

Alternative Approaches *to* **Monetary Policy**

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Preface

In a recent book titled *The Money Illusion*,¹ I explained a view that has come to be known as market monetarism. I used the market monetarist model to show how monetary policy mistakes worsened the Great Recession of 2007–2009 and also to demonstrate the advantages of a regime of nominal GDP targeting guided by market forecasts. In this book, I will try to convince readers of my most controversial claims about the role of the Fed in the Great Recession using a somewhat different approach.

From feedback received on *The Money Illusion*, I see a need to take a deeper look at the fundamentals of monetary policy. What is monetary policy? Why do economists find it so hard to agree on a consensus model? Why do monetary theories seem cyclical, with various approaches going in and out of fashion over time? Why is it so difficult to clearly identify the points of disagreement? To answer these and other questions, it is necessary to go beyond discussing my own views of how the economy works and which policies seem best. We need to figure out why economists differ on some of the most basic questions in monetary economics.

For many economists, getting down to basics might mean starting with a simple mathematical model of the economy, derived within a long-standing tradition, such as Keynesianism, monetarism, or new classical macroeconomics. Then various versions of this basic model can be compared. It has long been clear, however, that this sort of approach is not enough. Milton Friedman famously observed that his differences with the Keynesians could not be explained by pointing to differing assumptions about the shape of the IS and LM curves. The differences were much more fundamental. Monetarists and Keynesians did not just disagree as to which monetary policy was best, they did not even agree as to *what monetary policy is*.

In this book, I begin with a chapter discussing the question of what monetary policy is, a subject that is much more elusive than the reader might first imagine. I argue that *monetary policy* has a fuzzy definition, much like a term such as *politics*. There is a core of activities that are widely viewed as falling within the domain of monetary policy (or politics), surrounded by a wide range of activities that are loosely related.

Because of the ambiguous nature of monetary policy, there is no generally accepted view of how to measure the stance of policy. When two economists look at a given monetary

1. Scott Sumner, *The Money Illusion: Market Monetarism, the Great Recession, and the Future of Monetary Policy* (Chicago: University of Chicago Press, 2021).

policy, one might view it as highly expansionary, whereas the other insists that it is highly contractionary.²

In the first part of this book, “A New Way to Think about Monetary Policy,” I consider three basic approaches to the stance of monetary policy: (a) the quantity of money approach, (b) the rental cost of money approach (interest rates), and (c) the price of money approach. These approaches are so different from one another that discourse on monetary policy can resemble a sort of Tower of Babel, with experts not just disagreeing, but often failing to even understand one another.

In chapter 2, I closely examine a five-year period that was unusually rich in monetary policy experimentation (1929–1934). At various times during this period, each of the fundamental approaches to policy that are discussed in this book were used by policymakers, often in quite a dramatic fashion. Some of these policy experiments occurred *only* during this period, and not at any other time in US history. These policy initiatives provide revealing natural experiments that can be used to compare how the world looks when viewed from different theoretical perspectives. As in the classic Japanese film *Rashomon*, the same set of events can be narrated in quite different ways when viewed from alternative theoretical frameworks. I show that this period provides strong evidence for the superiority of the *price of money* approach to monetary policy.

Chapter 3 reprints a recent Mercatus working paper that evaluated what I call the Princeton School of Macroeconomics, a group including Paul Krugman, Ben Bernanke, Michael Woodford, Gauti Eggertsson, and Lars Svensson. This group revolutionized our understanding of monetary policy at the zero lower bound of interest rates. And as we will see, their work has important links to the policy experimentation of the early 1930s, but also points toward evolving policy trends in the 21st century. My hope is that the theoretical perspectives discussed in the previous two chapters will allow for a much deeper understanding of what the Princeton School accomplished, as well as differences within this group.

The first three chapters should make it easier to understand my own views on monetary policy. In chapter 4, I explain why both the quantity of money and the interest rate approaches are inadequate. A large increase in the monetary base might be associated with an extremely expansionary monetary policy, but it also might be associated with an extremely tight monetary policy. A sharp cut in nominal interest rates might be associated with an extremely expansionary monetary policy, but it also might be associated with an extremely contractionary monetary policy. Although no policy indicator is perfect, the price of money approach will allow us to develop much more reliable policy instruments and indicators.

