

# Simple Keynesianism for Monetarists: A Primer

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The right edge of Figure 1 shows us what is going on outside the window right now.

How are we to understand what is going on? It is not that we have forgotten 7% of our technological knowledge in the past two years so that—with an elasticity of labor supply of one—an extra 7% of our two years-ago workforce has decided to take leisure and engage in a Great Vacation. With no large-scale sudden aggregate regressive shift in technology or sudden large-scale shift in the relative attractiveness of leisure, we have a 7% fall in the proportion of adults who are at work—and the fall may get much larger before it comes to an end. Moreover, this fall is not the result of a decision by the Federal Reserve to slow the rate of growth of the money supply, which was a precipitating cause of the analogous large-scale falls in relative employment we saw in 1990-2, 1979-82, 1974-5, 1969-70, 1957-8, or 1953-4.

**Figure 1: The Adult Employment-to-Population Ratio in the United States since 1960**



Let us begin with the quantity theory of money:

$$(1) \quad Y = \left(\frac{M}{P}\right)V$$

and with Robert Lucas's observation that when  $MV$  falls or substantially slows its rate of growth,  $Y$  falls as well—that: “[it] is not possible to pull a modern economy through a neutral or painless deflation. Economic theory

doesn't really tell us why -- what's hard about it. But, the evidence, I mean, it just doesn't work...”<sup>1</sup>

Back in the 1920s economists did not have very good theories of the determinants of velocity. Now we know that velocity depends on a number of things. Let us partition them into a vector  $Z$  and the short-term nominal interest rate on Treasury securities  $i$ ,<sup>2</sup> and write the quantity equation as:

$$(2) \quad Y = \left(\frac{M}{P}\right)V_Z(i)$$

and recognize that  $V$  is now the multiplicative inverse of the relative money demand function  $L$ :

$$(3) \quad M = PYL_Z(i)$$

We can say two things about this function  $L$ :

- When  $i$  is very low, the interest elasticity of money demand will be very high in magnitude — will be near  $-\infty$ . Treasury securities and cash are then very close substitutes, and small changes in the relative price of close substitutes produce large changes in quantities demanded. This is not rocket science: this is just supply and demand.
- When  $i$  is high, the interest elasticity of money demand will be low — will be near  $-0$ . When one has done all one can to economize on one's money holdings because of the foregone

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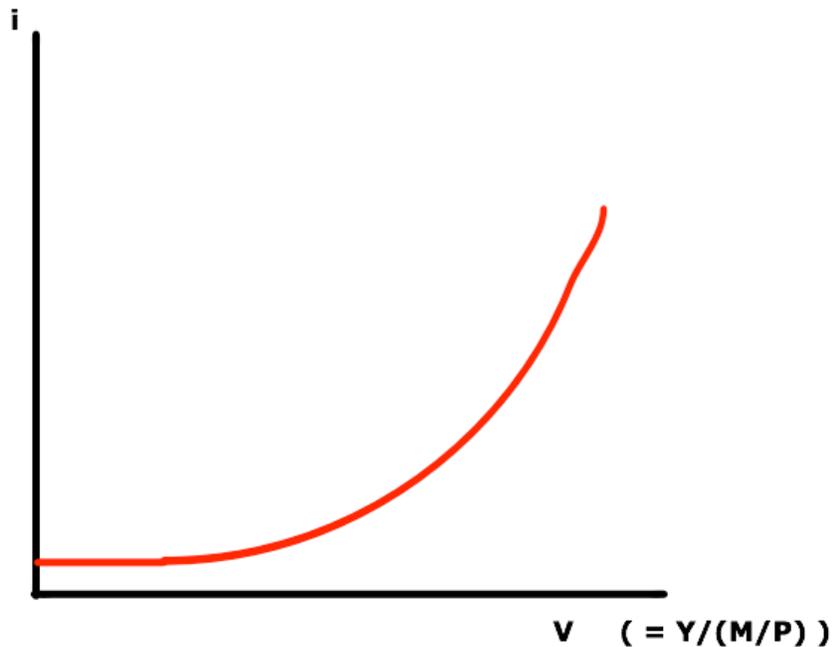
<sup>1</sup> Robert Lucas (2009), “Why a Second Look Matters” (March 30) <<http://tinyurl.com/dl20090407a>>.

