The Case for Helicopter Loans

Nicolaus Tideman*

Abstract

An important cause of fluctuations in economic activity is fluctuations in confidence that cause fluctuations in the demand for cash balances. When uncertainty increases, consumers cut back on spending to increase their reserves of cash, and the cutback in spending causes a recession. To avoid such recessions, a nation's monetary authority could create money and lend consumers enough to offset the increase in uncertainty, inducing them to be willing to continue spending at the rate needed to maintain full employment. When confidence returns and the demand for cash balances falls to its former level, an obligation to repay such loans can prevent the inflation that would otherwise occur.

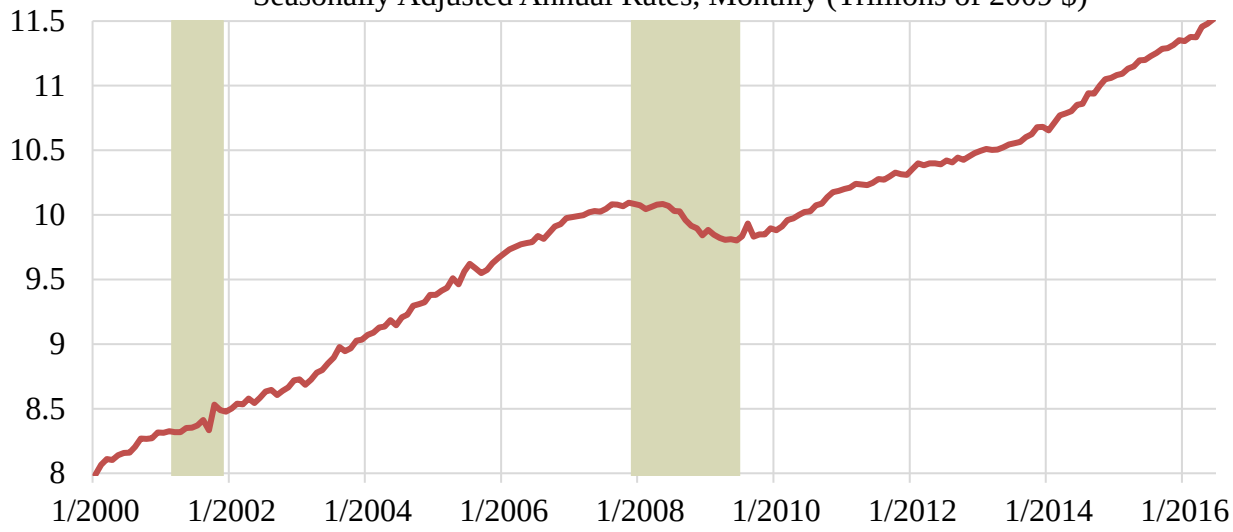
I. Introduction

The prolonged economic downturn that began in 2008 revealed the limited effectiveness of conventional monetary policy. Central banks innovated with Quantitative Easing (QE) programs, but these had little effect. This paper argues that central banks need an additional tool, a tool akin to fiscal policy, so that they can respond to a financial crisis by putting enough additional money directly into the hands of consumers that they will be willing to continue to spend at the rate needed to maintain full employment. The money would take the form of lines of credit for loans at a low or zero rate of interest. Such loans are called "helicopter loans," for reasons that will be explained. If central banks provide stimulus in the form of helicopter loans, then they can withdraw the lines of credit and require loan repayments as confidence returns, so that the money that had been distributed would not cause inflation.

Figure I illustrates the significant decline in U.S. household consumption in the recent financial crisis. On seeing Figure I, one might think, "There was a recession, so income declined. It is natural for consumption to decline when income declines." But this is not the explanation. Figure II shows that while consumption was declining, saving as a percentage of

* Virginia Polytechnic Institute and State University. I am indebted to Shaowen Liu and Florenz Plassmann for helpful comments.

Figure I: U.S. Real Personal Consumption
Seasonally Adjusted Annual Rates, Monthly (Trillions of 2009 $)



Calculated as personal consumption (NIPA Table 2.6, line 29), multiplied by the ratio of chained 2009 dollars to current dollars (lines 39 and 38 respectively in Table 2.6). NBER-defined recessions are shaded.

disposable personal income was increasing. Thus it is reasonable to infer that the cause of the decline in consumption was an increase in the demand for cash balances.

These graphs are consistent with the following account of the financial crisis. As losses in mortgage-backed securities mounted in 2007, people sought to prepare for anticipated difficult

Figure II: Saving as a Percentage of Disposable Personal Income
Seasonally Adjusted Annual Rates, 3-Month Moving Average

Calculated as the three-month moving average of the ratio of line 34 to line 27 in NIPA Table 2.6.

times ahead by increasing saving and cutting back on consumption. The failures of Bear Stearns and Lehman Brothers in 2008 heightened concerns, leading to increased saving, reduced consumption and the recession. Quantitative Easing gave banks additional reserves, but they found few customers to whom they wished to lend. Since bank lending is what increases the money supply, the absence of increased lending meant that the quantity of money remained below the level that would have induced people to spend at the level that would have been needed to maintain full employment.

Irving Fisher (1933, p. 342) described this phenomenon when he wrote, "These losses, bankruptcies, and unemployment, lead to (7) Pessimism and loss of confidence, which in turn lead to (8) Hoarding and slowing down still more the velocity of circulation." Similarly, Milton Friedman (1961) pointed out that fluctuations in consumer confidence were a plausible explanation of variations in the demand for cash balances.

In his lectures in monetary theory, Friedman pointed out that in an economy with fiat money, if people want to keep more cash in their pockets, there is no real resource cost to the economy in providing it.[1] From the perspective of real resources, the additional cash is just a bit of paper and some entries in bank ledgers, as long as people do not want to actually spend it. However, if the additional real cash balances are provided only by the natural mechanism inherent in a market economy, then they are provided by a fall in the price level, which generally occurs with an accompaniment of substantial unemployment.

Another component of Friedman's lectures in monetary theory was the example of helicopter drops of money, which he used to explain the quantity theory of money.[2] Friedman pointed out that if overnight helicopters dropped an amount of money equal to the initial money supply, equilibrium would occur only after prices had doubled. In a variation on Friedman's example, suppose that that there was an overnight doubling of everyone's demand for cash balances, simultaneous with a targeted helicopter drop that doubled the cash in everyone's pockets. The economy would continue with nary a ripple in employment or the price level.[3]

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[1] From my recollection of his course in fall 1965.
[2] This idea can also be found in Friedman (2006) [1969], pp. 5-7.
[3] This assumes that the "cash in people's pockets" does not become reserves for expanded bank loans.