2. Oddly, this also seems to be true of fiscal policy; see Tyler Cowen, “Economist Opinions on Fiscal Policy Are Now Super-Distorted,” *Marginal Revolution* (blog), August 2, 2022.

In chapter 5, I use the preceding analysis to make the case for the price of money approach. I begin by showing how the price of money approach avoids any zero-lower-bound policy constraints. I show that previous concerns about monetary policy ineffectiveness confuse cause and effect. Highly contractionary monetary policies often lead to near-zero interest rates and a very large demand for base money, which gets misdiagnosed as an “easy” monetary policy stance that is ineffective.

Under a fiat money regime, truly expansionary monetary policy stances are always highly effective in boosting nominal spending, and they actually require much less “effort” than more contractionary policy stances. Many recent problems with monetary policy could be resolved by targeting an asset price closely linked to market forecasts of nominal GDP growth.

My previous book received some favorable reviews but failed to make much headway on the central claim that the Fed caused the Great Recession with a tight money policy. I now believe that convincing others on this point will require a radically different way of thinking about monetary policy. There is some repetition in this book, which is intentional. The ideas are pretty counterintuitive, and I hope that making my case repeatedly, in a variety of contexts, will make the argument more convincing.

Because I am examining alternative approaches to monetary economics, I decided to add a second part to the book, “Problems with Alternative Approaches.” This part includes three chapters that critique alternative views. Chapter 6 reprints a Mercatus working paper that critiques the mainstream view that interest rates are a useful way of thinking about monetary policy, either as a policy indicator or instrument. Chapter 7 was first published at Econlib and criticizes Modern Monetary Theory. Chapter 8 criticizes libertarian ideas on monetary policy. You can think of these three appendixes as representing my critique of mainstream, left-wing, and right-wing views on money.

Part I

A New Way to Think about Monetary Policy

Chapter 1: What Is Monetary Policy?

In this chapter, I'll explain why monetary policy is a surprisingly elusive concept. Although the term *monetary policy* includes some broadly accepted core activities, its boundaries are quite fuzzy. Yet even if we cannot give monetary policy a precise definition, wrestling with the question of how best to define this term will provide insights into how policy affects the economy, and how to think about policy options for monetary policymakers.

As an analogy, consider the term *politics*. Most people could provide some sort of definition, yet I suspect we'd all be hard-pressed to precisely define this term. Indeed, the boundaries of politics are so expansive that you'll occasionally see people proclaim, "Everything's political." Nonetheless, we can say useful things about political figures, political institutions, elections, political goals, and so forth. Similarly, although monetary policy lacks a precise definition, we can say useful things about monetary policymakers, monetary policy tools, monetary regimes, and monetary policy goals.

The problem of defining monetary policy can be addressed on multiple levels. What do monetary policymakers actually do? What tools do they use? How do we identify their policy actions? What goals are they trying to achieve?

Because some of this material is a bit abstract, it will be helpful to begin with a road map of where we are going. I plan a special focus on the identification problem—how do we identify the stance of monetary policy? That is, how do we know when policy is expansionary and how do we know when policy is contractionary? We will focus on three major approaches:

1. The quantity of money approach. The stance of policy defined by changes in the money supply, which can be defined in multiple ways.
2. The interest rate approach. The stance of policy defined by changes in the *rental cost of money*, which is linked to the nominal interest rate.
3. The price of money approach. The stance of policy defined by changes in the price of money, which can be defined in multiple ways. This is the approach that I favor.

Each of these three approaches provides a road map for identifying changes in the stance of monetary policy. Thus, a monetary policy might be characterized as expansionary or contractionary after looking at changes in the money supply, the interest rate, or some measure of the price of money (such as the exchange rate or the bond market forecast of the future price level).

