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1

The Poverty of Monetarism

Preview

Monetarism, pioneered by Milton Friedman and Anna Schwartz, is both a macroeconomic theory of money and a doctrine of monetary policy. The basic tenet of monetarism involves a one-to-one relation between changes in money supply and changes in price levels. However, empirical evidence shows that this does not hold up well in the data after 1965, for either the United States or other countries. Also, monetarism fails to explain some more recent developments.

This chapter discusses these failures of monetarism, putting special emphasis on Hyman Minsky's (1965) critique. We do not argue that monetarism should be rejected wholesale. Rather, the framework should be broadened and put on new foundations. We show how the framework can be enriched by redefining the notion of fiat money and by distinguishing between inside and outside money. We further outline three new ideas, which are interrelated and come under the following headings: (1) money is equity; (2) money is sovereignty; and (3) money is central banking.

The title of this chapter, "The Poverty of Monetarism," is intended to be provocative. But why or how do we mean to provoke? Our title alludes to the title of Karl Marx's famous book *The Poverty of Philosophy*.

Beyond a reference to its title, however, this chapter has nothing to do with the content of Marx's book, unless one views monetary theory as a branch of philosophy. Another hint is to the title of Karl Popper's book *The Poverty of Historicism*. But here again, no reference to the main thesis of his book is intended. Popper addresses very different issues. His book is a critique of a leading social science approach, which takes a purely historical analysis to explain current social, political, and economic conditions.

We have no such critique of monetarism in mind. Rather, our emphasis is on its limitations as an economic theory and its failure to shed light on some fundamental macroeconomic trends, particularly its lack of success in explaining more recent developments—we call them “puzzles”—in the aftermath of the great financial crisis of 2008.

A Primer on Monetarism

Before we go into a detailed discussion of these puzzles, and what to do about them, we want to give a brief summary of what monetarism is. Of course, by now it is a large field, with many articles and books written on the subject, and it's impossible to give an adequate summary of this huge body of literature in just one chapter. But a short and direct way to an introduction is to go back to the foundational article on monetarism, “Money and Business Cycles,” published by Friedman and Schwartz in 1965. When one goes back to that article, one finds that in some respects, the authors actually covered more ground than what modern monetarism has become—a point that we will come back to later.

A second reason to go back to the original article by Friedman and Schwartz, as we discovered, is the response to Friedman and Schwartz's article by Minsky that was published in the same volume. For those unfamiliar with Minsky, his early writings in the 1980s on the importance of incorporating financial markets and credit into macroeconomic models, as well as on the causes of financial crises, had been ignored by mainstream macroeconomics when they appeared and have been rediscovered and celebrated for their prescience (alas too late) after the great financial crisis of 2008. A key notion in his analysis, the “Minsky

moment,” has since become a familiar term. Hyman Minsky is the same economist who had already commented critically on the foundational monetarist analysis of Friedman and Schwartz in 1965. What is interesting about his critique is that it already contains the central themes in his later, now famous writings on financial crises.

Following the broad summary of the key ideas of monetarism, we will turn to a discussion of some important empirical puzzles. We will then outline three ideas that aim to enrich the rather sparse doctrine of monetarism. These ideas are interrelated: (1) “money is equity”; (2) “money is sovereignty,” whose importance, however self-evident it may seem, has eluded many economists; and (3) “money is central banking,” another apparently self-evident observation that has often not been fully understood.

After an exposition of these three ideas, we will conclude this chapter with a brief look at the hotly debated current topics of *stable coins* and *cryptocurrency*, in particular the stable currency Libra, which has been proposed by a Facebook-led consortium. In essence, we will contend that Libra is not really money since it has nothing remotely to do with the three attributes that we just mentioned: equity, sovereignty, and central banking. We will also briefly comment on modern monetary theory (MMT), which has recently become a popular topic in the United States, and point out its major limitations.

1 Monetarism as Formulated by Friedman and Schwartz

What is monetarism? It is both a macroeconomic theory of money and a doctrine of monetary policy. In very simple terms, monetarism is an outgrowth of the quantity theory of money. Standard economic textbooks often describe the quantity theory of money with the following somewhat odd image: Should there be a “helicopter drop” of money into a closed economy amounting to, say, 10 percent of total money balances, this will result in a proportionate (in this case, 10 percent) increase in the general price level.

As stated more generally by Friedman and Schwartz, “There is a one-to-one relation between monetary changes and changes in money income and prices.” They state two main propositions that summarize their macroeconomic theory of money. According to the first, “Appreciable changes in the rate of growth of the stock of money are the necessary and sufficient condition for appreciable changes in the rate of growth of money income” (Friedman and Schwartz, 1965, p. 53). Note the “necessary and sufficient” part of the statement, which rules out other sources of growth in money income. The second proposition elaborates on the first, stating that “this is true both for long secular changes and also for changes over periods roughly the length of business cycles” (p. 53). The implicit message here is that monetarism alone has the power to explain income and prices, without any resort to or need to consider things like technological change or other real shocks.

The policy doctrine is also spelled out, albeit somewhat less precisely, when Friedman and Schwartz say (p. 53), “Our conjecture [is] that longer-period changes in money income produced by a changed secular rate of growth of the money stock are reflected mainly in different price behavior rather than in different rates of growth of output; whereas the shorter-period changes in the rate of growth of the money stock are capable of exerting a sizable influence on the rate of growth of output as well.” In short, changes in the money stock in the short run can result in changes in both economic activity and prices. But in the long run, changes in money produce changes only in prices, with no effects on income or growth.

It’s worth emphasizing where Friedman and Schwartz were coming from when formulating their new theory. Their article is in part a critique of the dominant macroeconomic theory after World War II, Keynesian macroeconomics, which paid little attention to money and monetary policy. Friedman and Schwartz made a very valid point when they noted that “Paul Samuelson [a leading proponent of the Keynesian theory] could assert confidently, ‘All modern economists are agreed that the important factor in causing income and employment to fluctuate is investment’ . . . These theories implicitly take for granted that an expansion of investment will produce an expansion of income regardless of what happens to the money stock” (pp. 32, 45).

Friedman and Schwartz then go on to emphasize that, on the contrary, “there is unquestionably a close relation between the variability of the stock of money and the variability of income” (p. 43). In sum, their critique of the dominant Keynesian theory of the time is that one cannot understand macroeconomic fluctuations if one leaves out money altogether.

2 Minsky’s Critique

Hyman Minsky’s critique, which was published along with the Friedman and Schwartz article in the same volume, is beautifully insightful, but unfortunately it has been completely forgotten and has received little of the attention that it deserved.

Minsky’s opening remark is that “Friedman and Schwartz cast the credit market as a supporting player rather than the star performer” (1965, p. 64). And this characterization, as Minsky goes on to argue, has things backward. If anything, the star player in explaining macroeconomic fluctuations—and what was to become Minsky’s main concern, financial crises—ought to be the credit market; at the very least, credit markets ought to have been given one of the leading roles. This has become a central theme in Minsky’s writings and is the essence of his critique of monetarism. Friedman and Schwartz, by completely ignoring the role of financial markets and financial institutions in their analysis, missed a fundamental dimension of macroeconomics. This is one major manifestation of the poverty of monetarism, which we will return to later.