While Friedman used the example of helicopter drops of money simply to explain the quantity theory, the terminology of "helicopter money" has entered the economics literature in recent years, as the name for a policy of giving money to all citizens, to prevent recessions (Reichlin et al., 2013, Buiter, 2014). The difficulty with a policy of helicopter money given to citizens is that if helicopter money has been distributed and people recover their confidence, so that the demand for cash balances returns to its prior lower level, there will be inflation, unless the quantity of money can be reduced in some way. This paper proposes that the way to provide helicopter money while preparing for such a needed later reduction in the quantity of money is to make the initial distribution of money a loan rather than a gift. Thus, this paper proposes a policy instrument of Fed-sponsored loans to most citizens. The loans make it possible to accommodate an increase in the demand for cash balances without a fall in the price level, and the repayments make it possible to avoid inflation when the demand for cash balances falls.

The remainder of this paper is organized as follows. Section II provides a review of related literature. Section III discusses the economic circumstances that led to the proposal for helicopter loans. Section IV presents the theoretical foundation for proposing helicopter loans. Section V discusses what might have happened in 2008 and 2009 if helicopter loans had been available. Section VI provides a detailed presentation of the policy proposal, while section VII provides commentary on the proposal. Section VIII discusses variations on the proposed policy. Section IX develops some statistics relevant to the proposal. Finally, section X concludes.

II. Literature Review.

Economists have recognized the precautionary motive for saving since at least the time of Keynes. Leland (1968) developed a simple analytical framework for the precautionary motive for saving, sowing the seeds for a rich literature that focuses on the consumption and saving behavior of agents facing idiosyncratic income risk and borrowing constraints. (See Zeldes (1989), Caballero (1990, 1991), Kimball (1990), Deaton (1991), Carroll (1997), and Engen and Gale (1997).) Several papers investigate the consumption and saving behavior of heterogeneous agents in general-equilibrium exchange economies. (See Bewley (1977), Huggett (1993), Wang (2003), and Guerrieri and Lorenzoni (2011).) This paper innovates by introducing a proposal for interest-free loans to households, as a policy tool for stabilizing consumption demand during times of increased perceived risk that leads to an increased precautionary demand for cash balances.

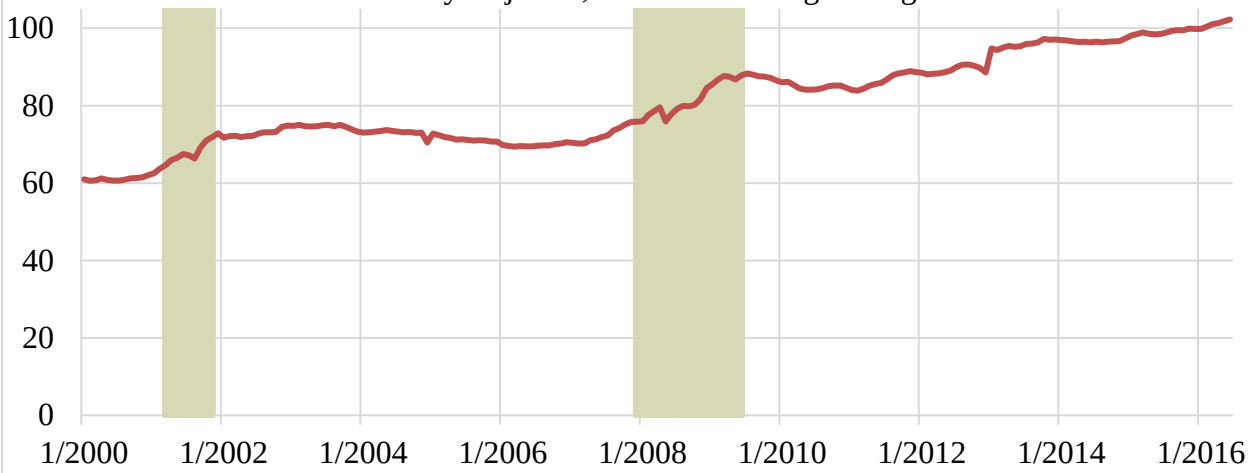
The paper is related to the literature on microcredit and social insurance benefits (such as Engen and Gruber (2001) and Hsu et. al. (2014)). Kaboski and Townsend (2011) evaluate the impact of intervention from a village fund in a household decision model with a borrowing constraint, income uncertainty and investment opportunities. This paper generates a similar result, that providing extra credit can boost consumption, but it differs from Kaboski and Townsend in its concern for a policy for a large economy rather than a village economy.

Finally, this paper is related to credit policy papers, such as Gertler and Karadi (2011) and Curdia and Woodford (2011). The existing literature has studied the effect of extending lines of credit to producers or to financial intermediaries during extreme financial conditions. This paper proposes instead a policy that provides extra credit to consumers, to foster economic stability (and recovery if necessary) through demand-side stimulus.

III. Background

That there are fluctuations in the demand for cash balances as a percentage of income is not in doubt. Figure III shows the ratio of "money with zero maturity" (MZM)[4] to disposable personal

Figure III: Money as a Percentage of Disposable Personal Income
Seasonally Adjusted, 3-Month Moving Average



Calculated as the three-month moving average of the ratio of St. Louis Fed's seasonally adjusted monthly MZM to line 27 in NIPA Table 2.6.

[4] There are many possible measures of money and no agreement among economists as to which measure is best. The St. Louis Fed's MZM seems most coherent to me. In terms of more standard definitions, it is close to M2, but it excludes time deposits less than $100,000, which are included in M2, and it includes all money market funds, where M2 includes only those of individuals.

income. The fluctuations in this ratio around a rising trend are clear. It is also noticeable in the figure that the ratio rose quite a bit faster than the trend in the last two recessions, both of which were associated with the bursting of speculative bubbles—the dot com bubble in the recession of 2001 and the housing bubble in the recession of 2008-09. It is plausible that the bursting of a speculative bubble would cause an increase in the demand for cash balances, both because asset value serves as an (imperfect) substitute for precautionary balances and because a crash in asset prices will rationally cause an increase in uncertainty and therefore an increase in the demand for precautionary balances.

Another way of viewing the consumer adjustment to an increase in the demand for cash balances is in terms of the resulting increase in the saving rate. Figure II shows the personal saving rate. As the real estate bubble formed, permitting people to satisfy their demand for precautionary balances through increases in home equity lines of credit, the personal saving rate fell. Then, as the recession was arriving in 2008 and 2009, there was a sharp, sustained rise in the saving rate, by about three percentage points. Such a rise in the saving rate in response to a financial shock is understandable, because economic uncertainty tends to increase after major shocks (Bloom (2009), Jurado et. al. (2015)), and an increase in anticipated fluctuations in income can be expected to increase the demand for buffer stocks of cash. Thus the financial crisis of 2008-2009 exemplifies an episode of high uncertainty leading to low consumption as a percentage of income.