<sup>2</sup> See Milton Friedman, ed. (1956). *Studies in the Quantity Theory of Money* (Chicago: University of Chicago Press) <<http://tinyurl.com/dl20090407b>>.

interest incurred by keeping extra cash balances, there still remains an irreducible minimum cash-in-advance constraint.

Thus we can plot velocity—the multiplicative inverse of relative money demand—against the short-term nominal interest rate on Treasury securities, and the graph will look like Figure 2. And simply multiply velocity by  $M/P$  to obtain real output  $Y$ .

**Figure 2: Velocity and the Interest Rate**



It is clear that even if we know the real money supply  $M/P$ , the form and parameters of  $V$ , and the variables  $Z$ , the bare quantity theory does not give us enough information to calculate what the level of real production, spending, and demand  $Y$  and the level of employment will be. We need

another equation to somehow pin down the level of  $i$ . The natural place to go for this equation is the flow-of-funds through financial markets, for the short-term nominal interest rate on Treasury securities  $i$  is important not just as a factor affecting the demand for the stock of real balances but also as a factor affecting the flow of financial funds as well. Of households savings  $S$  some are used to finance the government's budget deficit  $G-T$  and the rest is committed to financing businesses' investment spending  $I$ :

$$(4) \quad S = (G - T) + I$$

The demand from businesses for funds to finance investment will depend on profits and cash flow, which we proxy by the level of output  $Y$ , and by the level of asset prices  $A$ —which in turn are a function of a set of other variables  $X$  and the interest rate  $i$ :

$$(5) \quad I = I(Y, A_X(i))$$

The supply from households of savings will depend on their after-tax income  $Y-T$  and on their wealth, which is the product of their asset holdings  $Q$  and the value of assets  $A$ :

$$(6) \quad S = S(Y - T, QA_X(i))$$

For given values of  $G$ ,  $T$ ,  $Q$ , (4), (5), and (6) will tell us what value of assets  $A$  is consistent with equilibrium in the flow of funds through financial markets:

$$(7) \quad A = A_{G,T,Q}(Y)$$

which carries implications for the short-term level of interest rates  $i$ —which must be such to make investors indifferent at the margin between investing their net savings in other assets and investing them in short-term Treasury securities:

$$(8) \quad i = A_X^{-1}(A_{G,T,Q}(Y))$$

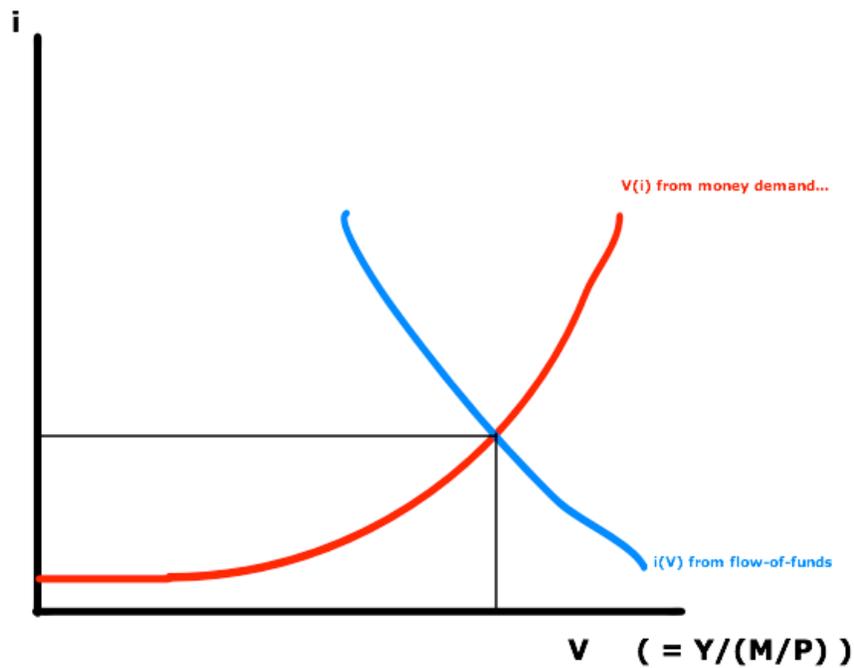
Substituting in from the quantity equation for Y in (8):

