



How Should the Central Bank Determine Its Target for Nominal Income Growth? Lessons from Free Banking and Friedman

Joshua R. Hendrickson

June 2019

There are many monetary theories of the business cycle, but a common theme among these theories is that a deviation between the demand for money and the supply of money represents an important source of business cycle fluctuations.¹ Given this common theme, one might wonder what type of monetary policy would help to avoid these sorts of fluctuations in economic activity. One policy that has been proposed is nominal income targeting. The basic idea behind nominal income targeting is that the central bank would establish a target growth rate for nominal income in the economy (as measured by, for example, nominal GDP). When nominal income is below its target, the central bank would engage in expansionary monetary policy by increasing the money supply. When nominal income is above its target, the central bank would engage in contractionary monetary policy by reducing the money supply. These changes in the money supply would bring about corresponding changes in nominal income so that nominal income would be generally equal to its target.

Advocates of nominal income targeting have argued that this policy would eliminate economic fluctuations caused by deviations between the money supply and money demand. To make this case, these advocates draw parallels to free banking systems. In a free banking system, banks are freely able to enter the market. Each bank issues its own brand of currency, which is redeemable for some other asset, such as gold. In this type of banking system, the money supply is competitively supplied. Banks—or so the argument goes—are led by the profit motive to adjust the supply of bank notes in conjunction with money demand. As a result, deviations between the money supply and money demand are insignificant with regard to the business cycle.

Supporters of nominal income targeting note that a nominal income target replicates this key feature of a free banking system. To understand why, consider the equation of exchange:

$$MV = PY,$$

where M is the money supply, V is the velocity of circulation, and PY is nominal income. The velocity of circulation is a measure of money demand. When money demand increases, the velocity of circulation slows down. When the demand for money declines, the velocity of circulation increases. All else equal, these changes in money demand would cause fluctuations in nominal income and, if prices are slow to adjust, real income. The central bank could eliminate such fluctuations by adjusting the money supply in accordance with money demand. When money demand increases (i.e., V declines), the central bank should respond by increasing the money supply (M). The increase in M offsets the reduction in V , and nominal income remains stable.

The ability to minimize deviations between the money supply and money demand seems like a desirable property of any monetary regime. Advocates of nominal income targeting stop using the analogy to free banking systems there. In doing so, what these advocates of nominal income targeting have ignored is that free banking regimes under a commodity standard not only had desirable short-run properties, but also had desirable long-run properties. In the short run, as explained above, free banking regimes automatically prevented business cycle fluctuations by adjusting the money supply in conjunction with money demand. But these systems also achieved *long-run* efficiency by issuing bank notes that effectively (if not officially) earned interest.

In this policy brief, I explain why interest-bearing bank notes lead individuals to allocate their wealth in a way that maximizes the potential gains from trade in society. I also explain why free banking regimes under a commodity standard effectively paid interest. I then argue that nominal income targeting advocates who draw parallels to free banking *have not gone far enough* in their analogy. In fact, an expansion of the free banking analogy would help to determine a precise target for nominal income growth.

THE FRIEDMAN RULE

Some types of money, such as currency and some checkable deposits, do not pay interest. Yet other liquid assets do pay interest. These two observations are the source of what is known in monetary theory as the rate-of-return dominance puzzle. The puzzle is to understand why anyone would choose to hold currency or checkable deposits instead of these other liquid assets. For example, why wouldn't people just store all of their wealth in liquid, interest-bearing assets? After all, even if these other liquid assets could not be used directly for purchases, why couldn't individuals just simultaneously sell the interest-bearing assets for cash and cash for the goods they want to purchase? Monetary theory is replete with explanations of rate-of-return dominance, but most

explanations have a common theme: transaction costs. These costs can come in the form of brokerage fees, bid-ask spreads, “shoe leather” costs of running to the bank or an ATM, fees to middlemen who can resolve issues related to counterfeiting, and countless others. Regardless of the source or the type of the transaction costs, the very existence of these costs creates an inefficiency.