IV. The Rationale for Helicopter Loans

Suppose that, instead of seeking to fight the recession of 2008-2009 by reducing interest rates, the Federal Reserve had sought to fight it with interest-free "helicopter loans" to consumers, to accommodate their increased demand for cash balances. Such a policy might have stabilized the economy by accommodating increase in the demand for precautionary saving and thereby maintaining consumption. The mechanism can be explained in terms of buffer-stocks.

A household facing a stochastic income stream, Y_t, divides its income at each time t between consumption C_t and saving ΔA_t, in such a way as to maximize the present value of expected future utility. That is, the household maximizes

$$U = \frac{1}{1-1/\sigma}\sum_{t=0}^{\infty}\left(\frac{1}{1+\rho}\right)^{t} C_t^{1-1/\sigma}$$

where σ is the household's intertemporal elasticity of substitution and ρ is the household's pure rate of time preference. The maximization is subject to the household's long-term budget constraint,

$$\sum_{t=0}^{\infty} C_t = Y + A_0$$

where A_0 is the household's wealth at time 0 and Y is the present value of the household's future income, consisting of the stochastic series Y_0, Y_1, Y_2, . . .

Any reduction in the expected value of a future Y_i or increase in the variance assigned to a future Y_i can be expected to lower C_0, since such a change in a future Y_i will increase the expected value of assets at that future time.

However, the maintenance of full employment in the economy depends on the sum of the consumption plans of all the households equaling the capacity of the economy to produce consumption goods. (There is limited capacity of declines in consumption to be offset by increases in government spending, investment, and net exports; here we ignore these.[5]) When households experience correlated increases in the expected variance of future income, their simultaneous responses in reducing consumption cause a recession. Such recessions can be avoided if, when households experience correlated increases in the expected variance in future income, they also receive interest-free loans (helicopter loans) that will last as long as the increase in the variance in future income and thus provide enough of a buffer against future income shocks that the opportunity cost of assets will fall to its level before the increase in expected variance of future income, and households will be content to leave their consumption plans unchanged.

When the crisis is over and households experience correlated declines in the expected variance in future income, they will want to increase their spending, causing inflation. An obligation at such a time to repay previous helicopter loans (over several months) can keep their spending from increasing and thereby prevent inflation.

Helicopter loans differ from unemployment insurance because that policy applies only to realized variations in income, while helicopter loans deal with changes in the uncertainty with respect to future income, whether or not there have been any changes in realized income.

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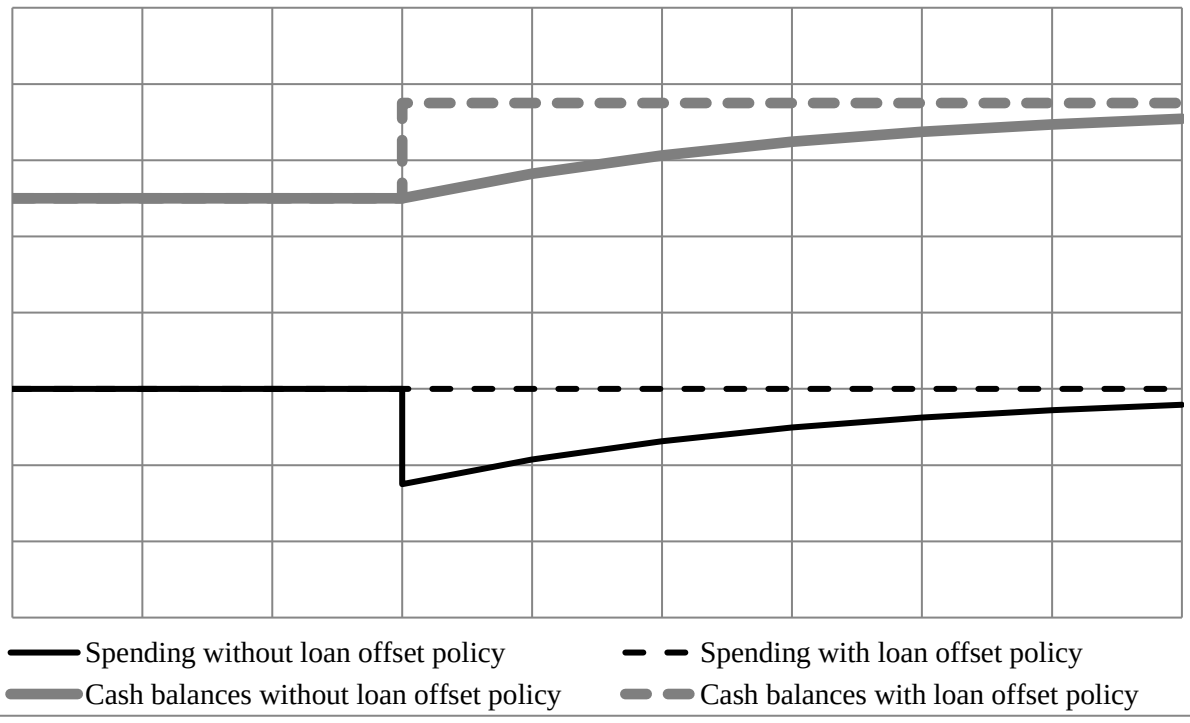
[5] Government responses are slow, firm are not inclined to invest when consumption is falling, and net export increase are not available to the world as a whole when there is a global economic crisis.

Figure IV provides a graphical illustration of loans to offset a shock to the variance in future income. This figure shows the hypothetical path of adjustment of consumers to a shock in the demand for precautionary balances, without and with an offsetting policy of loans to consumers. Without the policy of loans to consumers, a shock to the demand for cash balances causes consumers, in maximizing their intertemporal utility, to implement an immediate drop in spending, beginning to bring their cash balances closer to the new target level. As the level of cash balances approaches the new target, getting closer to the target becomes less valuable, and consumers reduce the rate at which they approach it. But there is a sustained deviation of spending from its equilibrium level. Without an infusion of cash, the drop in spending below its equilibrium level could be avoided only by an instantaneous drop in prices to adjust to the new desired level of precautionary balances. On the other hand, if a loan of just the right size offsets the increase in the desired level of precautionary balances, then precautionary balances reach their new desired level immediately, and consumers find that maximizing their intertemporal utility functions entails maintaining their levels of spending.

Figure IV: Evolution of Spending and Cash Balances
in Response to a Shock, without and with a Loan Policy



V. What Might Have Happened in 2008?

Suppose that the tool of helicopter loans had been available to the Fed in 2008. What might they have done? The Fed would have announced loans that they judged sufficient to maintain consumption spending, and all participating taxpayers would have seen corresponding increases in interest-free loans on their bank statements. If the Fed underestimated what was necessary to maintain aggregate demand, it could quickly increase the loan amounts. It is reasonable to expect that if such a policy had been implemented in 2008, any downturn could have been held to something that was brief and mild. High unemployment that persisted six years after the shock could almost certainly have been avoided. There would never have been a difficulty of policy being constrained by the impossibility of reducing interest rates below zero.