In chapter 2, these three approaches will be contrasted using an especially revealing case study, US monetary policy from 1929 to 1934. In chapter 3, these three approaches will be used to better understand some recent ideas developed by a group I have called the Princeton School of Macroeconomics. In chapter 4, I will examine some of the problems with using the money supply or interest rates as a policy indicator. In chapter 5, I'll show how using the price of money approach can address some of the long-standing problems that have bedeviled monetary policymakers.

People of the Concrete Steppes

Many economists and noneconomists would be puzzled by the question “What is monetary policy?” The answer seems obvious. Oddly, however, the “obvious” answers differ from one person to another. Here’s Wikipedia:

Monetary policy is the policy adopted by the monetary authority of a nation to control either the interest rate payable for very short-term borrowing (borrowing by banks from each other to meet their short-term needs) or the money supply, often as an attempt to reduce inflation or the interest rate, to ensure price stability and general trust of the value and stability of the nation’s currency.

Monetary policy is a modification of the supply of money, i.e., “printing” more money, or decreasing the money supply by changing interest rates or removing excess reserves. This is in contrast to fiscal policy, which relies on taxation, government spending, and government borrowing as methods for a government to manage business cycle phenomena such as recessions.

Further purposes of a monetary policy are usually to contribute to the stability of gross domestic product, to achieve and maintain low unemployment, and to maintain predictable exchange rates with other currencies.¹

This isn’t a terrible definition, but it has some odd asymmetries. In the first paragraph, monetary policy is said to be about controlling inflation. In the second, fiscal policy is about controlling the business cycle. In the third, monetary policy is also about controlling the business cycle. In fact, both monetary and fiscal policies affect aggregate demand, and aggregate demand affects both inflation and the business cycle. So why not say so?

The first sentence of the second paragraph talks about expansionary policy printing money, and contractionary in terms of “changing interest rates.” That’s not necessarily wrong, but why not explain the two in a symmetrical fashion? It is almost as if the editors are trying to please both Keynesians and monetarists in a single sentence.

1. Wikipedia, “Monetary Policy,” September 30, 2022, https://en.wikipedia.org/wiki/Monetary_policy.

Here's how I would have described monetary policy:

Monetary policy is a set of actions and/or statements by a monetary authority to affect the supply and/or the demand for base money, generally with the goal of influencing interest rates, inflation, output, employment and/or the foreign exchange rate.

Things get even more dicey when Wikipedia turns to expansionary monetary policy:

Expansionary policy occurs when a monetary authority uses its procedures to stimulate the economy. An expansionary policy maintains short-term interest rates at a lower than usual rate or increases the total supply of money in the economy more rapidly than usual.²

The first sentence is ambiguous. Is policy expansionary when the monetary authority intends it to be, or when it actually does stimulate the economy? I prefer the second interpretation. Surely, we would not wish to characterize a policy as expansionary if a delusional central bank misjudged the stance of its policy?

I don't much like the second sentence at all, and yet I am clearly in the minority on this point. Nick Rowe coined the term *people of the concrete steppes* for those who characterize monetary policy by specific actions, such as adjusting interest rates or changing the money supply. Unfortunately, this group is clearly in the majority.

What is wrong with viewing the stance of monetary policy in terms of interest rates and the monetary supply? To begin with, this approach is not even internally consistent. During the Great Depression, the Federal Reserve reduced interest rates to levels much lower than normal, and also sharply reduced the money supply. So by the Wikipedia definition, monetary policy was both expansionary and contractionary.

One solution to this dilemma would be to acknowledge that interest rates and the money supply might give a conflicting reading as to the stance of monetary policy, and then pick the one that is usually more accurate. The least bad option for a measure of the stance of monetary policy would probably be the money supply. But that's not how most of the public looks at monetary policy, and it is not even how most professional economists look at monetary policy. Later, I'll show that changes in the money supply are also an unreliable indicator of the stance of policy.

Alternatively, we could stick with interest rates but employ a more sophisticated measure of high and low interest rates. The most promising alternative would be to characterize expansionary policy as when interest rates are set below equilibrium, whereas a contractionary policy would occur when interest rates are set above the equilibrium rate.