In economics, efficiency is typically defined as the state in which all gains from trade have been exhausted. In an efficient equilibrium, the marginal benefit from consuming a good is equal to the marginal cost of producing that good. In a monetary economy, however, one must also consider that the timing of income and the timing of consumption do not always match. As a result, individuals will need to hold money between the time they receive income and the time they consume. Since money earns a lower rate of return than other liquid assets, this means that individuals must also take into account the opportunity cost of holding money. Thus, in a monetary economy, it follows that

$$\textit{Marginal Benefit} - \textit{Opportunity Cost of Holding Money} = \textit{Marginal Cost}.$$

Let i be the market rate of interest and i_m be the rate of interest earned on money. It follows that the difference between i and i_m drives a wedge between the marginal benefit of consumption and the marginal cost of production:

$$\textit{Marginal Benefit} - \textit{Marginal Cost} = i - i_m$$

What this illustrates is that when there is an opportunity cost associated with holding money, individuals tend to economize on money holdings. However, by doing so, they limit the possible gains from trade. An optimal monetary policy would eliminate the wedge between the marginal benefit and marginal cost. A policy that does this is what has come to be known as the Friedman rule.² To implement the Friedman rule, one would either need to pay a rate of interest on money equal to the market rate of interest ($i_m = i$), such that the opportunity cost of holding is zero, or reduce the market interest rate on the imperfect substitute to zero ($i = i_m = 0$). In either case, the opportunity cost of holding money is zero, and the outcome is efficient.

The optimality of the Friedman rule is robust across a wide variety of model specifications. However, implementing the Friedman rule is another story. Paying interest on money balances equal to the market rate of interest is fairly straightforward but often prohibitively costly, since it is hard to identify currency holders in order to pay them interest. The central bank could more easily implement the Friedman rule by ensuring that the rate of inflation is equal to $-r$, where r is the real interest rate. In other words, the central bank could generate a sufficient rate of deflation to ensure that the nominal interest rate equals zero.

INTEREST-EARNING BANK NOTES IN A COMMODITY STANDARD

Under a commodity standard, bank notes are convertible into the commodity at a fixed exchange rate. Let's assume that bank notes are denominated in dollars, that the commodity is gold, and that one dollar is defined as 1/20 of an ounce of gold. It follows that the official price of an ounce of gold is \$20. Nonetheless, gold is traded on world markets. As a result, the actual price of gold might differ from the official price. The fixed exchange rate between dollars and gold allows anyone holding gold or dollars (or both) to profit from deviations between the market price and the official price.

With convertible bank notes, individuals are effectively able to buy and sell gold at a fixed exchange rate. The fact that the market price might differ from the official price presents the opportunity for arbitrage. For example, suppose that an individual is holding \$20 in bank notes and the market price of gold is \$26 dollars per ounce. The individual could redeem the bank notes for an ounce of gold and sell the gold on the open market for \$26, so the individual would get his or her original \$20 back plus a \$6 profit. Alternatively, if the price of gold is \$14, the individual could buy an ounce of gold for \$14, take the ounce of gold to the bank, and get \$20 in return. Again, the individual earns a \$6 profit. What this implies is that the value of \$20 worth of bank notes at time t is actually $20 + |P_t - 20|$, where P_t is the price of gold. Any fluctuation in the price of gold relative to the official price therefore generates a positive rate of return for an individual holding bank notes. It follows that someone holding \$20 worth of bank notes is earning a rate of return of

$$i_m = \frac{|P_t - 20|}{20}.$$

If $i_m > i$, then holders of bank notes could earn arbitrage profits without taking on any risk. For example, one could borrow bank notes from the bank. Fluctuations in the price of gold would earn the borrower a rate of return equal to i_m . If $i_m > i$, the individual can borrow bank notes, earn a rate of return, pay back the loan with the bank notes borrowed plus interest, and still have notes left over. This is what is called a self-financing portfolio or a perpetual money pump. In other words, since the individual benefits from any fluctuation in the price of gold, the individual can earn profits without taking on any risk if the typical fluctuations in the market price of gold are large enough. However, if such opportunities exist in markets, they don't last for long. Soon many individuals would enter the market and borrow bank notes to earn their own profits. As they did so, the interest rate on borrowing, i , would rise and the range of the market price of gold would narrow as people tried to capture the arbitrage profits before their competitors. This process would continue until $i_m = i$.