Suppose that a policy of helicopter loans could have been implemented in 2008-09. What aggregate magnitude of loans might have been needed? The observed three percentage point rise in the saving rate represented a decline in consumer spending of about $300 billion per year. Since average household income was about $100,000 per year, the increased saving represents reduced consumer spending of about $3,000 per household per year. From the graph, it looks like consumers wanted to save an additional 3% of income for about four or five years. Thus it seems that loans averaging $12,000 to $15,000 per household might have been needed to persuade consumers to maintain spending at a full-employment level as the housing bubble collapsed, given their level of confidence. But if such loans had been made in 2009, before consumers had experienced the depth and duration of the recession, their expectations might have been more optimistic, making smaller loans sufficient. Thus calibrating the loans needed to stabilize consumer spending is likely to require a high degree of economic skill. It is reasonable to expect that economists at the Fed have that skill, so that the Fed would be able to achieve a greater degree of economic stability if interest-free consumer loans were added to their toolkit.

The primary tool of the Fed for combating recessions is reductions in interest rates. The most obvious limitation of this tool is that it can only be applied down to the point where the interest rate that the Fed seeks to control is zero. But even apart from this limitation, there is a difficulty with using interest rate reductions to combat a deficiency in aggregate demand caused by an increase in the demand for cash balances: The path from lower interest rates to more cash in the hands of the general public is quite indirect. If there is an increase in the demand for cash balances that the Fed offsets with purchases of government securities, then the purchase will

lower the interest rate on government securities and place additional funds in the hands of the persons and institutions that previously held the government securities. In re-optimizing their portfolios with a reduced supply of government securities, these investors will have a greater demand for investments that finance capital goods. Thus the reduction in consumer demand caused by an increase in the demand for cash balances is offset by an increase in the demand for capital goods. Increased orders for capital goods put increased cash in the hands of those who produce capital goods. Increased spending by the firms and individuals who produce capital goods will begin to put additional cash in the hands of the public. Meanwhile banks, seeing a lower interest rate, find it in their interest to pass some of that lower interest on to their loan customers, and the demand for bank loans increases, further expanding the money supply. Once a new equilibrium with greater cash balances is reached, the demand for capital goods will have retreated to its pre-stimulus level, and the demand for consumer goods will have returned to its level before the increase in the demand for cash balances. Even if the Fed chooses an increase in the money supply that exactly accommodates the increase in the demand for cash balances, there will be a disturbance in the equilibrium of the economy caused by the combination of the fact that time is required to reach the new equilibrium and the fact that the movement to the new equilibrium requires a temporary increase in spending on capital goods and a temporary decrease in spending on consumption, as consumers move to their desired levels of cash balances.

In the past few years the Fed has adopted a new tool for stimulating aggregate demand when the federal funds rate (the interest rate they seek to control) has been pushed to zero, namely purchases of mortgage-backed securities. While this policy tool is capable of increasing the quantity of money in the economy to any desired degree, it is much like purchases of government securities in terms of its indirectness. Purchases of mortgage-backed securities put additional cash in the hands of those who previously held these securities. In re-optimizing their portfolios with a reduced supply of mortgage-backed securities, these investors will finance the purchase of capital goods, and then the chain of causation occurs as with purchases of government securities.

In the case of mortgage-backed securities, there is an additional chain of causation by which aggregate demand is stimulated. The purchase of mortgage-backed securities lowers mortgage interest rates, which induces people to refinance their houses at lower interest rates. This reduction in the interest rate that qualifying homeowners pay on their mortgages increases their

permanent real incomes and causes them to spend more. However, those whose incomes come from receiving interest payments experience corresponding reductions in their permanent incomes. Still, there is likely to be an increase in spending, because the marginal propensity to consume of those whose incomes rise is likely to be greater on average than the marginal propensity to consume of those whose incomes fall. However, this redistribution between those who live on interest and those who pay mortgage interest does not increase the supply of cash balances. The increase in the supply of cash balances operates entirely through the spending that begins with the purchase of mortgage-backed securities by the Fed.

Contrast the sequence of steps above with what would happen if the Fed provided interest-free loans to consumers equal to the increases in their demand for cash balances. The loans would go into consumers' bank accounts, and that step would be sufficient to attain the new equilibrium. No further transactions would be needed. Still, additional action by the Fed would be needed to avoid undesired secondary effects. Everything would be fine if consumers took their additional precautionary reserves and put the money under their mattresses. But if, as can reasonably be expected, they put the money in bank accounts, then the banks will have additional reserves. They will want to put these reserves to work. If the federal funds rate is greater than zero, then banks will put their new reserves into that market, reducing that rate. The resulting reduction in the federal funds rate will induce banks to extend additional loans. This will be fine if there is unused capacity in the economy, but if the economy is initially at full employment, then the new lending will result in inflationary pressure. To avoid promoting additional lending, the Fed can either increase the reserve rate, turning the banks' new reserves into required reserves, or it can undertake open market operations, selling government bonds and thereby depriving banks of as much in reserves as they gained by the loans to consumers.

Fiscal policy—a change in government spending or taxes—has a more direct impact on the public's cash balances than traditional monetary policy. Additional government spending not financed by taxes puts additional cash directly into the hands of those who provide the goods and services that the government buys. From there it spreads throughout the economy. A tax cut tends to spread the additional cash even more widely and, if it is implemented by sending out checks, also quickly. The difficulties with using spending increases and tax cuts to offset increases in the demand for cash balances is that the political process tends to operate rather slowly and cannot reasonably be counted on to deliver the changes in the government deficit that

are needed to stabilize aggregate demand. Thus it is worth considering how an additional instrument of monetary policy might be used to provide what ideal fiscal policy would provide.

VI. Proposal

Based on the analysis above, I propose "helicopter loans" as an additional, fiscal component of monetary policy. What I mean by a fiscal component of monetary policy is a policy instrument that has macroeconomic consequences similar to the consequences of lowering and raising taxes, like fiscal policy, but is conducted by the monetary authority. The policy would be conducted by offering interest-free loans to most taxpayers. This represents an effort to create a macroeconomic policy that would have the best features of both monetary policy and fiscal policy, and not have the drawbacks of either. The virtue of monetary policy is that it is implemented by a body that is reasonably independent of political influence and can therefore implement a policy that reflects the best economic judgment. The drawback of monetary policy is that the tools that it uses to stimulate the economy, namely purchases of government bonds and (recently) mortgage-backed securities, are better suited to stimulating investment spending than consumer spending, since they operate on interest rates and therefore increase consumers' cash balances only indirectly. Expanding the quantity of mortgage-backed securities also entails the considerable expense of the mortgage production process. The virtues of fiscal policy are that it affects consumer spending directly, and that its effects are rapid and reasonably predictable. Increases and decreases in taxes generate decreases and increases in consumer spending respectively. The drawbacks are that the political process tends to takes a long time to make decisions and that politicians are very reluctant to raise taxes when macroeconomic stability requires it.