A second critique of Minsky’s is as follows: “The observed path of money income and prices is interpreted as the result of shocks imposed upon an otherwise inherently stable growth process by random or systematic changes in either the nominal quantity of money or the rate of change in the money supply” (p. 66).

The implicit premise of monetarism is that a market economy left to itself operates efficiently; it is inherently stable. As we explain in chapter 2, in effect, a key implicit assumption of monetarism is that the market economy is fundamentally frictionless, as Modigliani and Miller

(1958) assume in their famous irrelevance theorem. Minsky further points out that, by implication, “in this view, the introduction of a money supply that behaves in the correct manner would eliminate either all or at least a large part of those disturbances that constitute the major malfunctioning of an enterprise system” (p. 66).

Here, you have in essence a statement of the policy doctrine of monetarism. The monetarist policy prescription, as Minsky points out, follows from the basic premise of monetarism—namely, that only monetary shocks can destabilize the economy. Therefore, the only policy to achieve stability is to keep the growth of the money stock stable. If this rule is followed, aggregate economic activity will also be stable.

In the early 1970s, in developing the theory of rational expectations, Robert Lucas articulated an even more extreme point of view, which is that monetary policy can affect economic activity only if the change in money supply is *unanticipated*—if it comes as a surprise to economic agents. Assuming that the economy is already at an efficient equilibrium, any economic effects of a fully expected change in money supply would simply be offset and undone by revising prices (and wages). So if the belief is that the economic system, left to itself, is at its efficient equilibrium, then the monetary authorities cannot do better than follow a predictable and constant monetary quantity growth rule. They should announce in advance what they intend to do, so there will be no surprises and no unnecessary deviation from efficiency.

Minsky, of course, criticizes this premise, arguing that a market economy under *laissez-faire* is far from guaranteed to land on an efficient equilibrium, in large part *because of the way credit markets operate*. Such markets can push the economy into a financial crisis when too little credit is extended, or into a speculative bubble when credit is extended too freely. In Minsky’s view, “The working hypothesis should take the form of a model that integrates a more complete monetary and fiscal system into an income-expenditure framework. In particular, financial commitments along with financial assets should be integrated into the various behavior equations” (1965, p. 67).

The term “financial commitments” is a code word for debt. According to Minsky, when there is debt and credit in the system, the economy

behaves in much more complex ways than those implied by Friedman and Schwartz. Minsky contends that macroeconomists can understand how the system functions only if they introduce credit markets into their models. “One aim of such an integrated model,” as Minsky elaborates, “would be to explain what Friedman and Schwartz [leave out] . . . the reasons for the change in the rate of growth of the money stock. . . . That is, an objective of such a more complete model would be to explain not only money income, but also how monetary and financial crises are generated” (p. 67).

Minsky further underscores the need for such explanations by pointing to a key fallacy in the proposed monetarist theory, stating, “The implication of the Friedman and Schwartz’s explanation of business cycles is that, even if sharp declines in asset prices and net worth occur owing to a financial crisis centering around the nonmonetary part of the financial system, no serious depression will take place” (p. 68).

To be sure, if money supply shocks are *necessary and sufficient* to induce changes in money income, then by implication a shock to credit markets, but not to money supply, cannot cause a depression. But if we have learned anything from the Great Depression of the 1930s, and the great financial crisis of 2008, it is that depressions and major recessions are far from just monetary phenomena.

3 Some Macroeconomic Puzzles

We now turn to a discussion of some macroeconomic puzzles that arise when trying to view the world through a monetarist lens. If the macroeconomic theory of monetarism is correct, then we should see a tight comovement of monetary aggregates, economic activity, and inflation. But as we will show, this is far from being the case in the United States since publication of the Friedman and Schwartz article in 1965, as well as in other parts of the world, particularly China.

Friedman and Schwartz, of course, based their theory on U.S. macroeconomic time series before the publication of their article. As figure 1.1 illustrates, the relation between money growth, gross domestic product (GDP) growth, and inflation from 1930 to 1955 is

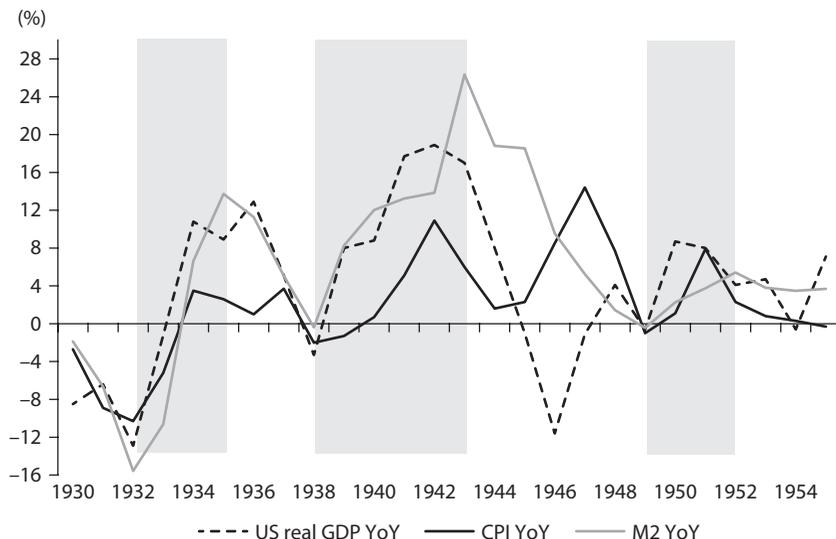


FIGURE 1.1. United States: 1930–1955, GDP, CPI, and M2 moved in tandem. YoY: year over year.

Source: Bloomberg.

broadly consistent with their theory: GDP growth, the change in the consumer price index (CPI), and the growth of the money stock, M2, all appear to move together. Note, in particular, how closely U.S. GDP, the CPI, and M2 all moved in tandem during the Great Depression in the 1930s. When M2 shrinks, so does economic activity. When M2 rises, so do the price level and economic activity.

It is largely the comovements of the three key macro variables over this time period that provide the empirical basis for Friedman and Schwartz's formulation of their two central propositions. What many monetarists have failed to note, however, is that even during this twenty-five-year period, the U.S. economy did not behave exactly in line with their theory, most spectacularly during World War II. As figure 1.1 illustrates, the period 1938 to 1946 experienced a huge increase in the money stock, M2, together with a huge increase in GDP, but a relatively small increase in the price level. Also, at the end of the war, there was a sharp contraction in GDP (–1 percent in 1945 and –12 percent in 1946) even though M2 continued to grow (by 19 percent in 1945 and

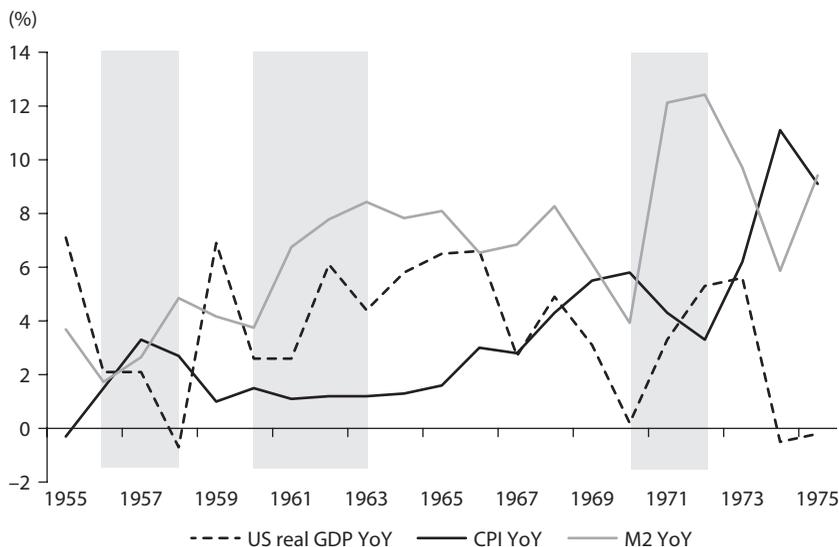


FIGURE 1.2. United States: 1955–1975, GDP increased, but CPI stayed flat, although M2 increased.

