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**WHAT HAS BEEN LEARNED SINCE 2001 ABOUT  
COUNTER-CYCLICAL TAX REBATES?**

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## ABSTRACT

What has been learned from the 2001 recession about the impact of counter-cyclical tax rebates? Based on their consumer surveys of the 2001 tax rebate, Shapiro and Slemrod estimate a marginal propensity to consume (MPC) out of rebates of 0.36 over two-and-a-half quarters. Using a macroeconometric model that contains an MPC of roughly this magnitude, we perform simulations and find that a rebate twice as large as the 2001 \$600 rebate repeated for four quarters would have reduced the unemployment rate at the end of one year from 5.9% to 5.2%. Johnson, Parker, and Souleles estimate an MPC of 0.66 over two quarters-- an estimate roughly twice as large as Shapiro and Slemrod. If the Johnson, Parker, and Souleles estimate of the MPC is correct, then our simulations imply that if the 2001 \$600 rebate had been repeated for four quarters it would have reduced the unemployment rate at the end of one year from 5.9% to 5.2%.

## **Introduction**

In June 2001 President Bush signed into law a tax cut containing a tax rebate of \$600 per married couple (\$300 per single person). For the quarter 2001.3, the aggregate rebate was about \$35 billion, 1.4% of that quarter=s GDP. The U.S. Treasury mailed these checks out in July, August, and September. The purpose of the rebate was to try to promptly stimulate consumer spending to counter the recession. The rebate was the one element of the tax cut that received bipartisan support. This paper addresses the question: What have we learned about the impact of counter-cyclical rebates from the 2001 experience?

## **Empirical Literature Prior to 2001**

According to the permanent income hypothesis of consumption, and the life cycle hypothesis, households should spend very little of a counter-cyclical rebate. But several empirical studies suggested that the spending response might be substantial. Mankiw (2000) reviewed empirical studies on consumption behavior and commented (p.120):

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

Mankiw looked at empirical studies that examined whether households keep their consumption steady (smooth) despite fluctuations in their current disposable income, or instead adjust their consumption to changes in their disposable income. For example, Campbell and Mankiw (1989) estimated 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) examined 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) studied the impact of income-tax refunds and concludes that consumption increases by at least 35% of a refund within three months. Mankiw said imperfect smoothing occurs because some consumers may not have rational expectations and may simply extrapolate their current income into the future; and some may face borrowing constraints as indicated by the fact that many households have virtually zero wealth. Mankiw concluded (p.121):

AReflecting 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.≡

## **The Shapiro/Slemrod Study of the 2001 Tax Rebate**

In the summer of 2001, through a new module in the University of Michigan Survey Research Center's monthly Survey of Consumers, Shapiro and Slemrod asked a sample of consumers what they planned to do when they received the \$600 rebate recently enacted by Congress. They asked consumers to look forward (p383):

Thinking about your (family's) financial situation this year, will the tax rebate lead you mostly to increase spending, mostly to increase saving, or mostly to pay off debt.≡

The Fall 2001 issue of the newsletter of the Office of Tax Policy Research (OTPR) at the University of Michigan Business School summarized the results of their survey. The article was entitled, Tax Rebates Go Largely Unspent.≡ Here are some excerpts from their summary (p1-2):

In a survey of 1,500 U.S. households conducted in August, September and October 2001, OTPR Director Joel Slemrod and University of Michigan economics professor Matthew Shapiro found that a surprisingly small percentage of households receiving the federal income tax rebate granted by this year's tax legislation spent or expected to mostly spend the rebate...Shapiro and Slemrod found that only 22 percent of households receiving the rebate expected to or had spent the rebate...The results offer a cautionary conclusion for fiscal policy. Contrary to the desires of policymakers, the tax rebate likely

will have little effect in stimulating the economy...Accordingly, another temporary tax cut, even one targeted at low-income households for which conventional wisdom would have predicted a higher spending propensity, likely would provide little fiscal stimulus.≡