One way of describing the proposal for helicopter loans is that instead of purchasing mortgage-backed securities, the monetary authority should purchase "citizen-backed securities," that is, packages of interest-free loans that banks would make to most of their customers. The reason that the loans would be interest-free is that it costs the Fed nothing to create the money that would be lent. To be eligible for a loan, a person would need to meet the following qualifications:

1) Have an account with a financial institution that has an account at the Fed
2) Have filed at least one income tax return
3) Not be delinquent on his or her taxes

4) Be legally competent to promise to repay a loan
5) Not be in a prison or other liberty-restricting institution

I am inclined to make corporations as well as citizens eligible for these loans, as long as there is a corporation income tax, but this feature could be decided either way. The argument for including corporations is that corporations as well as consumers have demands for precautionary reserves, and accommodating fluctuations in these demands for precautionary reserves by loans from the Fed would promote economic stability.

I propose two components to the loans to consumers. One component would be a loan of the same magnitude for all eligible citizens. The other component would be a loan equal to a specified fraction of the taxes that the consumer paid over the past five years. Call the first component the "loaned citizens' dividend" and the second component the "tax-deferral loan." Monetary policy would raise and lower the magnitude of the loaned citizens' dividend and the ratio of the tax-deferral loan to taxes paid in the past five years, to stabilize aggregate consumer demand.

While any rule could be used to determine the relationship between the magnitude of the loaned citizens' dividend and the fraction of taxes that was lent, one interesting possibility would be to make the combination equal to a specified fraction of linear econometric estimate of the demand for cash balances as a function of taxes paid. Thus if the demand for cash balances was estimated to be $8,000 plus 40% of federal income taxes paid over 5 years, then a policy of providing a loan of 25% of the estimated demand for cash balances would mean that the loaned citizens' dividend would be $2,000 per eligible citizen, and the tax deferral loan would be 10% of taxes paid over the past five years. A couple too poor to owe income taxes would receive a loaned citizens' dividend of $4,000. An upper middle-class couple that paid $20,000 per year in federal income taxes would receive the loaned citizens' dividend of $4,000 plus a tax-deferral loan of $10,000. Another way of describing the tax-deferral loan is that it would permit a five-year deferral of some specified portion of federal income taxes (10% of taxes in the example). The loaned citizens' dividend would provide a lifetime loan of the specified magnitude, which might be varied by policy changes. I would recommend that, if tax-paying corporations are accorded loans, these be only tax-deferral loans, with no equivalent of the loaned citizens' dividend, so that simply forming a corporation would not create an entitlement to a loan.

The administrative structure of the policy would be that every taxpayer who wished to participate would specify a primary financial institution with an account at the Fed, where he or she had an account. He or she would allow that institution to receive information from the tax authorities about filed tax returns, from which the institution would calculate the amount of the interest-free loan for which the taxpayer was eligible. The financial institution would credit the taxpayer's account with the loan and include the loan in a package sold to the Fed. Each year, as taxes were computed, the amount of the permitted loan would rise or fall. In the event of a fall, a schedule of monthly repayments would be implemented to bring down the amount of the loan over the course of a year. In the event of a rise, the amount of the interest-free loan would rise month by month over the course of a year. Thus a shuffling of the recipients of incomes would be neither stimulative nor contractionary.

Upon filing a first tax return and opening a bank account, a young person entering the workforce would have an immediate loan of the loaned citizens' dividend, and then five years of increasing loans. A person at the end of life, reducing his or her participation in the economy, would be required to gradually repay his or her tax-deferral loans. Outstanding loans would be fully due at death and would have the same priority in settling estates that unpaid taxes currently have. As a condition of participation, a person who was required to repay loans would be subjected to automatic monthly transfers from any bank accounts or other asset accounts. Overdue payments would incur interest charges at the average government borrowing rate. There would be some defaults, especially of loaned citizens' dividends, since so many people die without any assets, but these would likely be small enough that they would be tolerable.

If a time comes when it is necessary to reduce aggregate demand, and the Fed has previously extended loans to taxpayers, then it would be possible for the Fed to reduce aggregate demand by announcing future reductions in the loaned citizens' dividend and in the coefficient for the tax-deferral loans. To ensure that this would not be too disruptive to taxpayers' financial plans, it would be sensible to have a warning period of several months before increased loan payments were required.

To ensure that there will be a possibility of cooling down the economy by requiring loan payments from taxpayers, it would be sensible for the Fed to begin implementing the policy of extending tax-deferral loans, even in a time of full employment, and offset the policy, if necessary, by allowing interest rates to rise.

While it would be reasonable to implement repayments of loans only with notice of several months, this would not prevent such a policy from having immediate impacts, since people can be expected to reduce their spending immediately when they are informed of future required payments. For increases in the amounts of loans, on the other hand, immediate implementation is appropriate, since the purpose of the loans is to accommodate an immediate desire for increased precautionary balances. If people want more precautionary balances now, they could be expected to cut back on their spending if they were told that they would need to wait several months before the precautionary balances they wanted would be available.

A policy would be needed for dealing with situations in which a person with outstanding loans became ineligible by virtue of no longer meeting one or more of the requirements of eligibility. For example, a person might be convicted of a crime and sent to prison. I would suggest the following rule. If a person's ineligibility was expected to last a month or less (for example, he or she was sent to jail for a month for drunk driving), then the ineligibility would be ignored. If the person's ineligibility was expected to be indefinite (for example, he or she was declared mentally incompetent or was sentenced to prison for life or for a period of years exceeding his or her life expectancy), then the loan would be immediately payable, and the taxpayer's affairs would be wound up in bankruptcy court if the loan could not be repaid. If a person became ineligible for a period of time that was expected to have an intermediate length, then additional loans and required repayments would be suspended until eligibility was restored. If a person became ineligible by virtue of becoming tax delinquent, then the person would become ineligible for any further loans until the tax delinquency was paid.