$$(9) \quad i = A_X^{-1} \left( A_{GTQ} \left( \frac{MV}{P} \right) \right)$$

Recall our equation for velocity:

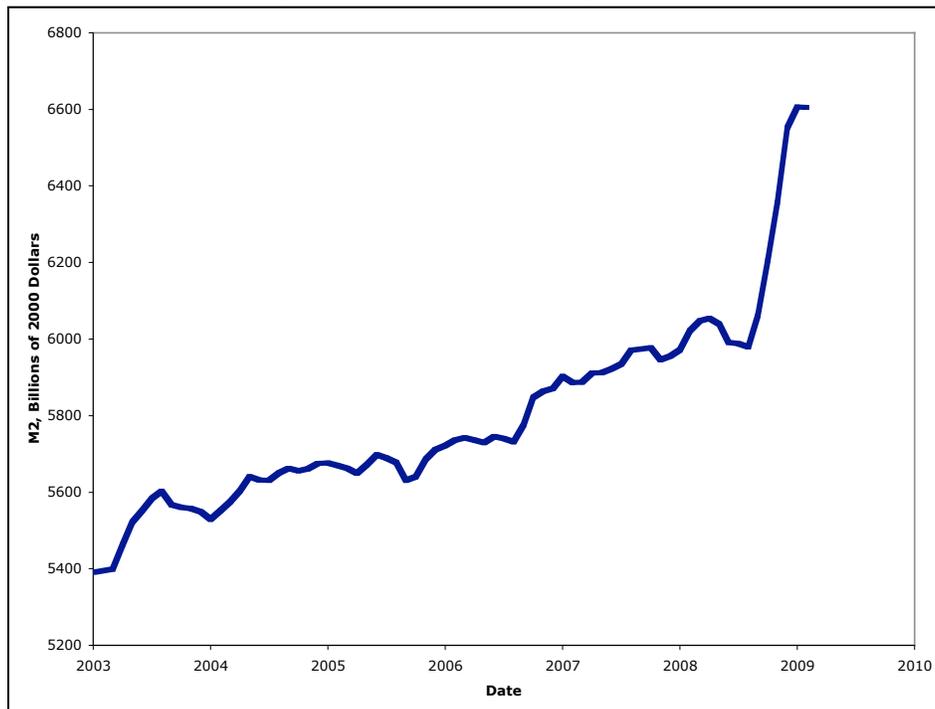
$$(10) \quad V = \frac{1}{L_Z(i)}$$

**Figure 3: The Level of Velocity**



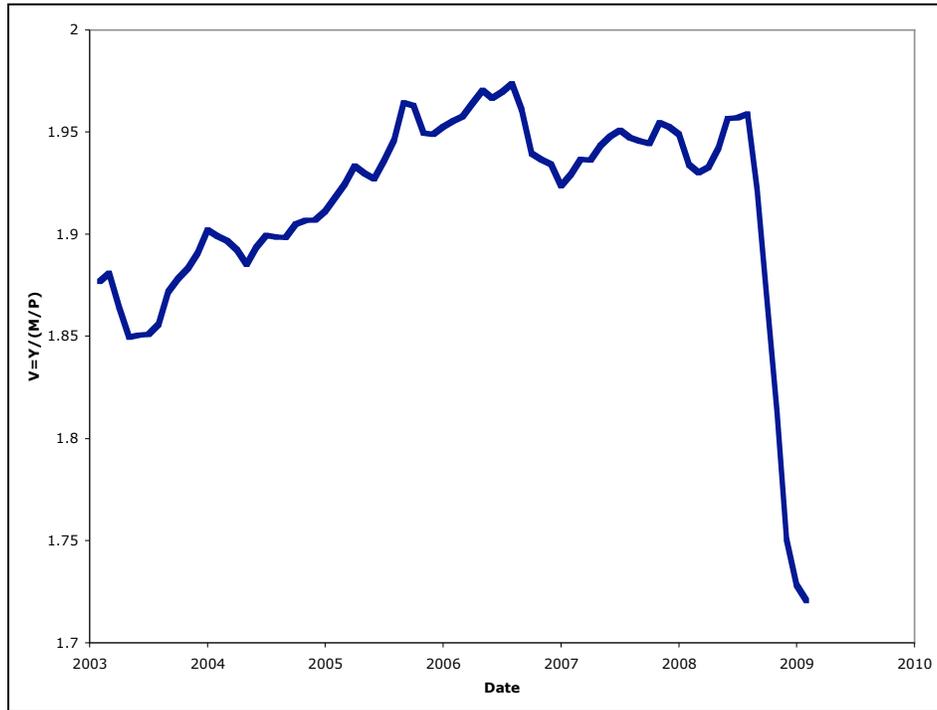
We now have enough to determine the value of velocity—and from that we can calculate the level of production, spending, and demand  $Y$  and the level of employment, as is shown in Figure 3.

**Figure 4: The Money Stock**



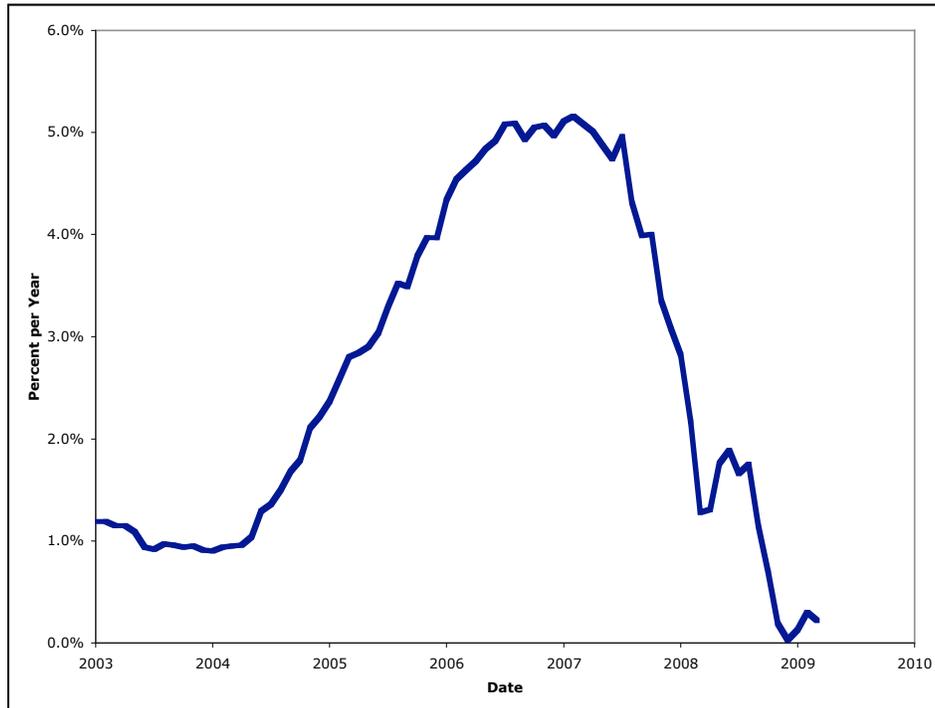
Now that we have our quantity theory of money augmented by the flow-of-funds equilibrium condition in place, we can start analyzing what has caused the slowdown in  $PY$ —and the sharp fall in  $Y$ , and in employment. The cause is not any fall or slowdown in  $M/P$ : Figure 4 shows that the real money stock was growing at a 2.25% annual rate until well after the crisis hit, and in the past six months the real money stock has been growing at a 20% annual rate.

