



Monetary Base

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Abstract

This brief essay is a working draft of an article in preparation for the forthcoming *International Encyclopedia of the Social Sciences*, 2nd ed., examining the role of the monetary base in monetary economics and monetary policymaking. Comments are welcome.

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Monetary Base**

The *monetary base* in monetary economics is defined and measured as the sum of currency in circulation outside a nation's central bank and its Treasury, plus deposits held by deposit-taking financial institutions (hereafter referred to generically as "banks") at the central bank. More generally, the monetary base consists of whatever government liabilities are used by the public to purchase and sell goods and services, plus those assets used by banks to settle inter-bank transactions. During certain specific historical periods when they were in circulation, measures of the monetary base also have included commodity monies such as gold and silver coin and bullion. The components—currency and deposits at the central bank held by banks—often are referred to as *base money*.

The monetary base has been defined by some authors as currency held by the public plus the cash reserves of banks. Such definitions, even when correct, can lead to confusion and should be avoided. A correct definition must include all base money held by banks, not solely the portion held to satisfy regulatory reserve requirements.

Monetary Economics

In monetary economics, the monetary base has several unique characteristics. First, its components include the assets issued directly by a nation's monetary authorities (Treasury and central bank) that are used by the private sector (the public and banks) to settle transactions. Transactions, of course, also may be settled by the exchange of privately issued bank deposits, but these have risk characteristics that differ from those of base money. Second, the size of the

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monetary base changes only if the monetary authorities take actions, actively or passively, to permit the change—the private sector cannot change the size of monetary base absent the cooperation of, and participation by, the monetary authorities. Hence in monetary theory the monetary base, under the control of the monetary authorities, is the direct link between monetary policy actions and economic activity, including subsequent inflation. As a practical matter, however, no central bank seeks to control the size of its monetary base exactly, fearing that so doing would sharply increase volatility of market interest rates.

Supply and Demand

Central banks control the supply of the monetary base by buying and selling assets. Purchases of assets, of any type, increase the monetary base when the central bank pays for such assets with currency or increased central bank deposit liabilities. Similarly, central bank sales of assets, of any type, reduce the monetary base when the purchaser surrenders currency or central bank deposit liabilities in payment. So long as the public willingly holds additional base money, the central bank is able to purchase assets and expand its size. Historically, this has tempted governments with weak fiscal discipline to utilize the central bank as a purchaser-of-last-resort for government debt when private capital markets are unreceptive, often leading to hyperinflation (Fischer, Sahay, and Vegh, 2002).

Demand for the monetary base includes the public's transaction demand for currency and banks' demand for base money to be used in their usual banking business and to satisfy statutory reserve requirements imposed on them by regulatory agencies.

Cross-country comparisons of monetary base growth occasionally have appeared in international economics because central bank interventions to affect exchange rates necessarily are conducted by the purchase and sale of assets, altering the size of the monetary base. When a

central bank *sterilizes* the effects of its actions on the monetary base by offsetting the purchase or sale of one asset with the sale or purchase of another (buying, perhaps, a foreign-issued bond while simultaneously selling from its portfolio a domestically issued bond) such that the size of the monetary base remains unchanged, most studies have found little effect on exchange rates.

Monetary Policy

In all current economies, growth of the monetary base is an endogenous variable, that is, a variable determined simultaneously with other variables such as employment, output, prices, and market interest rates. In modern times, only the Swiss National Bank has included among its monetary policy objectives a growth rate for the monetary base, although the Bank of England maintained a monitoring range during one interval (Rich, 1997). Most of the world's central banks conduct monetary policy by setting and manipulating the level of a short-term interest rate. In the United States, the Federal Open Market Committee implements policy by choosing a target level for the overnight federal funds rate (the interest rate charged by banks to each other for overnight loans of deposits at the Federal Reserve). The federal funds rate is maintained close to the target rate each day by increasing or decreasing the supply of base money.

Many empirical studies have examined linkages among growth of the monetary base, growth of broader monetary aggregates, and an economy's inflation rate. Over long periods of time, there is a clear positive relationship: absent significant structural or regulatory changes, prolonged inflation (and, especially hyperinflation) cannot continue without increases in the monetary base. In most historical cases, excessive growth of the monetary base has reflected lack of fiscal discipline, not failure of monetary policy (Fisher, Sahay, and Vegh, 2002). Sharp reductions in inflation such as occurred in the United States during 1979-1980 typically are accompanied by, and likely require, sharp reductions in the monetary base. There is substantive

disagreement regarding short-run relationships, however. While some studies assert having found direct linkages between growth of the inflation-adjusted monetary base and inflation-adjusted economic activity, other studies have found no reliable shorter-run connections. In 1988, Carnegie-Mellon University economist Bennet McCallum proposed a monetary policy rule in which the level of the federal funds rate target would be adjusted in response to growth of the monetary base. After initial widespread attention, the rule's impact on monetary policy has diminished in recent years.