Although this "Wicksellian" approach is indeed more promising than one that ignores the equilibrium interest rate, two distinct problems remain. First, it makes it difficult to

2. Wikipedia, "Monetary Policy."

communicate ideas. Very few people talk about monetary policy in this fashion. Second, we have no reliable way of estimating the equilibrium interest rate. I suspect that these two problems are related. People don't describe monetary policy in a Wicksellian fashion because they don't have any straightforward way of doing so.

Knut Wicksell suggested that the equilibrium interest rate is the one that leads to price stability. If rates are set below equilibrium, then prices will rise, and if rates are set above equilibrium, then prices will fall. In that case, we can infer that interest rates are below equilibrium (and hence that policy is expansionary) if we see prices rise.

But notice that in that case, the interest rate itself isn't really telling us anything about the stance of monetary policy; rather, it is movements in the price level that tell us whether policy is expansionary or contractionary. We *infer* the stance of policy by looking at its *effect* on the economy. The people of the concrete steppes absolutely hate this approach. They insist that monetary policy is the *concrete actions* taken by the monetary authority, and that changes in the price level and output are *outcomes* of policy, not the policy itself.

Perhaps a nautical analogy might help. The people of the concrete steppes might describe a ship captain's "steering policy" by the exact position of the ship's steering wheel. Nick Rowe and I might describe the captain's steering policy as the direction in which the ship is currently heading. Using that analogy, what really matters is the level of interest rates *relative to the equilibrium rate*, which can only be observed by looking at macroeconomic outcomes.

So far, I've tacitly assumed that the central bank directly controls variables such as the market interest rate or the money supply. In fact, interest rates have traditionally been a target of monetary policy, an *outcome* of policy actions that change the supply or demand for base money. Monetarists typically describe the stance of monetary policy in terms of changes in the broader aggregates, such as M1, M2, and M3. But those aggregates are also an outcome of more fundamental policy actions, and are not directly controlled by the monetary authority.

In frustration, some people of the concrete steppes might just throw up their hands and completely reject the Wicksellian model. In a wish to keep things simple, low (or falling) interest rates are viewed as expansionary monetary policy, and vice versa. If the economy is experiencing deflation despite low interest rates, it doesn't mean that money is tight; rather, it shows that monetary policy is weak and ineffective, and other more powerful forces are pushing the economy into deflation.

Unfortunately, that approach loses all plausibility when one attempts to generalize the model to all changes in interest rates. Thus, suppose you have an economy where the money supply is growing at 40 percent a year, prices are rising at 36 percent a year, real output is rising at 4 percent a year, the nominal interest rate is 38 percent, and real interest rates are 2 percent. Can we reasonably characterize that monetary policy as contractionary? After all, the "keep it simple, stupid" people of the concrete steppes suggest that monetary policy is all about interest rates. And a 38 percent nominal interest rate is certainly higher than normal. In fact, the interest rates would be high almost

entirely because of the Fisher effect. Policy in this case is clearly highly expansionary, and high nominal interest rates reflect high inflation expectations—which are a product of an expansionary monetary policy.

So the “KISS” approach clearly doesn’t work. Can the problem be fixed by focusing on the real interest rate, to avoid the problem of the Fisher effect? As soon as we make that adjustment, we are implicitly acknowledging that the equilibrium interest rate is affected by macroeconomic factors, such as inflation. But inflation is hardly the only factor that influences equilibrium interest rates; real economic growth, taxes, foreign capital flows, and a host of other variables also affect the equilibrium rate. If we try to account for the myriad factors that can affect the equilibrium interest rate, we end up back at the Wicksellian approach, where policy is expansionary when interest rates are depressed to a level below the equilibrium rate. And we are only able to identify that situation by looking at . . . you guessed it, macroeconomic *outcomes*.

I do understand why so many people find this state of affairs deeply frustrating. We’d like to think that we can look at how the monetary authority adjusts its policy tools and clearly see what it is doing to monetary policy. But that doesn’t happen to describe the world we live in. The setting of policy tools does not give us the information that we wish to know. We cannot avoid looking at outcomes.