This result comes directly from the interpretation of option pricing outlined by Robert Merton and Stephen Ross.³ A bank note is an option to buy gold at a fixed price. Merton explains that since the returns on an option are perfectly correlated with the returns on the underlying asset, individuals could construct portfolios of assets that replicate the behavior of other assets. By doing so,

individuals can perfectly hedge their risk. As it relates to this example, an individual can construct a portfolio by borrowing at the market interest rate to purchase bank notes. By doing so, they can replicate the behavior of a portfolio that consists solely of the underlying asset (gold in this case). Because the option and the underlying asset can be perfectly hedged, it follows that both must have an expected rate of return equal to the market interest rate.

This is important because when bank notes pay an effective rate of return that is equal to the market interest rate, this *automatically* achieves the Friedman rule. As a result, those who have drawn parallels between nominal income targeting and free banking under a commodity standard have *undersold* the desirability of adapting current policy to replicate commodity-based free banking regimes. In the next section, I discuss the implications for a nominal-income-targeting regime.

LESSONS FOR NOMINAL INCOME TARGETING

Some economists have argued that a desirable property of a nominal income targeting regime is that, like a free banking system, it would eliminate business cycle fluctuations owing to deviations between the money supply and money demand. The preceding discussion suggests that there are more lessons to be learned from free banking regimes under a commodity standard that have not been appreciated. Not only did free banking regimes under a commodity standard automatically adjust the money supply in conjunction with money demand, but they also automatically implemented the Friedman rule. Free banking systems therefore not only eliminated an important source of fluctuations around the long-run equilibrium, but actually promoted an efficient long-run equilibrium.

Achieving the Friedman rule in the current institutional environment would likely require a deflationary policy. The implication for nominal income targeting is clear from Friedman's original discussion of his aforementioned rule. In particular, before outlining the case for the Friedman rule, Friedman had advocated a different rule for monetary policy known as the *k*-percent rule. Under this rule, the central bank would commit to a rule in which the money supply grew at a constant rate, *k*.

Friedman argued that these two rules are not contradictory. In fact, he argued that, using the equation of exchange, one could set the growth rate of the money supply such that

$$\% \Delta M = \% \Delta P + \% \Delta Y$$

Money Growth = Inflation Rate + Real GDP Growth

where velocity is assumed to be constant. The target for money supply growth would be the sum of the trend growth rate of the economy and the desired rate of deflation necessary to achieve the Friedman rule. A nominal-income-targeting regime could use this same general principle to

develop a target for nominal income growth rather than money growth. As a result, the nominal income targeting regime implements Friedman’s desired policy with the additional flexibility of allowing fluctuations in velocity to be offset by changes in the money supply.

Up to this point, advocates of nominal income targeting have mostly eschewed specific targets for the path of nominal income. Friedman’s discussion demonstrates how to adapt the target for nominal income growth to be consistent with the Friedman rule. A nominal income growth target with a deflationary bias consistent with the Friedman rule would not only mitigate fluctuations in the economy owing to deviations between the money supply and money demand, but would also promote long-run efficiency in portfolio allocation between money and other assets.

ABOUT THE AUTHOR

Joshua R. Hendrickson is an associate professor of economics at the University of Mississippi. His primary area of expertise is monetary theory, history, and policy. His research has been published in the *Journal of Money, Credit and Banking*; the *Journal of Economic Dynamics and Control*; *Macroeconomic Dynamics*; the *Journal of Economic Behavior and Organization*; *Economic Inquiry*; the *Journal of Macroeconomics*; *Economics & Politics*; as well as others.

NOTES

1. For a representative sample, see Clark Warburton, “The Monetary Disequilibrium Hypothesis,” *American Journal of Economics and Sociology* 10, no. 1 (1950): 1–11; Milton Friedman, “The Quantity Theory of Money: A Restatement,” in *Studies in the Quantity Theory of Money*, ed. Milton Friedman (Chicago: Aldine, 1956), 3–21; Leland Yeager, *The Fluttering Veil: Essays on Monetary Disequilibrium* (Indianapolis: Liberty Fund, 1997); and Steven Horwitz, *Microfoundations and Macroeconomics: An Austrian Perspective* (London: Routledge, 2000).
2. Milton Friedman, “The Optimum Quantity of Money,” in *Optimum Quantity of Money and Other Essays* (Chicago: Aldine, 1969).
3. Robert C. Merton, “The Theory of Rational Option Pricing,” *Bell Journal of Economics and Management Science* 4, no. 1 (1973): 141–83; Stephen A. Ross, *Neoclassical Finance* (Princeton: Princeton University Press, 2005).