Source: Bloomberg.

10 percent in 1946), while the growth rate of the CPI was a lot lower (2 percent in 1945 and 9 percent in 1946).

If we move forward in time and look at what happened during the 1950s, 1960s, and 1970s, as illustrated in figure 1.2, we also see that the prediction that growth in the money stock eventually results in a higher price level doesn't quite hold up during this period. During the 1960s, although there was quite substantial growth in the money stock and, by today's standards, sustained high growth in GDP, there was surprisingly little inflation. Even more puzzling is the *negative* relation, shown in figure 1.4, between changes in the money stock and changes in the CPI from 1965 to 1987. Moreover, the findings of our regression analysis of changes in M2 against changes in GDP and CPI, illustrated graphically in figure 1.4, provide little evidence of a "one-to-one relation" between changes in M2 and changes in the CPI.

Moving from the mid-1970s to the mid-1990s, things get even more complicated for the two Friedman and Schwartz propositions—and, ironically, this is the period when monetarism's influence may well have

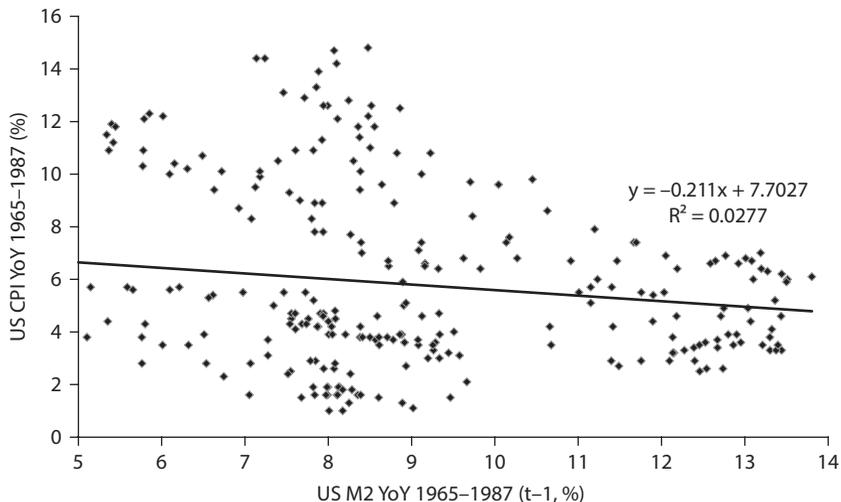


FIGURE 1.3. United States: Regression analysis, M2 versus CPI, 1965–1987:
 $CPI_{t_0} = -0.211 * M2_{t-1} + 7.703$ ($R^2 = 3\%$).
 Source: Bloomberg.

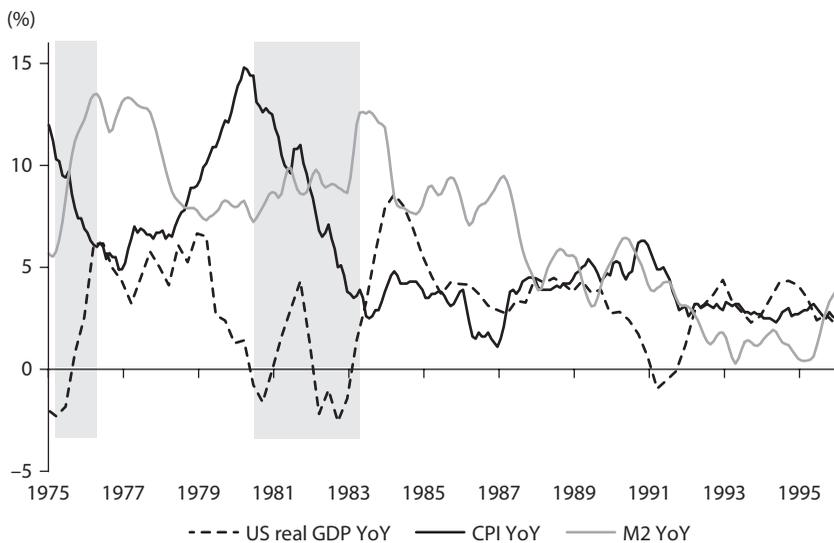


FIGURE 1.4. United States: 1975–1995, GDP still rose,
 but CPI declined as M2 accelerated.
 Source: Bloomberg.

peaked. As figure 1.3 illustrates, there is no clear relation, whether in the short or the long run, between the growth of the money stock, money income, and inflation during this period. For example, while M2 grew between 8 percent and 12 percent per annum from 1980 to 1983, the CPI declined from 14 percent to less than 4 percent, and economic activity was subdued.

Of course, this is the period when the Federal Reserve (Fed), under the leadership of Chairman Paul Volcker, tamed inflation by sharply raising interest rates. Nevertheless, it's worth pointing out that inflation (i.e., growth in CPI) was not tamed by reducing the growth of M2, as Friedman and Schwartz would have predicted, but rather by raising interest rates. Also, even as M2 continued to grow at more than 5 percent per year throughout the 1980s, inflation remained subdued, at well below 5 percent.

To be sure, monetary theory did evolve over this period, with some macroeconomists deemphasizing the importance of monetary aggregates and focusing instead on the role of interest rates, partly because of the lack of a clear one-to-one relation between changes in M2 and changes in GDP and CPI. But the focus on monetary aggregates has returned since the great financial crisis. What Friedman and Schwartz viewed as standard monetary policy conduct—namely, open market operations—and what had been neglected before the crisis as a result of the change in emphasis on interest rates returned under the new terminology of *quantitative easing*, unconventional monetary policy, and expansion of central bank balance sheets. The inevitable resurgence of monetary aggregates was, of course, the consequence of interest rates reaching the *zero lower bound*. Changes in monetary aggregates were seen as a new tool to use once interest rate policy was no longer an option.