U.S. Currency Held Abroad

In some countries outside the United States, large amounts of U.S. currency circulate freely and are used for the purchase and sale of goods and services. It is common practice, however, for measures of the monetary base to exclude foreign-issued currency. This practice is not without controversy. To the extent that inflation is driven by total aggregate demand, foreign currency used in transactions matters. To the extent, however, that a country's long-run inflation largely is caused primarily, or perhaps exclusively, by increases in its own monetary base, foreign currency is properly excluded. Current empirical studies provide little guidance as to which is the more appropriate measure in these cases.

For the United States, one additional issue arises. Alone among the world's nations, a large proportion of U.S. currency—more than half and perhaps as much as two-thirds—is held outside the United States (e.g., Anderson, Bordo and others, 2006, pp. 3-614 and 3-615). Should this currency be excluded from the U.S. monetary base? While experimental measures have been constructed that do so, no such measure has gained wide acceptance and none is currently published, despite Nelson's (2002) finding that such a measure of the domestically held U.S.

monetary base has been more closely connected to economic activity than other monetary aggregates.

Changes in Reserve Requirements

To be used as a longer-run measure of the stance of monetary policy, measures of the monetary base must be adjusted for the effect of changes in statutory reserve requirements. The resulting series is referred to as the *adjusted monetary base*. Increases in statutory reserve requirements, for example, tend to increase the quantity of base money demanded by depository institutions to satisfy the requirements, conditional on their level of deposits. If no offsetting action is taken by the central bank, this increase is economically equivalent to the central bank reducing the monetary base itself. To avoid sudden jumps in market interest rates due to changes in statutory reserve requirements, central banks have tended to match such increases in demand with increases in supply. For further discussion, see Anderson and Rasche (2003).

The Future

Two developments during the last decade portend a reduced future for the monetary base in monetary economics. More specifically, these developments suggest a reduced demand for base money. First, central banks worldwide have reduced regulatory reserve requirements to very low levels, attenuating banks' demand for central bank deposits. In the United States, although regulatory reserve requirements have not changed, banks since 1994 have used *retail deposit sweep programs* to sharply reduce their holdings of base money. (In a retail deposit sweep program, a bank reclassifies a transaction-oriented deposit subject to a high reserve requirement as a savings-oriented deposit subject to a low requirement.) Most banks that have implemented such automated sweep systems have reduced their required reserves to a level small enough to be satisfied by the vault cash and deposits at Federal Reserve Banks that they hold in

the ordinary course of their banking business, thereby eliminating regulatory reserve requirements as a determinant of the demand for the monetary base (Anderson and Rasche, 2001). In other countries, regulatory reserve requirements have been replaced with payments-oriented requirements that generally allow banks to hold zero deposits overnight at the central bank. In the Euro area, the European Central Bank imposes a broad regulatory reserve requirement on most bank deposits at a three percent rate. This requirement must be satisfied solely with deposits held at the ECB; vault cash is not eligible. See Borio (1997) for a survey.

The second continuing development is the growth of electronic payments. In the absence of binding regulatory reserve requirements, demand for base money is driven by the need of households, firms and governments to initiate and settle payments. If electronic payments displace most currency and paper checks, then demand for base money might fall to such a low level that central banks would find control of its supply a weak lever by which to implement policy. The answer to this question remains uncertain. But, many economists have noted that tax payments play a central role. Most governments require that taxes be paid in base money. In the United States, for example, tax payments to the U.S. Treasury must be settled in deposits at the Federal Reserve Banks—the Treasury accepts payments from households and firms drawn on banks only to the extent that such payments later are settled by the banks on behalf of their customers in deposits at the Federal Reserve Banks. Economists as diverse as Sir John Hicks (1969) and Michael Woodford (2002) have argued that this tax-payment function will assure a long-term role for base money in the economy.

Data Availability

In the United States, both the Board of Governors of the Federal Reserve System, Washington, D.C. and the Federal Reserve Bank of St. Louis publish monetary base data with

and without adjustments for the effects of changes in statutory reserve requirements. Data and details of the calculations and adjustments are available from those institutions.

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