Shapiro and Slemrod presented an analysis of their consumer surveys in an article in the *American Economic Review* (2003a). In their first paragraph they stated (2003a, p381):

AWe find that only 21.8 percent of those receiving the rebate reported that it would lead them to mostly increase spending. This spending rate is remarkably low, both from a theoretical prospective and when compared to previous estimates.≡

Shapiro and Slemrod also did a follow-up survey in March and April 2002, asking consumers to look backward (2003a, p391):

ADid the tax rebate lead you mostly to increase spending, mostly to increase saving, or mostly to pay off debt?≡

They reported that AIn this survey, 24.9 percent of respondents reported spending the rebate.≡ In their conclusion, they stated (2003a, p394):

AOur finding of a very low spending rate raises a cautionary note about the reliability of fiscal policy in general. It is possible that key parameters such as the propensity to

consume are contingent on aggregate conditions in ways that are difficult to anticipate.≡

Shapiro and Slemrod suggested that the spending rates they find are low compared to what some theoretical models predict and compared to much existing empirical evidence, and that the aggregate marginal propensity to consume (MPC) might be unstable, so fiscal policy might have different effects at different times.

What do the Shapiro/Slemrod consumer surveys imply about the marginal propensity to consume (MPC) out of the rebate? Shapiro and Slemrod acknowledged that their consumer surveys do not provide direct information about the MPC out of the rebate because they did *not* ask what *percent* of the rebate the person intends to spend. Recall that they asked, ADid the tax rebate lead you mostly to increase spending, mostly to increase saving, or mostly to pay off debt?≡ For example, if everyone intends to spend 40% of the rebate and use 60% to pay off debt, then 0% would answer Amostly to increase spending,≡ yet the marginal propensity to consume is 40%, not 0%. In a subsequent paper (2003b) they wrote (2003b, p103):

AThe aggregate marginal propensity to consume (MPC) from the rebate is an important input for studying the aggregate impact of the tax rebate. Our survey does not provide the MPC directly. Instead, it offers self-reported estimates of the fraction of people who would either mostly spend the rebate or mostly save it, either by adding it to assets or repaying debt. We could have inquired about the MPC directly on the survey by asking the following question: >What fraction of the rebate did you spend?≡ In designing our survey instrument concerning the 1992 rebate, we decided that asking about the fraction was too complicated [f.n. Given the tendency of survey respondents to >heap≡ on round

numbers, e.g. 0, 50-50, and 100 percent, it is not clear that asking about fractions would have given less lumpy and more informative data]. We used the same design decision for the survey instruments concerning the 2001 rebate.≡

They then used their survey results to estimate the MPC. They wrote (2003b, p103-04):

A With some assumptions about what range of individual MPCs correspond to mostly spending or mostly saving and the distribution of those individual MPCs, our aggregate answers can be converted to an aggregate MPC...More generally, it is reasonable to expect that there is a distribution of individual marginal propensities to consume between 0 and 1 that is neither bunched right around 0.50 nor entirely at values of either 0 or 1. By making some plausible assumptions about the shape of the distribution, we can estimate the range of average, or aggregate, MPCs that is consistent with what the survey reveals. For example, what if the probability density of individual propensities to consume is highest at a value equal to the fraction of people who mostly spend and falls off linearly on both sides of this value? In the appendix, we show that, with these assumptions, only values of the average MPC between 0.340 and 0.372 are consistent with one-quarter of the population having an MPC of 0.50 or less. Note that the aggregate MPC in this example is always greater than the fraction of people who mostly spend the rebate, but it lies within a fairly small range.≡

Shapiro and Slemrod (2003b) therefore estimated that between 34.0 and 37.2 percent of



the 2001 \$600 tax rebate (checks from the U.S. Treasury mailed to households in July, August, and September) was spent by March 2002. Hence their estimate for the MPC as of two-and-a-half quarters (seven and a half months) was 36 percent.