**Figure 5: Monetary Velocity**



Instead, the fall in production and employment is due to a sudden and absolute collapse in velocity. Figure 5 shows that over the past six months velocity has been falling at a 25% annual rate. And the short-term nominal interest rate on Treasury Securities has fallen to extraordinarily low levels measured in tenths of a percent per year, if that, as Figure 6 shows.

**Figure 6: Nominal Interest Rate on Three-Month Treasury Bills**

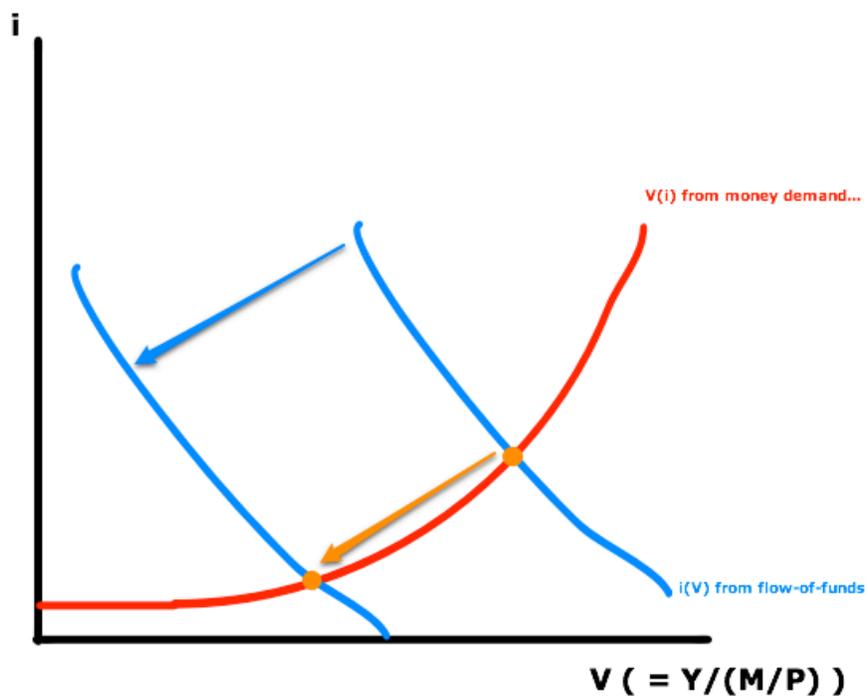


In the language of equations (9) and (10) and of Figure 3, this course of events is a sharp move down and to the left—presumably generated by a sharp downward movement in the flow-of-funds equilibrium condition in Figure 3 and Figure 7. Why has the blue  $i(V)$  flow-of-funds line moved downward on Figure 7? Part of the reason is surely the financial crisis that started with the recognition of likely defaults in the subprime mortgage market. Recall that the blue  $i(V)$  flow-of-funds line maps out those combinations of short-term nominal Treasury rates  $i$  and velocity-of-money  $V$  combinations that are consistent with a balanced flow-of-funds through financial markets from savers to investors:

$$(11) \quad S(Y - T, QA_X(i)) = (G - T) + I(Y, A_X(i))$$

A steep fall in wealth reduces investment, and the flow of savings will balance reduced investment at the previously-prevailing interest rate only if  $i$  drops. But the rest of the reason is that the past six months have seen a tremendous expansion of  $M/P$  as the Federal Reserve has attempted to keep the economy on an even keel, and an expansion of  $M/P$  moves the blue  $i(V)$  flow-of-funds line to the left. In this model, one cause of the collapse of velocity is the fact that the real money stock  $M/P$  has expanded so much in recent months.