How well did the Friedman and Schwartz predictions fare following this resurgence in attention to M2 after the great financial crisis? It is fair to say that, for monetarists, this is by far the most puzzling period in U.S. macroeconomic history. From August 2010 onward, as shown in figure 1.5, although there has been a sharp increase in the growth of M2—on the order of 6 percent per annum, which was achieved by the Fed's massive expansion of its balance sheet—both GDP growth and the CPI

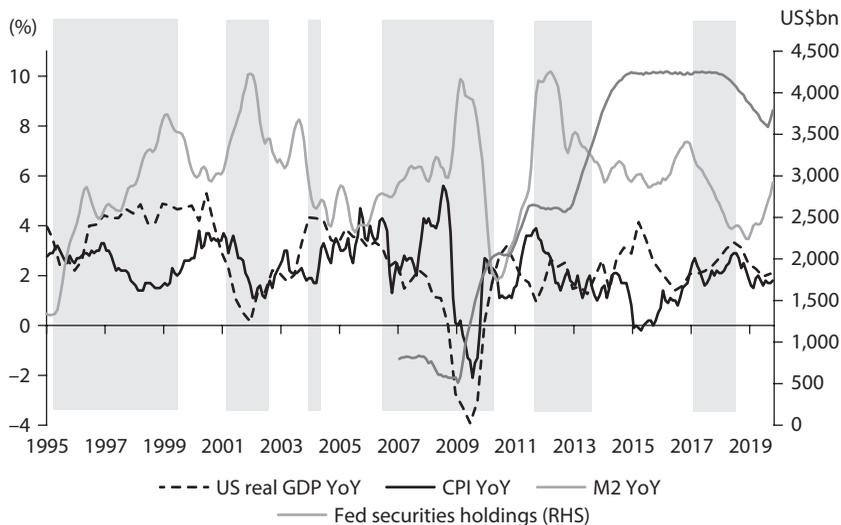


FIGURE 1.5. Since 1995, when M2 growth in the United States rose, CPI and GDP growth remained flat. RHS: right-hand side.

Source: Bloomberg.

remained flat at around (if not less than) 2 percent per annum, casting doubt on Friedman and Schwartz's posited relation between money stock, income, and prices. And far from a short-run phenomenon, this "anomaly" has persisted for well over a decade.

The Case of China. Similar monetary puzzles are observed in other countries than the United States. Consider first the macro experience of China over the past quarter century. It too fails to support the Friedman and Schwartz prediction that money growth in the long run results only in higher prices and has no lasting effect on economic activity. The evolution of China's macroeconomic aggregates is very striking, especially after 1996. As shown in figure 1.6, even though its money stock, M2, grew between 20 percent and 10 percent per year, there was no inflation. And, again, this is not a short-run phenomenon—it happened over several decades.

Why did China experience no inflation despite the high growth in its money supply? The answer is that very high growth in economic activity accompanied the high growth in M2. Output increased in proportion

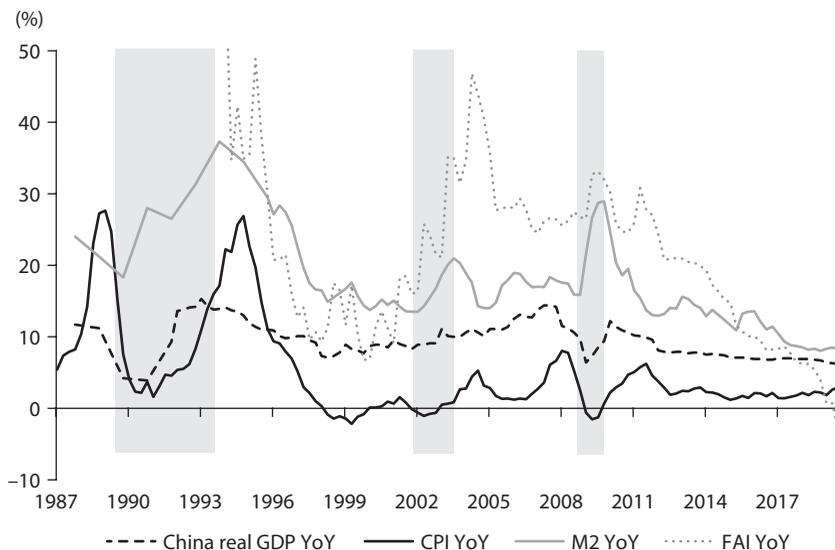


FIGURE 1.6. China: GDP and M2 grew in tandem, but CPI was flat after 1996. FAI: fixed-asset investment.

Source: Bloomberg.

with the money stock, so the price level remained more or less stable. The increase in output is in turn explained by China's very large investment in fixed assets (as shown in the figure). High investment, of course, contributes directly to reported GDP growth. But investment also has at least the potential to increase the productive capacity of the economy.

So, in applying the simple quantity theory of money to China, we might come up with the following explanation: instead of increasing the price level, the growth in the stock of money helped finance investment, which in turn increased production. If you increase the stock of money and also increase output, it is no longer obvious what will happen to the price level. The Chinese experience is a clear illustration of this point.

Yet another challenge for monetarism is to explain how changes in money growth affect money income and prices in an *open* economy. The Friedman and Schwartz analysis essentially assumes a closed economy, which as a first approximation may have been a reasonable simplification

for the U.S. economy at the end of the nineteenth century and the beginning of the twentieth. But today most economies are much more open. This is especially true of most advanced economies, which operate under free trade and capital movements.

Japan and Switzerland. Consider the case of Japan, which is a very open, advanced economy. As figure 1.7 illustrates, M2 has grown over a long period of time. At the same time, this growth has been accompanied by a parallel trend growth in accumulated overseas assets, including strikingly large holdings of U.S. stocks and government and corporate bonds. Japan over this period has effectively been able to finance the accumulation of such assets through a combination of private investment and money growth, thereby increasing the wealth of Japanese households. Japan has faced no inflation as a result of its money growth. If anything, Japan has been fighting deflation by meeting the global demand for safe assets with an increased supply of yen.

This episode starkly illustrates how the Friedman and Schwartz monetarist propositions are likely to break down in an open-economy context. Japan is not the only country that has been able to accumulate a lot of assets from the rest of the world by increasing its money supply while avoiding inflation. The same is perhaps even more true for Switzerland, the epitome of an advanced, small, open economy. As shown in figure 1.8, Switzerland today has a foreign exchange assets-to-GDP ratio of around 120 percent. And Switzerland essentially acquired all its foreign exchange assets by printing Swiss francs—that is, by increasing its money supply. As can be seen in the figure, M2 grows in tandem with the accumulation of foreign exchange reserves. Switzerland was able to buy itself 120 percent worth of GDP almost for free because the increase in M2 did not result in any consumer price inflation in Switzerland.

To sum up the empirical record, the basic tenet of monetarism—“longer-period changes in money income produced by a changed secular rate of growth of the money stock are reflected mainly in different price behavior rather than in different rates of growth of output”—does not hold up well in the data after 1965, the year that Friedman and Schwartz’s foundational article was published. This is true whether one looks at the experience of the United States or other countries.