### **Simulating the Impact of Rebates in the 2001 Recession**

In a recent paper, Seidman and Lewis (2005a) simulated the macroeconomic impact in the 2001 recession of the actual rebate (an expenditure of \$35 billion in the third quarter of 2001, 1.4% of that quarter's GDP), and of a hypothetical rebate twice as large and repeated in three additional quarters (roughly 3% of GDP for four quarters), using the model developed, empirically tested, and continuously updated by Fair (2003, 2004). The Fair model's consumption equations imply a gradual, moderate consumption response to a change in disposable income. The Fair model does not distinguish between a rebate and other disposable income in its consumption equations. After presenting the results of these simulations, we will discuss these results in light of the empirical studies of the 2001 rebate by Shapiro/Slemrod.

A full description of the model is given in Fair (1994, 2003, 2004). The Fair model assumes that the labor market does not clear continuously so that a fall in aggregate demand generates a rise in unemployment in the short run. The model consists of 30 stochastic equations estimated by two-stage least squares, 101 identities, 131 endogenous variables, slightly over 100 exogenous variables, and many lagged endogenous variables. It has six sectors: household, firm, financial, federal government, state and local government, and foreign. For monetary policy, the Fair model estimates an interest rate reaction function (a Taylor rule) based on the historical

behavior of the Federal Reserve. This estimated equation implies that the Federal Reserve generally engages in counter-cyclical monetary policy, lowering the interest rate (specifically, the three-month Treasury bill rate) in response to a rise in the unemployment rate, and raising the interest rate in response to a rise in the inflation rate.

Because anti-recession tax rebates generate temporary, not permanent, deficits, rational financial market participants should not expect continuing future deficits from these policies. The reaction of financial market participants to the prospect of permanent deficits might well be very different. Fair (1994, 2004) provides a thorough discussion the empirical testing of the model, and the relationship of these empirical tests to the Lucas critique and Lucas's hypothesis of rational expectations.

Seidman/Lewis performed two simulations of tax rebates in the 2001 recession. First they removed the rebate in 2001.3 and simulate the path the economy would have taken in the absence of the rebate; the difference between the historical path (with the rebate) and the path without the rebate measures the impact of the rebate. Second, they doubled the rebate in 2001.3, repeated this larger rebate in the next three quarters, and simulated the path the economy would have taken; the difference between the path with this larger repeated rebate and the path without the rebate measures the impact of the larger repeated rebate.

They found that the actual 2001 rebate, given its modest size and lack of repetition (an expenditure of \$35 billion in the third quarter of 2001, 1.4% of that quarter's GDP), had only a small effect on the economy. By the fourth quarter after the rebate (2002.2), the unemployment rate was only 0.1% lower than it would have been without the rebate-- 5.8% instead of 5.9%.

However, they found that the hypothetical rebate, twice as large and repeated in three

additional quarters (3% of GDP for four quarters), would have had a large effect on the economy. By the fourth quarter after the rebate (2002.2), the unemployment rate would have been 0.8% lowerX 5.1% instead of 5.9%. It is reassuring that this hypothetical rebate would raise the ratio of government debt to annual GDP by only 2.4 percentage points-- to 34.5% instead of 32.1%.

### **The Simulations In Light of Evidence from Shapiro/Slemrod**

What MPC out of disposable income is embodied in the Fair macro-econometric model, and how does this MPC compare to the MPC estimated by Shapiro/Slemrod?

