

Journal Review:

Money Demand and the Effects of Fiscal Policies

N. Gregory Mankiw, Lawrence H. Summers

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I. Summary

Mankiw and Summers (1986) reexamines the choice of scale variable in money demand function. They question the regular use of GNP as the scale variable, and suggest that *consumer expenditure better explains money demand* based on existing theories and empirical facts. The authors also look at other scales variables, such as personal disposable income, private spending, final sales, and domestic absorption, and find that these variables do not match consumer spending in explaining money demand.

This finding implies that *tax cut does not necessarily expand aggregate demand and output, assuming that money supply is constant*. Using a modified demand equation and IS-LM model, the authors show that tax cut can be contractionary for U.S. economy.

II. Methodology

Mankiw and Summers refers to *portfolio and transaction models of money demand* to find a better choice of the scale variable¹. Portfolio model basically says that wealth level or permanent income, instead of regular income, determines money demand.

Regular income is unstable to explain money demand, because it consists of transitory incomes and permanent income. When we get job promotion, our salary increments are more likely to be our permanent incomes. Whereas our bonuses and overtime pays are transitory or temporary in nature. Therefore permanent income is a better determinant of how much money to hold. Furthermore, change in permanent income affects proportionally change in consumption. So we can use consumption as a proximate of permanent income to explain money demand.

Transaction model of money demand suggests that consumer transactions create more money demand than government and business transactions. U.S. government accounts, in the form of government bonds and treasury securities, are not part of M1 and M2 definition (Federal Reserve Bulletin). Thus they cannot hold more money than consumers. Whereas businesses can hold the money at minimum because they are more sophisticated at managing their money, and they are bigger entity as well. The First reason is self-explanatory. The second one relates to the economies scale of money demand. Baumol's money demand equation estimates money demand as a square root of the transaction volume or income. So businesses with bigger transaction volume hold less money relative to their size, compared to consumers with smaller transaction volume.

The authors then use *their empirical facts* to support these theoretical findingsⁱⁱ. The first fact shows that households hold the largest portion of M1 and M2, with 64% and 90% respectively. The second fact shows that consumption contributes only 64% of GNP; but 86% of M1 holding and 96% of M2 holding are allocated to this activity – a ratio of 1.34 and 1.50. Whereas investment contributes 15% of GNP, with only 5% of M1 holding and 1% of M2 holding are allocated to this component – a ratio of 0.33 and 0.07.

This fact tells us that the propensity to hold money out of consumption is four times (M1) and twenty times (M2) the propensity to hold money out of investment. Both facts are consistent with the theoretical finding that consumers with their consumptions hold more money than businesses with their investment.

The authors also present additional *empirical evidences from previous studies* to further backup their findingsⁱⁱⁱ. For example, Goldfeld (1976, p. 715) concludes that “of the three transactions variables, in the pre-1974 period, GNP is clearly the worst, while consumption and personal income are equally good.” Laidler (1977, pp. 139-148) presents evidence which favors permanent income over current income or nonhuman wealth as the scale variable of money demand. Judd and Scadding (1982, p. 1008) further adds that “one of the conclusions reached about the demand for money in the pre-1973 period (mostly based on annual evidence) is that permanent income or wealth outperformed measured income in producing a stable money demand function.”

In addition to income (GNP) and consumption, the authors also consider other scale variables to determine whether consumption is still a better variable to explain money demand. One way is to *compare various stabilities of money velocity when velocities are measured with different scale variables*^{iv}: gross national product (Y), consumer expenditure (C), consumer spending on nondurables and services (CNS), personal disposable income (Y-T), private spending (C+I), final sales (GNP less inventory investment), and domestic absorption (GNP less net exports). A Variable that produces the most stable velocity should be the most correct variable in the quantity theory of money equation and the money demand function. This method assumes that money supply (M) equally affects nominal GNP (PY) in the long run. Therefore, velocity

(V) has to be relatively stable. The authors use two different sets of data. First one is standard deviation of M2 velocity from 1930 to 1979 annual data accumulated by Friedman and Schwartz (1982). The second one is standard deviation of M1 and M2 velocity from 1960 to 1984 quarterly data. Standard deviation of M2 velocity from 1930 to 1979 shows that disposable income (Y-T) and consumer spending on nondurables and services (CNS) have the most stable velocities. Whereas standard deviation of M1 and M2 velocity from 1960 to 1984 shows that consumer expenditure (C) and consumer spending on nondurables and services (CNS) have the most stable velocities. Results from the two datasets tell us that GNP may not be the correct variable in the quantity equation, and some kind of consumer expenditures fit the equation better.