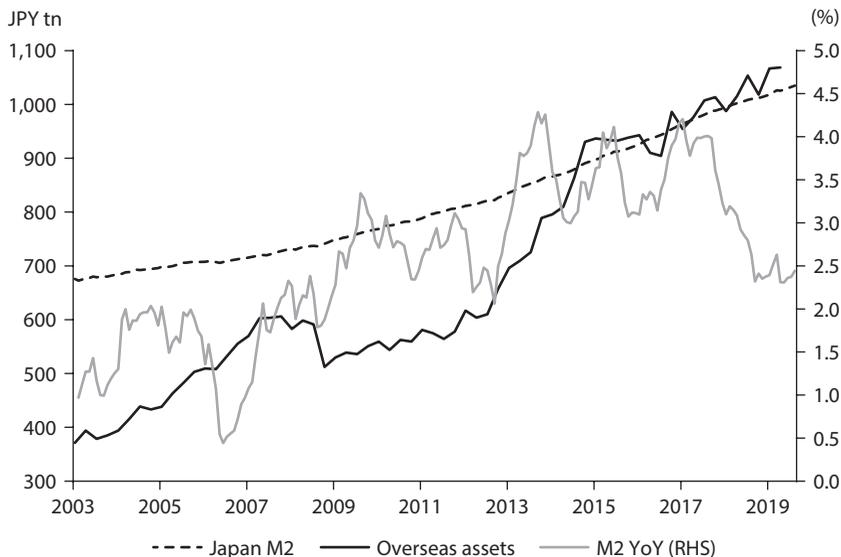


FIGURE 1.7. Japan: M2 and overseas assets growth were positively correlated.
Source: Bloomberg.

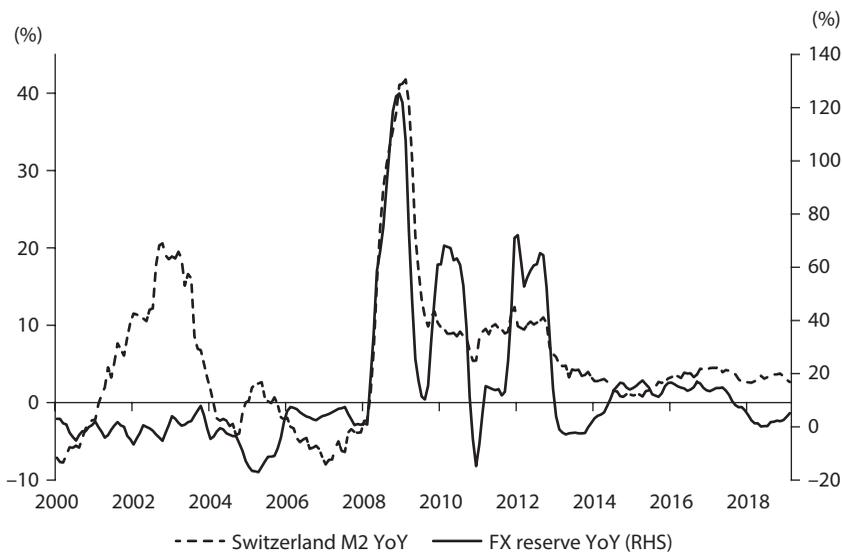


FIGURE 1.8. Switzerland: FX reserves significantly increased, along with M2.
Source: Bloomberg.

4 Enriching the Monetarist Framework

We now turn to the question of how to address these failures of monetarism—how to enrich the basic monetarist theory to allow a more nuanced analysis and a broader set of predictions that accord better with the observed facts. We shall not argue that one should reject the entire framework and start from new foundations. Rather, we will show how the framework can be enriched by redefining the notion of *fiat money* and by distinguishing between *inside* and *outside* money. Much of the Minsky critique of monetarism can be addressed, and most of the puzzles described earlier explained in this way. Moreover, several broad new insights emerge from taking this approach.

4.1 Money Is Equity

We will start with a fundamental idea first proposed in our 2018 article “The Capital Structure of Nations.” The title suggests a link to corporate finance. The idea that individual companies have capital structures—consisting mainly of debt and equity—is of course familiar. But what about nations—what is *their* capital structure? Does it even make sense to talk about a capital structure of nations?

In attempting to answer this question, one immediately runs into the following issue. It is easy enough to understand that nations, like companies, finance themselves with debt; we call it “sovereign debt” when a nation rather than a company issues debt. But what about equity; what is equity for a nation? Here is our key insight: equity for a nation is fiat money. How is equity like fiat money? When a corporation issues equity, how much does it cost to issue equity? It costs nothing in a corporate finance sense—that is, in the perfect markets framework set out by Modigliani and Miller (1958). Issuing equity should leave the value of the firm unchanged, given two conditions: (1) the company is not overvalued; and (2) investors expect companies to make reasonably productive use of the money. Given these two conditions, a corporation can just declare that it is issuing more shares; that is, that it is increasing shares outstanding from 1 million, say, to 2 million; and so long as the

market believes that the company will earn its cost of capital on the investment funded by such capital, its stock price will stay the same. And in the case of governments, the printing of money (fiat money) costs nothing, provided that investors and citizens have confidence that the new money will be put to good use.

All this is not to say that issuing more shares is always value-increasing for a company's existing shareholders. To the extent that management is issuing shares at a discount from their intrinsic market value, there is an ownership "dilution" cost, a transfer of value from existing to new shareholders. And if the expected incremental profit associated with the new investment fails to materialize, then the investment itself effectively ends up reducing shareholder value—but that's not the fault of the offering itself.

Dilution costs for companies issuing shares are analogous to inflation costs for governments that print money without constructive uses for it. When one increases money supply without commensurately increasing output, prices have to go up. There is inflation, which means that each unit of money is worth less. And having made this analogy between fiat money and corporate equity, we can think of both monetary theory and the quantity of money differently. Like corporations, nations can effectively ask themselves: How should we finance our investments, with money or with debt? It is important to emphasize the point that we are framing the question of optimal money supply and monetary policy entirely through the lens of investment. The questions that we are asking are these: How should a nation finance its investment? Should it print more fiat money, or should it issue debt? And when we say "debt" in this context, we mean foreign-currency debt.

Before we answer this question, it should be pointed out that we are focusing on an important aspect of fiat money that is generally ignored in textbook treatments of classical monetary theory. These treatments state that money has three functions—as a unit of account, as a medium of exchange, and as a store of value. To these functions, we add that fiat money is also legal tender—one that provides its owner with a claim on a share of a nation's wealth in much the same way that shares in a company provide the holder with a legal right to a share of the company's

profits. In our analysis, a nation's equity is the sum of central bank-issued domestic currency and Treasury-issued domestic-currency debt. Fiat money has value as legal tender. It can be used as a medium of exchange inside national borders, and it is the only way to pay taxes. Note for now that by lumping together fiat money and domestic-currency debt, we are making an oversimplification, which we relax in our later analysis.

But let's come back to our question of how a nation should finance its investments. When it comes to issuing equity, the dilution cost of an equity issue must be traded against the benefit of raising more funding for investment. When the benefit is larger than the cost, it pays to issue more equity. And as simple as that sounds, it has profound implications for monetary economics. Printing more money is not always bad; it all depends on what the money buys. If more money finances valuable investment that could not otherwise be funded, money should be printed. And, of course, new shares, like new money, do not drop from a helicopter. Much as new corporate shares should be, and generally are, issued to fund promising new projects, the printing of money is justified by the quality of the new activities that it makes possible.

