Y]_F$	$[B/Y]_M$	$[B/Y]_{M\&F}$	$[?B/Y]_F$
1	0.0	3.8	3.8	0.0	33.6	33.6	0.0
2	1.9	4.4	6.4	2.0	34.6	35.0	0.4
3	2.7	4.4	7.1	2.7	33.0	33.8	0.8
4	2.5	4.6	6.9	2.3	31.8	33.0	1.2
5	2.3	4.3	6.3	2.0	30.0	31.7	1.7
6	1.5	4.3	5.4	1.1	30.5	32.4	1.9
7	0.8	4.3	4.8	0.5	33.1	35.1	2.0
8	0.4	4.4	4.6	0.2	35.7	37.8	2.1