VII. Commentary

The rationale for the proposed policy instrument is a belief that fluctuations in employment are caused substantially by efforts of taxpayers to optimize their cash balances in circumstances in which their demands for cash balances fluctuate considerably. To achieve increases in cash balances, taxpayers reduce spending. But a reduction in spending represents a reduction in aggregate demand, with a consequent increase in unemployment. If taxpayers could receive loans equal to the increases in their demands for cash balances, it would be possible for them to meet their goals for the safety provided by additional cash balances, with little if any real cost to the economy and without any reduction in aggregate demand for goods and services, and therefore without any increase in unemployment.

Comparing the proposed policy with the Fed's policy of buying mortgage-backed securities and with fiscal policy, all three operate by inducing greater spending. The purchase of mortgage-backed securities induces greater spending on capital goods, financed by those who previously held mortgage-backed securities. Fiscal policy either involves greater spending by the government or it induces greater spending by those who pay lower taxes. With loans financed by the Fed, there is more spending by all eligible taxpayers who find that they do not need to add to their savings to satisfy their desire for additional precautionary balances.

The two policies that can maintain spending in the face of an increase in the demand for cash balances are an immediate tax rebates and Fed-financed loans. The other policies operate more slowly. The difficulty with relying on a policy of tax rebates is that it lacks a workable alternative in the reverse direction. Politicians tend to be extremely reluctant to raise taxes just because economists say that macroeconomic stability requires it. On the other hand, having the Fed tell taxpayers that it is time for them to begin making payments on their interest-free loans is much less problematic.

The policy of purchasing mortgage-backed securities has a number of drawbacks that do not apply to Fed-financed loans. The policy of purchasing mortgage-backed securities and thereby reducing mortgage interest rates induces homeowners to refinance their homes, a process that is time-consuming and expensive, which delays the impact and reduces the efficiency of the policy. With stimulus from mortgage-backed securities, the set of taxpayers who can benefit from the policy is restricted to the relatively small set of those who are credit-worthy, have enough home equity to refinance, and are economically knowledgeable enough to understand the value of the opportunity to do so. With Fed-financed loans, on the other hand, a much wider set of taxpayers benefits from the stimulus program.

Another aspect of the equity of the proposed system concerns the distribution of seigniorage. An increase in the demand for cash balances provides an opportunity for the government to print currency and for banking system to extend additional interest-bearing loans that will primarily be deposited in non-interest-bearing accounts. Both printing money and expanding the volume of bank loans provide opportunities for increased "profit" for the economy—interest on bank loans and seigniorage on printing money. When the demand for cash balances increases, either because the economy expands or because citizens feel a need for the greater financial security of a higher level of cash balances, there is justice as well as regulatory convenience in allowing the

profit from the greater demand for cash balances to be received by those who have the greater demand, rather than by the Treasury and the banking system. When the demand for cash balances increases, it costs the economy virtually nothing to create the additional cash by printing money and expanding credit, so why not let people have the additional money that they want? If instead the increase in demand for cash balances is to be accommodated by increases in bank loans, it is quite complex to ensure that banks will be motivated to extend exactly the quantity of additional loans that will match the increase in demand for cash balances, and there will be a myriad of redistributive effects before a new equilibrium is reached.

Having an additional policy instrument permits the pursuit of an additional policy goal. If Fed-financed loans are used to stabilize consumer demand, then interest rate policy can be focused on stabilizing the demand for capital goods. Of course, both stabilization efforts would need to stabilize demand at a level that was consistent with maintaining the desired rate of inflation, and it could happen that better outcomes could be achieved through decisions that did not involve assigning individual goals to policies.

VIII. Variations on the proposed policy

There are many variations on the policy that could be considered. Interest could be charged on the loans at a level sufficient to cover administrative costs and defaults. This would discourage some people from participating and therefore mean that larger loans would need to be extended to those who did participate. Interest rates could be varied with factors reflecting the probability of default. Experience would be needed to determine the actual correlates of default, but it seems likely that interest rates would be higher for people who paid less in taxes and for those who were older. Those who paid little in taxes would probably participate at high levels even if interest was charged, since they generally face such high interest rates in the market. Those who were old might participate noticeably less. This might be acceptable if it meant that the default rate would be considerably lower.

It is possible that poorer people would actually benefit from requiring that interest be paid on the tax-deferral loans. To the extent that the requirement that interest be paid discourages rich people from participating, the loans for those who do participate will be greater. For poorer people, who face high borrowing costs, the opportunity to receive a larger low-interest loan could more than compensate for the obligation to pay interest.

Since the top 1% of taxpayers pay about one-third of all income taxes, a policy of allocating interest-free loans in proportion to taxes paid would result in one-third of the interest-free loans going to the top 1%. This is not necessarily a bad thing. If we think that the tax system allocates the costs of public activities appropriately, then a sharing of the benefit of an opportunity to postpone some taxes in proportion to taxes paid is reasonable. On the other hand, it may simply be politically unacceptable to have multi-million dollar tax-free loans go to those who pay the most in taxes. In that case, one would put a cap on the magnitude of the loan that a taxpayer could get, and there would be bigger loans for those whose allocations were less than the cap.

If interest was to be charged on loans, one could consider a policy of offering lines of credit from which taxpayers could draw loans when they wished. My own contingency reserves are primarily in the form of a home equity line of credit. When I go to my bank's Web site, I see my checking account, my wife's checking account, our savings account and our home equity line of credit. We can transfer money among these at will. Under the policy I propose, there would be another entry for my Fed-financed loan and/or line of credit. This would show the maximum line of credit for which my wife and I were eligible, how much we had already drawn, the interest rate on our loan, and the monthly amount of interest. At present I pay no fee for the unused part of my home equity line of credit, though there were fees for setting it up. For Fed-financed loan accounts, fees for unused lines of credit might or might not be charged.

Instead of basing the permitted loan or line of credit on income taxes alone, one might want to take account of the variety of credits and additional taxes. I would not recommend that taxes beyond income taxes, payroll taxes and, if corporations are included, the corporation income tax, be included in the determination of the size of the loan or line of credit for which a taxpayer would be eligible.

To the extent that economic conditions are different in different regions, in would be possible to have loans of different magnitudes in different regions. This would be particularly relevant in adapting the idea to the European Currency Area, where differences in economic conditions make it difficult to devise a monetary policy that is appropriate for the whole area.

IX. Some preliminary statistics

Implementation of the policy would require research into the demand for cash balances as a function of taxes paid. What follows is a preliminary inquiry into what such research might show.