And whereas the cost of issuing equity is dilution of ownership, the cost of printing money for a nation is inflation. There is a deep insight from corporate finance in this analogy—namely, that new equity issuance does not necessarily result in a dilution of ownership or loss in value for existing shareholders.

To see this, suppose that all shareholders own one share in a company. One day, the company announces a new share issue that will double the amount of shares outstanding. But instead of a public offering, the company does this through a rights issue. That is, it gives all shareholders first refusal right on the new shares, so they could simply double their shareholdings by accepting the new shares. If each shareholder takes the company's offer and buys a second share, what is the outcome? Each shareholder still owns the same fraction of the company. And regardless of the price charged for that second share, there has been no dilution of ownership. If shareholders purchase their share in a rights offering at a lower or higher price, they are simply changing

what they are paying themselves; they are in effect shifting money from their left to their right pocket.

The lesson here, then, is that dilution costs arise only when the firm is undervalued, and as a result, new shareholders end up getting shares at a favorable price at the expense of existing shareholders, so there is a transfer of value from existing to new shareholders. It is the same with inflation, which is costly only to the extent that it redistributes benefits and costs. If there is an increase in the money supply and everyone gets a proportionate increase in money income, it does not matter if the price level goes up. It does not matter because everyone still gets the same proportionate amount of output. If we worry about the costs of inflation, we really are worrying about redistribution costs as the result of inflation.

Another lesson from corporate finance is that a corporation may optimally issue new equity even though this involves a dilution cost. Typically, when a firm announces that it plans to issue new shares, its share price declines. That is, the announcement of a plan to issue new shares lowers the financial market's perception of the value of the firm. A natural question in light of this evidence is: Why go forward with a share issue if this is *expected* to reduce the value of the firm? The obvious answer is that the share issue will allow the firm to raise capital that will be used to fund value-increasing investment.

But if it is worth raising these new funds, why do financial markets respond by lowering the share price? The answer to that is less obvious. In simple terms it is that, on average, the news that companies need to raise new funds is not good. In many (if not most) cases, companies choose to raise new funds because they incurred losses. Also, even when profitable, companies are more likely to raise funds for investment by issuing equity (rather than debt) when they believe that the stock is overvalued by the market, which also explains the negative stock price reaction even though the money raised is to be used to finance value-enhancing growth.

But, as already suggested, it does not follow that whenever a company needs to raise new funds, it is best to avoid equity because its stock market value will be negatively affected. Raising new funds through an

equity issue may be the lesser evil. Corporations often find that it worth incurring these dilution and “signaling” costs because the funds raised allow the firm to survive a loss or take advantage of valuable investment opportunities. Such costs may be the price to pay for ensuring that the company will be able to carry out positive net present value (NPV) investments (Fu and Smith, 2021).

We translate these observations into monetary theory as follows: The lessons from corporate equity issuance, when transposed to public financial management, are that sometimes inflation costs can be justified, provided that they buy something valuable. Printing money instead of adding to a country’s debt burden to fund valuable public expenditures may well be the best policy, even if this could cause inflation in some circumstances. The alternative of not undertaking these expenditures, or of adding more public debt and exacerbating a debt overhang problem, could be worse than inflation. Inflation is thus not something to be avoided at all costs. Just as with new equity issues that can give rise to dilution and a negative stock price reaction, suffering some inflation may be the lesser evil.

Our reformulation of monetary economics emphasizes the process by which fiat money enters the economy. In our model, money enters the economy through purchases of assets or investment goods by the government. In contrast, under textbook monetary theory, money enters the economy through helicopter drops. We know that money doesn’t drop from helicopters, and something fundamentally important may be missing from a theory that does not keep track of how money enters the system. It matters for our understanding of how the economy responds to changes in money supply to keep track of what was exchanged for the newly printed money. If money is spent on productive investment that increases output, then clearly money growth does not just affect money income and prices. This is especially true in an economy with imperfect credit markets, as Minsky emphasized, in which more money spent by the government on investment is not viewed simply as displacing private investment.

This brings us to the important question of the optimal quantity of money. How much fiat money should the government supply? It turns

out that monetarists don't have a complete answer to this question. The typical argument that is given is related to the *Friedman rule*: the optimal rate of growth of the money stock is *negative*.¹ The logic underlying this rule begins with two observations about fiat money: first, it is a special store of value because it does not earn any interest; second, it is essential for exchange, and buyers must be encouraged to hold sufficient money balances to maintain efficient exchange. But since buyers prefer at the margins to hold an interest-bearing asset rather than money, they must be given incentives to hold money. Such incentives are provided by shrinking the quantity of money in the economy over time to produce deflation and thus enable money to earn a positive real return.

That in a nutshell is the Friedman rule. Even if one accepts its basic logic, the Friedman rule leaves unanswered the question of where the current stock of money comes from and whether it is optimal. It just takes the current stock of money as given and assumes that that stock has no effect on the optimal money-growth rule.

As an aside, it is interesting to note that despite the incomplete answer given to the question of the optimal quantity of money to start with, the Friedman rule has influenced the thinking behind recent efforts to create cryptocurrencies. The design of bitcoin, for example, aims to constrain its growth through mining to enable its value to grow, thereby providing an incentive for investors to hold the non-interest-bearing bitcoin. The question of whether the total amount of bitcoin will be sufficient to meet the demand for transaction services, however, has not really been addressed.

What is the optimal quantity of money? Extending our analogy of money as equity, we argue that there cannot be a clear-cut answer to this question. Just as with equity financing for a corporation—for which there is no well-defined optimal amount—there is no precise way of tying down the optimal quantity of money in an economy. Corporate finance addresses the question of equity issuance by considering how an investment opportunity should be financed. It doesn't address the question in terms of a fixed quantity of equity. More equity financing is

1. See Friedman (1968).

desirable if it helps fund productive new investments, limits the potential for excessive corporate borrowing, or plugs a loss to allow the company to continue. More equity issuance is also desirable for existing shareholders when financial markets are overvaluing the company—but such benefits are simply a transfer of wealth from new to old shareholders. By the same logic, share buybacks are desirable when shares are undervalued and wealth is effectively transferred from selling to remaining shareholders.

These concepts from corporate finance find a ready application to the monetary economics for open economies. As we saw earlier, Japan and Switzerland accumulated large holdings of foreign exchange and other assets during the financial crisis and over the past decade. In the case of Switzerland, foreign exchange reserves were accumulated as a result of the Swiss National Bank's efforts to meet the increase in global demand for safe Swiss franc assets during the crisis, and thereby avoid an excessive appreciation of the Swiss franc. In effect, the Swiss National Bank behaved like a corporation that issues more shares when its equity—as reflected in this case by the value of the Swiss franc against most other currencies—is more highly valued by financial markets.

Monetarism and classical monetary theory offer essentially no guidance on how countries should manage their foreign exchange reserves. It offers no prescriptions on when it makes sense to print more money and purchase more foreign exchange assets and when it makes sense to “buy back” fiat money held abroad. The following quote from Larry Summers, when he was undersecretary of the Treasury, makes that amply clear: “Soon after I arrived at the Treasury as undersecretary of international affairs in 1993, I was briefed about the Exchange Stabilization Fund. That's a Treasury fund. One of the first questions I asked was why this fund was the size that it was. Greenspan [then chair of the Fed] reported to me somewhat sheepishly their conclusion that depending upon certain assumptions that were difficult to pin down, the optimal level of reserves was somewhere between \$20 billion and \$2 trillion.” The analogy of fiat money as equity provides simple principles that can be imported from corporate finance and help guide countries' foreign exchange reserve management.