Seidman/Lewis (2005a) obtained the AJ-quarter MPC= $s$  (defined below) out of disposable income 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 ( $Y_t$ ) 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,  $Y$  would have been  $Y_1'$ , with the increment  $Y$  is  $Y_1$ , so the increment is  $\Delta Y_1 / Y_1 - Y_1'$ . This increment will raise quarter 1 consumption directly through the  $Y_t$  term in the equation, and will also raise consumption in subsequent quarters through the  $C_{t-1}$  term. Let  $C_i$  be real per capita consumption in quarter  $i$  following  $\Delta Y_1$ , and  $C_i'$  be real per capita consumption in quarter  $i$  had there been no  $\Delta Y_1$ . Then  $\Delta C_i / C_i - C_i'$  is the increment in consumption in quarter  $i$  due to  $\Delta Y_1$ , and  $\sum_{i=1}^J \Delta C_i$  is the cumulative increment in consumption over  $J$  quarters due to  $\Delta Y_1$ . The marginal propensity to consume (MPC) in one quarterX A the one-quarter MPC= $s$  is defined as  $\Delta C_1 / \Delta Y_1$ , and A the J-quarter MPC= $s$  is defined as  $(\sum_{i=1}^J \Delta C_i$

)/ $\Delta Y_1$ . Note that the time period  $\times$  the number of quarters  $\times$  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  $(\sum_{i=1}^J \Delta C_i) / \Delta Y_1$  for each equation using its estimated coefficients. Then summing over the three components gives the J-quarter MPC. In an appendix Seidman/Lewis (2005a) give the details of how to calculate the MPC=s from the estimated coefficients of the Fair model=s consumption equations.

They found that the Fair model contains the following MPC=s: one-quarter MPC = .20, two-quarter MPC = .36, three-quarter MPC = .47, and four-quarter MPC = .55. The Fair model=s MPC estimates are similar to (slightly larger than) the MPC implied by the Shapiro/Slemrod empirical study. The Shapiro/Slemrod results imply a two-and-a-half quarter MPC of .36, while the Fair model implies a two-quarter MPC of .36.

When Seidman/Lewis (2005a) adjust the Fair model to differentiate between the rebate and other disposable income and apply the slightly lower Shapiro/Slemrod MPC to the rebate, then by the fourth quarter after the hypothetical rebate (2002.2), the unemployment rate would have been 0.7% lower  $\times$  it would have brought down the unemployment rate from 5.9% to 5.2% (instead of 5.1%).

### **The Johnson/Parker/Souleles Study of the 2001 Tax Rebate**

Their abstract summarizes their paper (2004):

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 and to test the Permanent Income Hypothesis and related models. 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.

Crucial for their study is the fact that the timing of the mailing of each rebate was based on the second-to-last digit of the Social Security number of the tax filer who received it, a digit that is effectively randomly assigned. They explain (p1):

The last four digits of a Social Security Number (SSN) are assigned sequentially to applicants within geographic areas (which determine the first three digits of the SSN) and a group (the middle two digits of the SSN). The main reason for this staggered disbursement schedule is that it was difficult in practice to print and mail the rebate

checks all at once. Accordingly, the disbursement schedule was keyed to the randomized social security digit for purposes of fairness.≡

They use a special module of the Consumer Expenditure (CE) Survey. The authors state that of all the U.S. household surveys, the CE A contains the most comprehensive measures of households= expenditures.≡ The regular CE data, however, would not have been adequate to study the 2001 rebate. They explain (p1):

AIn particular, the ongoing CE survey does not record the timing of taxes and transfers, nor the Social Security numbers of households= tax filers. However, shortly after the passage of the 2001 Tax Act, the authors worked with the staff of the Bureau of Labor Statistics (BLS) and other government agencies to add a special module of questions about the tax rebates to the Survey. This module asked households about the timing and amount of each rebate check they received, and was included in the survey from shortly after the rebate mailing began until the end of 2001. This is the first paper to use the new tax rebate module and exploit the randomized timing of the rebates in the CE.≡

Because households received the same rebate check at different times, and because the time of receipt was randomly assigned, the authors are able to estimate how receipt of the rebate affected a household=s expenditure.