When information from table "1 01-13," "6 13," and "6 13 means" of the Federal Reserve's *Survey of Consumer Finances*[6] are combined, as in Table 1 below, it is possible to establish a relationship between income and bank account balances.[7] Figure VI displays the relationship between income and average transaction accounts for those with accounts graphically in logarithmic terms. When this relationship in logarithms is fitted to a hyperbola, the hyperbola that emerges is the degenerate hyperbola,

$$[\ln (TA) - 0.794 - 0.471 \ln (Y)] [\ln (TA) + 2.331 - 1.264 \ln (Y)] = 0 \quad (1)$$

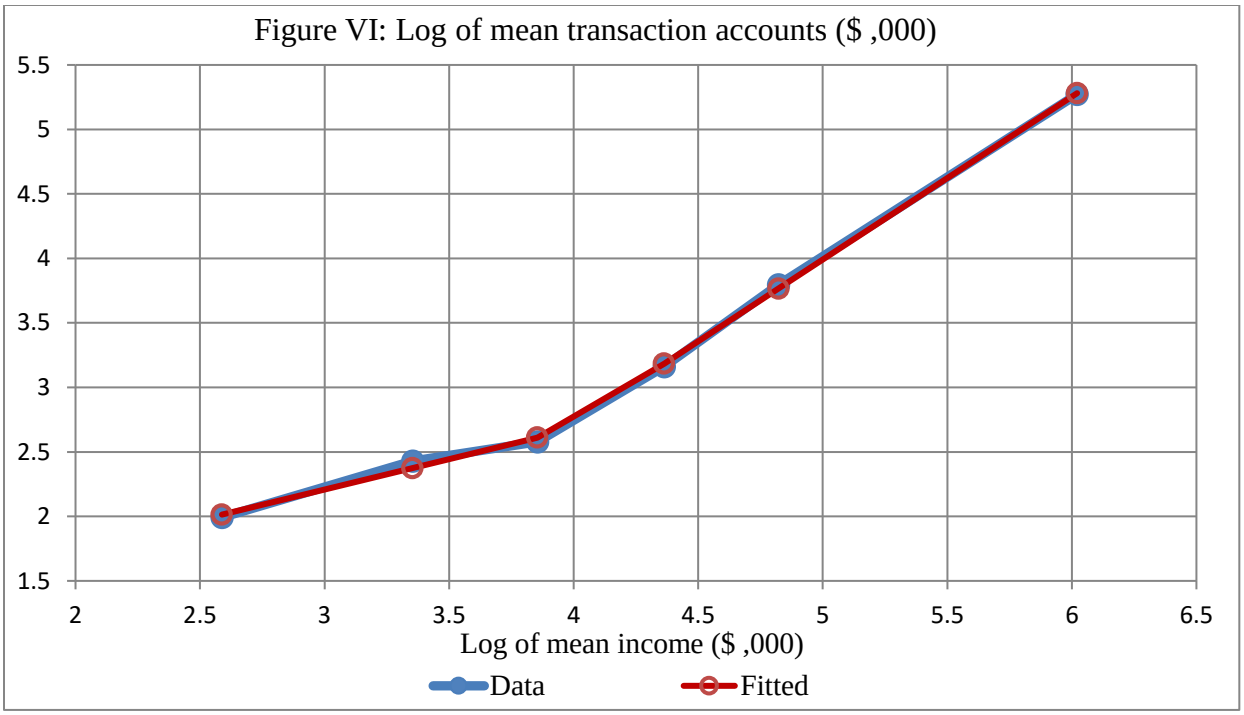
Table 1: Income and Transaction Accounts by Percentile of Income

Percentile of income	Mean Income ($,000)	Percent with Transaction Accounts	Mean Transaction Accounts ($,000)	Mean Transaction Acc. of those with accounts ($,000)
Less than 20	13.3	79.1	5.8	7.3
20–39.9	28.6	90.7	10.3	11.4
40–59.9	47.2	97.2	12.8	13.2
60–79.9	78.5	99.1	23.4	23.6
80–89.9	124.3	99.8	44.5	44.6
90–100	412.0	100.0	194.8	194.8
Source: FRB 2013 *Survey of Consumer Finances*, tables "1 01-13," "6 13," and "6 13 means."				

where TA is mean transactions accounts, in thousands of dollars, of those in the percentile range who have transactions accounts, and Y is mean income in thousands of dollars of those in the percentile range.

[6] Available at http://www.federalreserve.gov/econresdata/scf/scfindex.htm.

[7] The discussion switches here from money with zero maturity to transaction accounts because of data limitations. A variety of measures of the money stock are available on a weekly basis, but the only available figures for the demand for cash balances by income category are the from the Federal Reserve's *Survey of Consumer Finances*, which tabulates mean transaction accounts by income category once every three years.



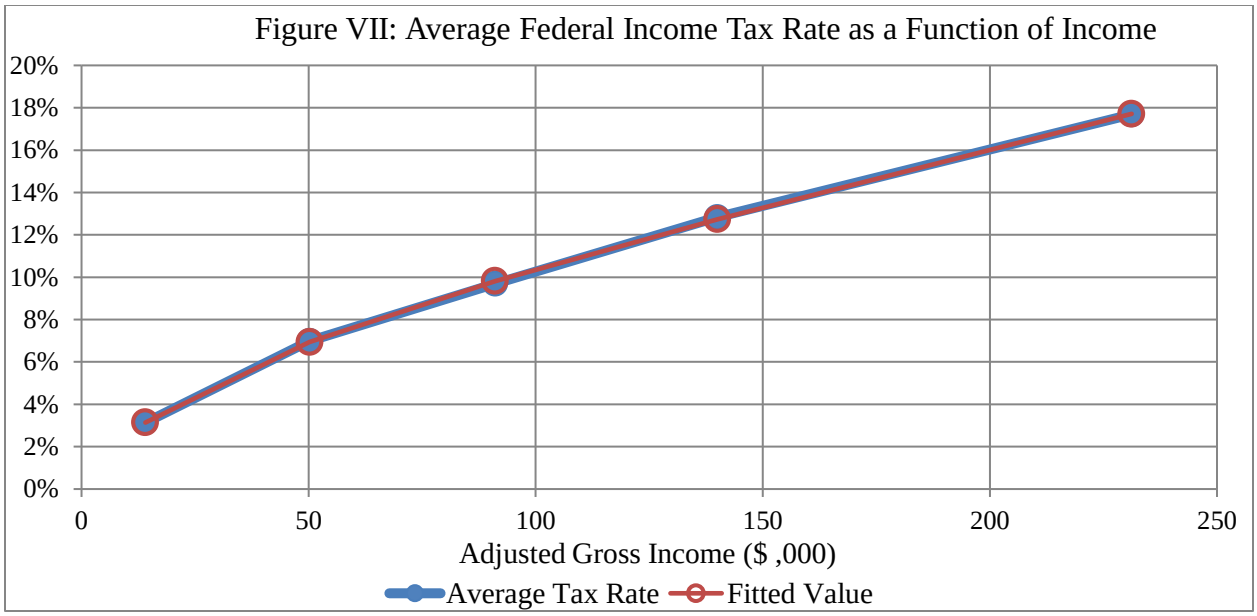
A relationship between income and the average income tax rate can be established from the IRS's Statistics of Income, which have been organized by the Tax Foundation at their Web page http://taxfoundation.org/article/summary-latest-federal-income-tax-data. The data are shown in Table 2 and graphed in Figure VII. The data are approximated by the hyperbola

$$[0.3365 + 0.01182\ Y - ATR][0.06781 + 0.00050\ Y - ATR] = 0.02062, \qquad (2)$$

where Y is average adjusted gross income in thousands of dollars in the percentile range and ATR is the average tax rate in the percentile range. Taxpayers in the top 1% are ignored here, because they do not fit the same equation.