Switzerland's monetary policy during the Global Financial Crisis of 2007–2009 (GFC) is instructive in one other important way. Because of this crisis, there was suddenly a global shortage of liquidity and safe reserve assets. The U.S. dollar could no longer fully play its role as the global reserve asset. Investors around the world sought safe assets wherever they could find them. One of the countries they turned to was Switzerland—in part because of the Swiss reputation for stability and disciplined financial management—and consequently there was a huge increase in demand for Swiss francs. By supplying more Swiss francs to meet the greater demand from the rest of the world, the Swiss National Bank not only acted in the interests of Switzerland but also helped make the rest of the world more stable.²

4.2 Money Is Sovereignty

We turn next to a brief discussion of why fiat money is all about sovereignty, and why joining a monetary union always amounts to a loss of sovereignty. When should two or more countries enter into a monetary union? When is it optimal for two economically integrated countries to swap their national currencies for a single, common currency? Although this question is framed in the narrow terms of the costs and benefits of a monetary union, it has broader significance and raises, in a particularly simple and stark way, the question of the organization of the international monetary system and how to deal with the coexistence of multiple currencies.

The classical theory of optimal currency areas has been proposed by Robert Mundell in 1961. He frames the basic idea of optimal currency areas as follows: “Money is a convenience and this restricts the optimum number of currencies” (Mundell, 1961, p. 662). To paraphrase, money is about facilitating exchange by lowering transaction costs. And if the goal is lower transaction costs, then one should restrict the number of currencies. He

2. If the supply of safe assets (in particular, fiat money) is too small, the demand for these assets could push interest rates into negative territory. And when interest rates are negative, the entire financial system is more fragile. For more on this, see our paper “The Capital Structure of Nations.”

further elaborates: “If the world can be divided into regions, within each of which there is factor mobility and between which there is little or none, each of these regions should have a separate currency that fluctuates relative to all other currencies” (p. 663). In other words, Mundell argues that if there is factor mobility between two countries, they should have the same currency because transaction costs would be lower under a single currency and there would be more trade.

In contrast to Mundell, who underlines the trade benefits from a single currency, we emphasize the sovereignty implications of surrendering a national currency for a common currency. The cost for a country of joining a monetary union is loss of sovereignty. When a country joins a monetary union, it forgoes the option to use the printing press in difficult times, thereby increasing the risk of a future costly crisis. When a country joins a monetary union, it gives up the option to print money when it needs to. When the country is desperate, it may need to print money to cushion the economic and social effects of a crisis. If the country is in a monetary union, it can no longer do that on its own.

The full implications of abandoning monetary sovereignty for Eurozone members became apparent only after the great financial crisis of 2007–2009. Every country in the world was affected by this crisis, yet only one region in the world also had to deal with a sovereign debt crisis later, and that was the Eurozone. As a result of joining the monetary union, Euro member-states could no longer monetize their debt. The effect of monetary union was that all member-countries’ domestic-currency debt had, in effect, been turned into foreign-currency debt—that is, national debt that could no longer be serviced with the country’s fiat money. Naturally, whenever a country accumulates large foreign-currency debt, investors worry that the country may not be able to meet these obligations. These concerns can become self-fulfilling as turned out to be the case in the early stages of the euro crisis. Thus, the euro crisis sharply revealed the cost in terms of loss of sovereignty of joining a monetary union.

But if relinquishing one’s monetary sovereignty can be so costly, why join a monetary union? What is the benefit? That is actually a harder question than identifying the cost. The benefit cannot just be the lower

transaction costs and the greater trade integration mentioned by Mundell. The studies that have sought to measure the effect of monetary union on trade integration in the Eurozone have found no significant increase in trade as a result of the introduction of the euro. Common sense suggests that these benefits cannot be that great. Indeed, think about how much is saved by moving to a single currency in today's age. The transaction cost of trade between two countries today is not much larger than the cost of converting one currency to another. Nowadays, most payments are electronic, and foreign exchange conversion fees are a fraction of the cost of trading goods and services between countries.

One might object that exchange rate risk is a major impediment to trade, and the benefit of a monetary union is to eliminate that risk. But, again, in today's world, hedging currency risk is not a significant cost. Nevertheless, we do argue that the benefits of monetary union are indeed linked to the exchange rate. More precisely, the benefits of monetary union are related to how exchange rate movements reflect changes in money supply in each country.

Our argument starts by showing that if the exchange rate moves frictionlessly and instantaneously in response to changes in money supply in a country, then monetary policy in one country has no effect on other countries. Each country is perfectly insulated from monetary policy in other countries because movements in the exchange rate effectively neutralize the monetary policy changes of other countries. We refer to this result as the "International Monetary Neutrality Proposition" and attribute it to Friedrich Hayek (1976), even though he had a somewhat different idea in mind. Interestingly, Hayek was engaged in a debate with Friedman on the merits of currency competition. In opposition to Friedman, who maintained that the state should have a monopoly over fiat money, Hayek extolled the virtues of free competition among currencies. If currency markets are perfectly competitive, he argued, the exchange rate would reflect the relative value of each currency, and there would be no harm in having free monetary competition. Friedman, in effect, had in mind an inefficient exchange rate adjustment mechanism to back up his view that a state monopoly on money is preferable, in contrast to the general assumption he made in Friedman and Schwartz (1965) to derive the

fundamental propositions of monetarism, that the market economy operates in a frictionless and competitive manner. In other words, when proposing the monetarist doctrine, Friedman argues within a Modigliani-Miller framework, while when opposing Hayek, he is placing himself outside this framework. Interestingly, some of Hayek's ideas are now being recycled to promote the benefits of competition from cryptocurrencies.

Where one comes down on in this debate depends fundamentally on one's view of how responsive exchange rates are to changes in money supply. We show that the benefits of monetary union arise when the exchange rate is not sufficiently responsive, so an individual country is not perfectly insulated from monetary policy in other countries. In a situation where the exchange rate underreacts to changes in monetary policy, there is an incentive to print too much money to provide an artificial boost to purchasing power in other countries, creating a risk of excess inflation. One benefit of monetary union is thus to eliminate this tendency to print too much money and create too much inflation.

If we look back at what happened before monetary union in Europe, we see evidence supporting our theory. Well before the euro was introduced, exchange rates among European Union (EU) member currencies were for institutional reasons constrained to remain within a tight band (the so-called snake). And as a consequence, exchange rates among member-country currencies were unresponsive to changes in money supply in individual countries. As things played out, some countries printed so much money to stimulate their economies that they artificially boosted the purchasing power of their currencies; and since the currencies were not able to depreciate, the result was unsustainable current account deficits. Because their exchange rates did not depreciate, these countries were in effect able to live above their means; they were spending more than they could really afford. But, eventually, these countries were forced to abruptly adjust their exchange rates when the exchange rate within the currency band was no longer sustainable. And because these exchange rate crises generated a lot of instability across EU countries, the elimination of such monetary externalities was seen as a major benefit of monetary union.