The second way to compare those scale variables is to see *how each variable explains historical M1 and M2 demand from 1960 to 1984 in the quantity theory of money equation*^v. Specifically, the authors compare standard error of estimates that are produced by each scale variable. Consumer expenditures (C) and consumer spending on nondurables and services (CNS) have the smallest standard error for M1, but other scale variables, disposable income (Y-T) and final sales (GNP less inventory investment), have the smallest standard of error for M2. Although consumer spending has a smaller standard error than GNP, this method cannot confirm strongly that consumption is a better scale variable than other non-GNP variables.

What we have learned so far from the empirical evidences is that consumer expenditure is a better variable than GNP. But we do not know yet whether a combination of some GNP components, including consumer expenditure, explains money demand. The author attempts to *negate this hypothesis using below equation*^{vi}:

$$\begin{aligned} \text{Log}(M) = & \alpha_0 + (1 - \lambda)\log(P_Y) + \lambda\log(P_C) + \alpha_1\log(r) + \alpha_2 \text{ time} \\ & + \alpha_3 [(1 - \lambda)\log(Y) + \lambda\log(C)] \end{aligned} \quad (1)$$

where M = the money supply per capita,
 P_Y = the GNP deflator,
 P_C = the consumer expenditure deflator,
 r = the nominal interest rate,
 Y = real GNP per capita, and
 C = real consumer expenditure per capita.

The key determinant of this equation is λ or “consumption weight”. If $\lambda = 0$, then GNP is the scale variable of money demand. If $\lambda = 1$, then consumer expenditure is the scale variable. The intermediate value of λ tells us that a combination of GNP components explains money demand without denying that the consumer expenditure is a better scale variable. The authors use annual M2 data between 1931 and 1979, from Friedman and Schwartz. They warn us that data since 1960 has a high standard error of λ , thus it can not confirm that either GNP or consumption is the scale variable. The reason is that the ratio of nominal consumer expenditure to nominal GNP has been stable since 1960. But the ratio fluctuates a lot during 1930s, 1940’s and 1950s. So the earlier part of the data is still useful for this testing. The result shows that all GNP components, except consumer spending on nondurables and services (CNS), has a consumption weight (λ) close to 1; and they all have very low standard error between 0.10 and 0.20. This strong evidence confirms that consumer expenditure is a better scale variable than other components of GNP, and at the same time reject the notion that the combination of GNP components explains money demand.

If we accept the notion that consumer spending, instead of GNP, is a scale variable in the money demand function, then the authors argue that how can this result

impacts on tax cut policy. They use a *modified money demand equation* and *IS-LM model* to answer this question^{vii}. We assume that consumer spending depends on disposable income and interest rate; and money demand depends on consumer spending and interest rate. These assumptions apply to equations below:

$$Y = C(Y - T, r) + I(Y, r) + G \quad (2)$$

$$M/P = L(C, r) \quad (3)$$

Then the authors performed a standard comparative statics exercise on this equations which yields a tax multiplier equation:

$$\frac{dY}{dT} = \frac{-C[L_C I_r - L_r]}{\Delta} \quad (4)$$

$$\text{where } \Delta = -(1 - C_Y - I_Y) (L_C C_r + L_r) - (I_r + C_r) L_C C_Y.$$

For tax cut to be expansionary, the following condition has to hold:

$$\frac{dY}{dT} < 0 \text{ iff } L_C < L_r / I_r \quad (5)$$

Only if change in money demand (L_C) is higher than change in investment (I_r), due to change in interest rate (r), that tax cut (dT) reduces income (dY). In other words, money demand has to be interest-inelastic relative to investment for tax cut to be contractionary. The authors express this condition in the following manner:

$$\varepsilon_C > \frac{C}{I} \times \frac{\varepsilon_r}{\eta_r} \quad (6)$$

where ε_C = quantity elasticity of money demand
 ε_r = interest elasticity of money demand, and
 η_r = interest elasticity of investment.