**Figure 7: The Collapse of Velocity and of Treasury Bill Interest Rates**



If it is indeed the case that money demand becomes highly interest-elastic when  $i$  becomes low — and it is hard to imagine why it should not: when  $i$  is low Treasury bonds and cash are close substitutes, and it is not possible to write down a model in which demand for close substitutes is not highly elastic in response to changes in their relative price — then this suggests that further monetary expansion will be likely to have a very large component of its potential effectiveness negated. Increase  $M/P$  more, and shift the blue  $i(V)$  flow-of-funds curve further to the left. This velocity crowding-out is of little concern or import if the Treasury interest rate  $i$  is high enough for  $V(i)$  to have a substantial slope. But it becomes of overwhelming importance when  $i$  is — as it is now — very low.

Robert Lucas believes that monetary expansion is still very powerful relative to other policy tools even in our current situation with very low values of  $i$ :

[T]he Fed has...induced double-digit growth in M1 and M2 domain monetary aggregates.... [A]s confidence returns, which it will, velocity is going to return to pre-crisis levels.... Now would a fiscal stimulus... add another weapon that would help in this problem?... If the government builds a bridge, and then the Fed prints up some money to pay the bridge builders, that's just a monetary policy.... We can print up the same amount of money and buy anything with it... the only part of the stimulus package that's stimulating is the monetary part...

But there is something deeply wrong with Lucas's logic. As long as asset prices are depressed and flow-of-funds equilibrium produces very low Treasury interest rates  $i$ , printing up extra money is not very stimulative at all: on the flat part of the  $V(i)$  money-demand curve, monetary injections are offset nearly one-for-one by velocity declines and induce nearly complete velocity crowding-out with little effect on spending  $Y$ .

What, then, is needed in order to boost spending  $Y$  when  $i$  is low? Clearly the appropriate policy is to move the blue  $i(V)$  flow-of-funds curve to the

right: to do something to boost the uses of funds on the right side of (11) relative to the sources of funds on the left—and so move the  $i(V)$  flow-of-funds curve up and boost the interest rate  $i$  at which the flow-of-funds from saver sources is in balance with business investment uses.

And what is the most immediate tool at hand with which to boost the uses of funds in financial markets and so push the interest rate  $i$  up and so raise velocity? A government budget deficit: increasing  $G-T$  will do the job. Monetary expansion is ineffective at raising  $MV$  when  $i$  is low and Treasury bonds and cash are close substitutes. But a fiscal deficit that operates on  $i$  and thus on  $V$  can be very effective indeed.

Indeed, Lucas appears to have it completely backward. The monetary injection part of the policy is immediately crowded out by a fall in velocity. Only the soaking-up of savings by additional government borrowing can boost spending. Such is the immediate logic of the basic quantity theory—if one grants that velocity depends on the nominal interest rate  $i$  (and who would deny that that is the case?) and once one grants that when  $i$  is low Treasury bonds and cash are close substitutes (and who would deny that that is the case as well?)

By now readers will, of course, have noticed the punchline before I can give it. I started. with the bare tautological quantity theory of money. I added a sensitivity of money demand to the nominal interest rate  $i$ . I asserted that assets with similar characteristics when  $i$  is low are close substitutes when  $i$  is low. I used flow-of-funds equilibrium in financial markets to pin down the value of  $i$ .

And I arrived at what is John Hicks (1937), “Mr Keynes and the Classics; A Suggested Interpretation.” Up to a scale factor  $M/P$ , the  $V(i)$  curve is the Hicks-Hansen LM curve. Up to the same scale factor  $M/P$ , the  $i(V)$  curve is the Hicks-Hansen IS curve. And, of course, the behavior of this quantity-theoretic model when  $i$  is low is the hyper-Keynesian liquidity trap: “pushing on a string.” Yet what in this chain of argument could the most true-blue monetarist disagree with? The quantity theory of money? Interest elastic money demand? Equilibrium in the flow-of-funds through

financial markets? Assets with similar characteristics being close substitutes?

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