To summarize, the one major, and perhaps the greatest, cost of monetary union is loss of monetary sovereignty. The benefit is a more stable and less inflationary monetary policy across the union. There can be many forms of monetary union, and the costs and benefits are to a large extent a question of design. Sovereignty may be only partly abandoned if each member-state can continue to control its own monetary policy while still remaining within the union. We show that monetary union is always less costly and more beneficial when it is accompanied by a fiscal union; and there is no downside to monetary union in our model if the monetary authority of the union can still exercise the option to print money in times of exigency. The creation of the euro has been more costly for some member-countries because of its design flaws, particularly the lack of fiscal transfers and the restrictions imposed on the central bank to print money.

Our analysis of monetary union has broader implications for the international monetary system. Since the collapse of the Bretton Woods system in 1971, there has not been much of a managed international monetary order. Despite attempts by the International Monetary Fund (IMF) to push for a regime of fixed exchange rates as “nominal anchors” immediately after the Bretton Woods system folded, the international monetary system became a free-for-all, with the major currencies being allowed to float freely since the Louvre Accord was agreed upon in 1987. This unmanaged system generates excessive instability, as individual countries’ monetary policies generate significant externalities for other countries. This is particularly true in the case of U.S. monetary policy and the U.S. dollar. The reality that, even under a floating exchange rate regime, changes in monetary policy in one country are not immediately and fully neutralized by adjustments in the exchange rate is a major source of instability. If we want a more stable global economy and financial system, we will need to move toward a more managed exchange rate system and greater monetary policy coordination. We do not live in the ideal world envisioned by Hayek, where monetary policy can be set purely from a national perspective and exchange rate movements can be counted on to neutralize unwanted effects on other countries.

4.3 Money Is Central Banking

We turn finally to another fundamental way of enriching the monetarist framework: a theory of the coexistence of what we (following others) call *outside* and *inside* money. Outside money is fiat money issued by a central bank, and inside money is created by banks. By making this distinction, we integrate credit into an otherwise standard monetarist framework, thereby implementing part of the agenda laid out by Minsky in his critique of Friedman and Schwartz.

Using Minsky's own words, we cast the credit market, along with a central bank, as the "star performer[s]." We develop a model of a monetary economy with a credit market, where fiat money coexists with credit and where banks and the central bank play unique roles. In essence, banks have the local information to be able to screen good and bad loan applicants and to extend new financing to firms with a "positive net continuation value." The central bank supports the banking system in two main ways: (1) by providing fiat money reserves to banks so they can lend against these reserves, and (2) by acting as a lender of last resort.

In our model, the central bank does not lend directly to firms but only provides liquidity to banks. Why doesn't the central bank lend directly to firms? Why is it only a lender of last resort? Banks have better information and incentives to make lending decisions than the central bank. This is not a new observation; indeed, much of the banking literature is based on that premise. Also, if the information that bankers have is necessary for efficient credit allocation, it would be counterproductive to have the central bank compete with commercial banks in the loan or deposit-taking market.

Turning the questions being asked here around, it is also natural to ask if it is conceivable to have a banking system without a central bank. In our model, the central bank plays a key role as a provider of outside money to banks and as a lender of last resort. The history of banking and central banking provides ample evidence of the importance of the lender-of-last-resort function. In fact, most central banks in the world were created for that very purpose.

But although the banking literature extensively analyzes the central bank's lender of last resort function, the entire literature on lender of last resort, with one or two exceptions, is based on real models without fiat money. An important innovation of our book, thus, is to analyze lending of last resort in terms of *outside money creation* in a monetary economy. As we will try to explain, this is far from a technical issue, and the conclusions on how central banks should intervene as lenders of last resort are fundamentally different in a monetary than in a real economy.

What is the current thinking on the lender of last resort? Walter Bagehot wrote a classic book in the late nineteenth century, *Lombard Street*, dealing with banking crises and the role of the Bank of England. He formulated a simple rule to guide the Bank of England's interventions to help banks in a financial crisis: central banks "should lend without limit to solvent firms, against good collateral and at 'high rates.'" That has become known as "the Bagehot rule," and it survives to this day as a central tenet for lending as a last resort. For example, the Bagehot rule is enshrined in official monetary policy for the Eurozone, as the following policy statement indicates: "national central banks can temporarily provide emergency liquidity assistance (ELA) to euro area credit institutions which are solvent but face liquidity problems."

Similar language can be found in section 13(3) of the Federal Reserve Act: "Under unusual and exigent circumstances, the Board of Governors . . . may authorize any Federal Reserve Bank . . . to discount for any individual, partnership, or corporation, notes, drafts, and bills of exchange when such notes, drafts, and bills of exchange are indorsed or otherwise secured to the satisfaction of the Federal Reserve Bank." Interestingly, the authority of the Federal Reserve under section 13(3) has been further restricted by the Dodd-Frank Act after the great financial crisis. Even though the Federal Reserve was authorized to lend only against good collateral to solvent institutions, it was deemed that this was not a sufficiently tight constraint on the lender of last resort. The Federal Reserve invoked section 13(3) to justify its intervention to save Bear Stearns in the spring of 2008. In particular, it argued that Bear Stearns was solvent and provided adequate collateral. Later, in September 2008,

it again referred to section 13(3), but this time it was to justify its decision not to intervene and save Lehman Brothers on the grounds that, unlike Bear Stearns, Lehman Brothers was not solvent and did not have collateral of sufficient quality.

In our analysis of the lender of last resort, we show that the Bagehot rule is flawed in a systemic crisis. It is counterproductive to lend only to solvent institutions and to require good collateral. What is good collateral, anyway? What is “good” is largely in the eye of the beholder. Experts can and do differ widely on the valuation of collateral in a crisis, as the aggregate shortage of liquidity results in huge differences in the face and market values of financial assets. The arbitrariness in assigning a value to collateral in a crisis further underlines the inconsistency in the Fed’s responses to save Bear Stearns but to let Lehman die.

In any case, as we will further elaborate, to hang a lender-of-last-resort policy around the value of collateral of a failing bank in a crisis is fundamentally muddled thinking since the point of the intervention is not, as in the case of a bankruptcy court, to determine the fate of individual companies and provide liquidity to solvent ones; the role of lender of last resort is to avoid the collapse of *the entire financial system*.

Much of our analysis is centered on developing a model of a monetary economy with a credit, or banking, sector with different roles for inside as well as outside money. As Minsky emphasized, it is important to work with such a model to be able to understand the full complexity of the effects of changes in money supply on investment, money incomes, and prices.

Before we get there, we briefly summarize our answers to the questions that we raised above. First, what is inside money?

In essence, it is an *obligation* issued by a commercial bank that allows its holder to redeem it at any time for fiat money held in reserve by the bank. Inside money is created with the backing of outside money and is extinguished when the holder of inside money redeems the obligation for cash (i.e., outside money). If you look at your bank account or the financial statements of a firm, they are all just electronic numbers. But behind these numbers is always the possibility that they can be converted into hard cash. Note here the importance of the notion of

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