Table 2: Average Income Tax Rate as a Function of Adjusted Gross Income

	Number of Returns	Adj. Gross Income ($ mil.)	Income Taxes Paid ($ mil.)	Average AGI ($,000)	Average Tax Rate	Fitted Value
Top 1%	1,365,857	1,555,701	365,518	1,139.0	23.50%	
1-5%	5,463,429	1,263,178	223,449	231.2	17.69%	17.71%
5-10%	6,829,285	956,099	122,696	140.0	12.83%	12.74%
10-25%	20,487,857	1,865,607	180,953	91.1	9.70%	9.81%
25-50%	34,146,428	1,716,042	119,844	50.3	6.98%	6.94%
Bottom 50%	68,292,856	960,561	30,109	14.1	3.13%	3.14%



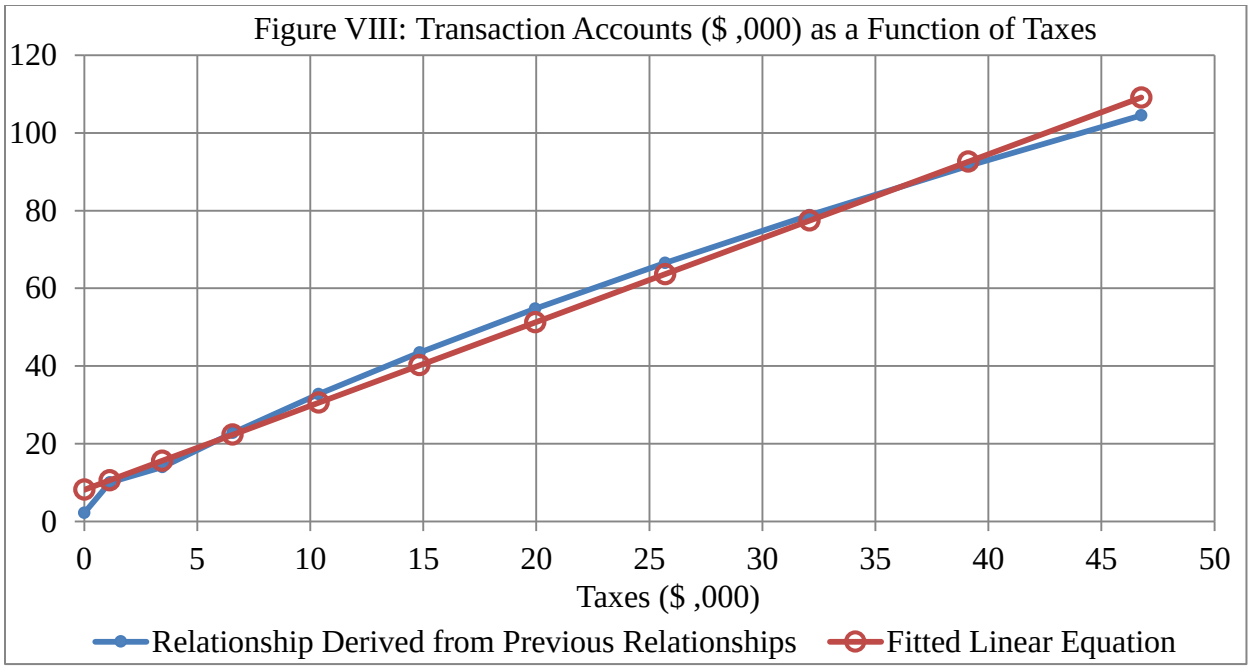
From the combination of the relationship between income and transaction accounts in (1) and the relationship between income and tax rates in (2) it is possible to establish a relationship between taxes and transaction accounts, as shown in Table 3. Figure VIII shows both the relationship derived from previous relationship and the best linear fit,

$$TA = 8.164 + 2.159\ T, \qquad (3)$$

where TA is transactions accounts and T is income taxes paid, both in thousands of dollars.

Table 3: The Relationship between Taxes and Transaction Accounts

Income ($,000)	Taxes ($,000)	Transaction Accounts ($,000)	Fitted Trans. Accounts ($,000)
1	0.01	2.21	8.18
25	1.14	10.09	10.62
50	3.46	13.99	15.63
75	6.57	22.81	22.35
100	10.37	32.81	30.56
125	14.84	43.50	40.20
150	19.95	54.78	51.23
175	25.70	66.57	63.65
200	32.09	78.81	77.44
225	39.11	91.47	92.59
250	46.76	104.50	109.11



While this analysis is rather crude, it is reasonable to expect that in a more detailed and systematic inquiry one would find a roughly similar relationship between taxes and transaction accounts. It would also be reasonable to expect that if one had full data on cash balances including currency and coins, then the observed relationship would not fall so far below the linear trend for those who pay the least taxes, since it is likely that currency and coins are relatively larger components of cash balances for people who pay very little in taxes.

To undertake a more complete analysis, one would begin with the micro data from the Federal Reserve's *Survey of Consumer Finances* and add data on taxes paid. An analysis based on such data would provide reasonably reliable estimates of the relationship between income taxes paid and the deposit component of the demand for cash balances. The currency and coin components are much more difficult to estimate. I am not aware of any data on the distribution of currency holdings by income class.

X. Conclusion

Fluctuations in the saving rate that are generated by changes in the demand for cash balances are a major source of fluctuations in employment. These fluctuations in employment could be avoided if available cash balances fluctuated to compensate for fluctuations in the demand for cash balances. The most straightforward way to achieve the desired fluctuations in available

cash balances would be to have the Fed expand and contract the money supply through loans to taxpayers that would increase or decrease in phase with the demand for cash balances. Distributing such loans among non-delinquent taxpayers in proportion to the taxes they pay has the virtue of concentrating the loans on persons who, because they are current on their taxes, are relatively unlikely to default.

It seems that such a policy instrument ought to be feasible in principle. The next steps in evaluating the possibility of such a policy instrument would be to embed the idea in a general equilibrium macroeconomic model, to undertake further empirical work on the relationship between taxes paid and the demand for cash balances, to have the idea evaluated by a variety of economists, and to have lawyers comment on its legal feasibility.

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