The CE survey obtains reports of expenditures by a large, stratified random sample of U.S. households. In an interview, a household reports its expenditures over the preceding three months. Each household is interviewed every three months until it has given four reports. The

authors describe the special CE module as follows (p7):

The special module of questions about the 2001 rebates covers the crucial period during which and after the rebates were mailed: the module went into the field in the second week of August, and remained there through the end of December. The new questions asked households whether they received a rebate, how many rebate checks they received, and then the month and amount of each check received. These questions were asked at the end of the CE interview, after households completed their usual reporting of consumption expenditures and other information.≡

A crucial feature of the CE survey for their study is this (p6):

New households are added to the survey every month so that the data are effectively monthly in frequency.≡

Thus, in their sample they have some households interviewed with the special module in August, and some in September, who are asked whether they had received a rebate (and if so, the rebate amount) and what they spent in the three months preceding the interview. Rebates checks were mailed out according to a staggered weekly schedule from July through September. Hence, in August and September some interviewed households had received a rebate, and others had not, solely because of differences in their social security number.

They regressed the change in a household's consumption from one quarter to the next

against a set of variables including the amount of the rebate the household had received in the preceding quarterX an amount which might be zero. In this way, they could estimate the impact of the actual receipt of a rebate of a given amount on a household=s consumption spending.

They report (p12):

AWe find that, during the three-month reference-period in which a rebate was received, relative to the previous three-month period, a household on average increased its expenditures on food by 11 percent of the rebate, its expenditures on non-durable goods strictly defined by 24 percent of the rebate, and its expenditures on non-durable goods broadly defined by 37 percent of the rebate. The latter two results are both economically and statistically significant, and counter to the PIH [permanent income hypothesis].≡

They also examined spending in the subsequent quarter. They report (p17):

AIn sum, the pattern of coefficients suggests a large increase in expenditure at the time of rebate receipt, then a decaying but still substantial effect in the subsequent quarter or two.

Households spent about two thirds of their rebate on nondurable consumption goods in the quarter of receipt and subsequent three months.≡

They studied the impact of the rebate among households that differed in income, and in liquidity constraints. They report (p19):



ALow income households spent a much larger fraction of their rebate during the three-month period of receipt than the typical (middle-income) household. For nondurable goods, these differences are both statistically and economically significant. In the three months in which the rebate arrived, low income households spent...about 75 percent of their rebate...Households with few liquid assets spent a significantly greater share of their rebates than the typical household...In sum, we find evidence that households with low income and low liquid wealth consumed more of their rebates than typical, which is consistent with the existence of liquidity constraints. These households are consuming most of their rebates soon after receipt, not saving much of them to smooth expenditure in future periods. This could be either because they expect to have higher income in the near future (e.g., due to an economic recovery) or because they have a high propensity to consume one-time or highly liquid funds.≡

The Johnson/ Parker/Souleles study implies that if the actual 2001 rebate had been repeated for four quarters, this would have been sufficient to achieve the same reduction in the unemployment rate (from 5.9% to 5.2%) by the end of the fourth quarter.

### **Policy Implications**

Empirical study of the 2001 tax rebate experience provides support for the future use of counter-cyclical tax rebates. One approach would be to wait for the next recession and then call on Congress to enact tax rebates to combat it. It would be better, however, to urge Congress to

*pre-enact* tax rebates *now* that would be automatically triggered by the commencing of the next recession and automatically dettriggered by recovery from the recession (Seidman, 2001; Seidman and Lewis, 2002; Seidman, 2003; Seidman and Lewis, 2004). The automatic triggering would prevent delay when the recession hits, and the automatic dettriggering would prevent permanency when the recession is over. Congress would be free to override its triggered tax rebates with discretionary action. The automatic policy is a default action which occurs only if Congress fails to enact an over-riding discretionary policy. Congress would not delegate any authority over fiscal policy; it would approve in advance all aspects of the triggered tax rebates.