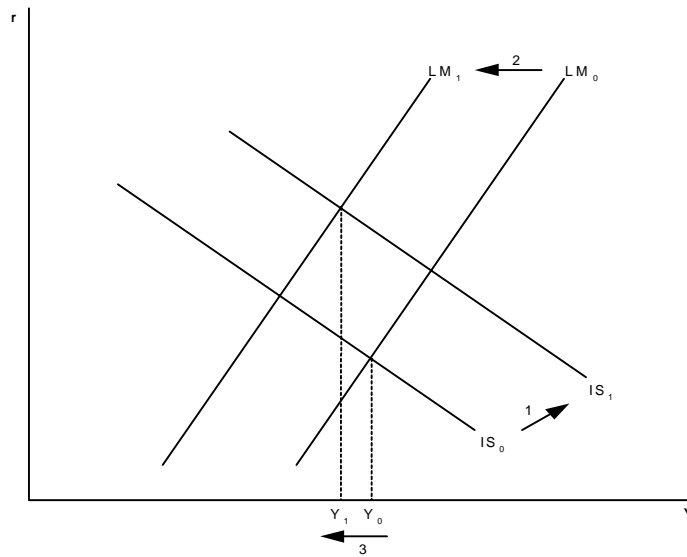
Based on their empirical data and other findings, they estimated that $\varepsilon_C = 1.0$, $\varepsilon_r = 0.1$,

$\frac{C}{I} = 4$, and $\eta_r = 0.8$. When we apply these numbers to equation (6), we have

$$1.0 > 4 \times 0.1/0.8 \quad \text{or} \quad 1.0 > 0.5. \quad (7)$$

which satisfies the contractionary tax cut condition, assuming that consumer expenditure is the correct variable of money demand function.

The authors also illustrated this finding using IS-LM curve below.



Tax cut raises aggregate consumption at a given interest rate (r). This shifts IS curve rightward (arrow 1). But the tax cut also shifts LM curve leftward (arrow 2), because at a given interest rate (r) and income (Y), consumption increases which then explains higher money demand. The end result is income (Y) shifts to the left (arrow 3).

At last, the authors used *1964 and 1981 tax cuts* to support their finding^{viii}.

Although 1964 tax cut was expansionary, they argued that money supply and interest rates were not constant. Monetary authority expanded reserve base to accommodate expansion, and the real return on three months treasury bills declined from 1964 to 1966. 1981 tax cut was contractionary with unemployment rate increased from 1981 to 1982.

Money supply is more stable as the Federal Reserve followed a Monetarist view in the early 1980s. During 1981-1982 period, the large personal tax cut seemed to explain an increase in C/Y ratio and a decline in M1 velocity.

III. Evaluation

This section, I evaluate two hypotheses that the authors argued in their paper. They are *consumer expenditure better explains money demand* and *tax cut does not necessarily expand aggregate demand and output, assuming that money supply is constant*.

Does consumer expenditure, instead of income, better explain money demand?

According to Cambridge equation of money demand, demand of real balance ($\frac{M^d}{P}$) is a proportion (k) of a given real income (Y) that people hold as money (k). One of the factors that affects “k” is wealth, which is a more permanent or long-term concept of income. And consumer spending is a good proxy of permanent income. In other words, consumer spending affects how much real income that people want to hold as money. We extend our evaluation of consumer spending in explaining money demand by examining an equation below:

$$Y = \bar{T} + C + \Delta FA^D + \Delta H_h \quad (8)$$

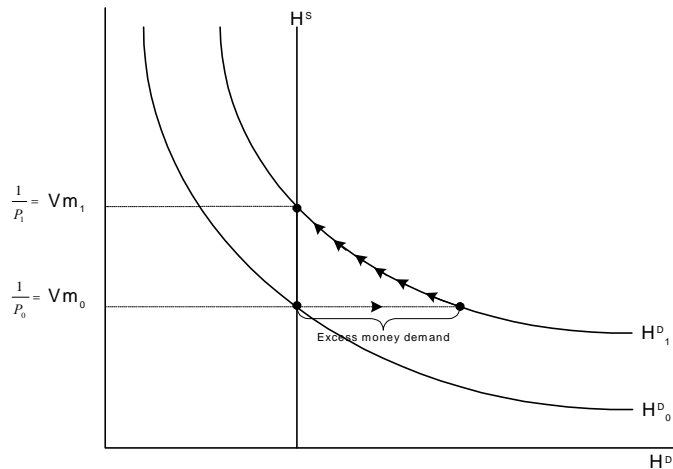
In this case, tax is an exogenous variable and cash hoarding is equivalent to the money demand. Equation (8) shows that income is not a good variable to explain money demand, because change in income (Y) might affect three variables: consumer spending (C), demand in financial assets (ΔFA^D), and cash hoarding (ΔH_h). In addition, an economy of scale in money demand suggests that people hold less money relatively to

their income. So cash hoarding is a small variable for aggregate income to explain. If we hold income constant, than change in consumption might affect only two variables: demand in financial assets (saving) and cash hoarding (money demand). Therefore consumption, instead of income, better explains money demand.