Suppose Congress pre-enacts the following formula for setting the aggregate tax rebate  $R$  for a quarter:

$$R/[GDP]_{-1} = s[U_{-1} - U_T]$$

where  $R$  is the aggregate rebate for this quarter,  $GDP_{-1}$  is last quarter's nominal GDP,  $U_{-1}$  is last quarter's unemployment rate,  $U_T$  is the trigger unemployment rate, and  $s$  is the strength parameter set by Congress. Assume Congress specifies that each quarter's value of  $U_T$  be set equal to  $[U_N + 0.5\%]$  where  $U_N$  is the most recent estimate of the NAIRU the non-accelerating-inflation rate of unemployment by the Congressional Budget Office (CBO). Currently, the CBO's most recent NAIRU estimate is 5.2%, so this quarter the trigger unemployment rate  $U_T$  would be 5.7%. If Congress sets  $s=3$ , then this quarter the formula would be

$$R/[GDP]_{-1} = 3[U_{-1} - 5.7\%].$$

Then if last quarter's unemployment rate were 6.4%,  $R/[GDP]_{-1}$  would be 2.1%, so this quarter's aggregate rebate would be 2.1% of last quarter's GDP. If each household receives

the same dollar rebate (as in 2001), then each household's rebate for the quarter would be set equal to  $R/N$  where  $N$  is the number of eligible households.

For comparison with the 2001 experience, recall that the aggregate rebate paid out in the third quarter of 2001 was 1.4% of that quarter's GDP. If Shapiro/Slemrod's lower spending estimate is correct, then a rebate twice as large  $\times$  2.8% of a quarter's GDP  $\times$  repeated each quarter for one year would have reduced the unemployment rate at the end of the year by 0.7 percentage points (for example, from 5.9% to 5.2%). If Johnson/Parker/Souleles higher spending estimate is correct, then the same rebate  $\times$  1.4% of a quarter's GDP  $\times$  repeated each quarter for one year would have achieved the 0.7 percentage point reduction. If we average the two estimates  $\times$  2.8% and 1.4%-- we get 2.1%: an aggregate tax rebate of 2.1% of last quarter's GDP repeated each quarter for one year would reduce the unemployment rate 0.7 percentage points.

How should the aggregate tax rebate be converted into a rebate for each household? Should each household receive the same dollar rebate? If so, then each household's rebate would be set equal to  $R/N$ , where  $N$  is the number of households eligible to receive the rebate. In 2001, all two-parent households that paid more than \$600 in income tax the previous year received the same \$600 dollar tax rebate; single individuals each received \$300. Some conservatives might prefer that the dollar rebate rise as household income rises because higher income households paid higher dollar tax in the previous year. Some liberals might prefer that the dollar rebate fall as household income rises because higher income households are less in need of assistance. An equal-dollar rebate can be viewed as a compromise between these conservatives and these liberals. We propose that each household's rebate be set equal to  $R/N$ .

How can low-income working families be reached? Many of these families were excluded from the 2001 tax rebate because they owed little or no federal income tax in the previous year (2000). But most of these families did pay federal payroll tax. A tax rebate should be given to each household up to the amount the household paid in federal income tax plus federal payroll tax. The Internal Revenue Service has payroll tax as well as income tax information on each individual. This modification would ensure greater inclusion and fairness.

To summarize: We propose that Congress pre-enact the aggregate rebate formula  $R/GDP_{-1} = s(U_{-1} - U_T)$ , where  $R$  is the aggregate rebate,  $GDP_{-1}$  is last quarter's GDP,  $U_{-1}$  is last quarter's unemployment rate, and  $U_T$  is the trigger unemployment rate. Based on empirical analysis of the 2001 rebate, we propose that Congress set the strength parameter  $s$  equal to 3, and the trigger unemployment rate equal to  $U_N + 0.5\%$ , where  $U_N$  is the most recent estimate of the NAIRU by the Congressional Budget Office (currently, that estimate is 5.2% so  $U_T$  would be 5.7%). We propose that the rebate for each household equal  $R/N$  where  $N$  is the number of eligible households-- the number of households that paid either income or payroll tax in the previous year.

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