Next question is does tax cut not necessarily expand aggregate demand and output, assuming that money supply is constant? When government cuts taxes, people have higher disposable income for consumption. Since consumption replaces income in explaining money demand and money demand (ΔH_h) is a proxy of disposable income ($Y-T$) in equation (9), the higher consumption (C) causes a higher demand for money.

$$Y-T = C + \Delta FA^D + \Delta H_h \quad (9)$$

Assuming that money supply (H^S) is fixed. A higher demand for money shifts rightward money demand curve below.



Suddenly we have an excess demand for money or excess supply of goods and services. Having not enough money supply to “chase” the goods, people cut spending and hold more cash. Money demand begins to decline and price starts falling up to a higher

equilibrium value of money. When people cut spending, aggregate demand and output are in contractionary state.

The assumption that money supply is constant does not hold theoretically. Money supply consists of high-powered money (\bar{H}) and bank credit (BC). Monetary authority controls \bar{H} which we hold constant in our previous evaluation. But change in money demand affects bank credit and then money supply, according to money multiplier equation (10) below.

$$M^s = m.\bar{H}$$
$$M^s = \left[\frac{cu+1}{cu+rd+e} \right] \bar{H} \quad (10)$$

where, cu = cash/deposit ratio

Lower tax initially increases consumption and money demand. Higher money demand means higher cash deposit ratio (cu). Higher cu in equation (10) translates into a lower money supply multiplier (m) that reduces money supply (M^s). Therefore changes in money demand affect money supply when we include bank credit into the definition of money supply.

My evaluation concludes that consumption is a better variable than income to explain money demand in a simple aggregate demand function. This condition allows tax cut to increase consumption and money demand in the beginning. But it lowers aggregate demand and output at the end, as consumption declines due to excess money demand. The fixed money supply assumption enables the excess of money demand. But we find that constant money assumption does not hold if we include bank credit as part of money supply.

References

- Baumol, William J. "The Transactions Demand for Cash: An Inventory Theoretic Approach." *Quarterly Journal of Economics*, November 1952.
- Dornbusch, Rudiger, and Stanley Fischer. *Macroeconomics*, 6th ed. New York: McGraw-Hill, 1994.
- Federal Reserve Bulletin
- Friedman, Milton, and Anna J. Schwartz. *Monetary Trends in the United States and the United Kingdom, 1867-1975*. Chicago: University of Chicago Press, 1982.
- Mankiw, N. Gregory, and Lawrence H Summers. "Money Demand and the Effects of Fiscal Policies." *Journal of Money, Credit and Banking*, vol. 18, issue 4, November 1986, pp. 415-429.
- Goldfeld, Stephen M. "The Case of the Missing Money." *Brookings Papers on Economic Activity*, No. 3 (1976), 683-730.
- Laidler, David E. W. *The Demand for Money: Theories and Evidence*, 2nd ed. New York: Dun-Donnelly, 1977.

Endnotes

ⁱ See section 2. PRELIMINARY CONSIDERATIONS, subsection *Theoretical Arguments*, p. 416.

ⁱⁱ See table 1: Who Holds Money? and table 2: Allocation of Money to GNP Components, p. 417.

ⁱⁱⁱ See subsection *Previous Empirical Evidence*, p. 418.

^{iv} See section 3. NEW EVIDENCE ON THE SCALE VARIABLE, subsection *The Stability of Velocity*, pp. 419-420.

^v See subsection *Standard Money Demand Functions*, pp. 420-422.

^{vi} See subsection *Nonlinear Money Demand Equations*, pp. 423-425.

^{vii} See section 4. THE EFFECTS OF FISCAL POLICY, subsection *An IS-LM Model*, pp. 425-427.

^{viii} See subsection *Past Tax Cuts*, pp. 427-428.