Policy Tools, Policy Targets, and Policy Goals

We’ve only just scratched the surface of all the reasons why the concrete steps taken by a monetary authority do not describe the stance of monetary policy. Many more examples are to come. But concrete steps are an important part of the process, so we need to first step back and consider the role they do play in monetary policy.

The term *monetary policy* suggests that “money” must play some sort of important role in the process. Surprisingly, some prominent economists deny that this is true. Michael Woodford has described what monetary policy might look like in a world without money. But on closer examination, his “moneyless” model does contain a medium of account.³ Indeed, without a medium of account, it is difficult to see how you could have concepts such as the price level and nominal gross domestic product (NGDP). In the real world, these aggregates are measured in money terms (dollars, pounds, euros, etc.), with money being the medium of account for all nominal values in the economy.

Consider two famous identities:

$$P = Ms/md, \tag{1.1}$$

3. Bennett T. McCallum, “Michael Woodford’s *Interest and Prices*: A Review Article,” Carnegie Mellon University and National Bureau of Economic Analysis, March 7, 2005.

where P is the price level, M_s is the nominal supply (or quantity) of money, and md is assumed to represent money demand (or money holdings) in real terms.

$$M*V = P*Y = NGDP, \quad (1.2)$$

where M is the nominal stock of money, P is the price level, Y is real GDP, and $NGDP$ is nominal GDP. The term V is often (misleadingly) referred to as the velocity of circulation.

One way to think about the monetary authority's concrete steps is to look at its policy tools—the steps it can take to influence the supply or demand for money (medium of account), and hence the price level and NGDP. When I started teaching, textbooks began with three basic Fed policy tools:

1. Open market operations (OMOs), which are the purchase and sale of bonds with newly issued base money
2. Discount loans of newly issued base money (reserves) to banks
3. Reserve requirements, which represent a minimum level of bank reserves as a share of deposits

In 2008, a fourth tool was added in the United States:

4. Interest paid on bank reserves

More recently, reserve requirements have been abolished.

The first two tools directly affect the size of the monetary base. With regard to the price level identity, they directly affect the nominal stock of money (M_s). The second two tools affect the real demand for bank reserves, and hence the real demand for the monetary base (md).

There are other ways to categorize these tools. Thus, monetarists who define the *money supply* as M2, and not the monetary base, would say that all four tools affect the supply of money. When you increase the demand for base money with higher reserve requirements or higher interest on reserves (IOR), you reduce the M2 money supply.

But let's not get bogged down by semantics. The basic point is that central banks have a set of policy tools that directly affect the supply of money or the demand for money, and hence the price level. These concrete steps are a very important part of what central banks do. Unfortunately, by themselves they do not tell us whether monetary policy is expansionary or contractionary.

At this point, the textbooks will often explain monetary policy as a three-stage transmission mechanism with policy tools having an impact on various short- and intermediate-run policy targets, which then affect long-run policy goals. Unfortunately, the terms are not always used in a consistent fashion. (You probably know this, but perhaps without knowing that you do.) For instance, the media often refer to the Fed's interest rate target. They also refer to the Fed's inflation target. And yet in one of these two cases the term *target* is used in a very different sense from the other case.

This inconsistency will be easier to visualize if we begin with the monetary system in place before 2008, when the primary tool of the Fed was open market operations. Later, we'll look at interest on reserves, which has recently become a very important policy tool. Consider the following transmission mechanism:

OMOs → monetary base → interest rates → inflation

This process could be described in two ways:

- Tools (OMOs), targets (interest rates), and goals (inflation)
- Tools (OMOs), policy instrument (interest rate), and target (inflation)

Thus, one economist might say, "The Fed targets interest rates at a level it thinks will achieve its long-run inflation goal of 2 percent." Another economist might say, "The Fed uses interest rates as a policy instrument in order to target inflation at 2 percent."

Both economists are describing *the exact same process*. But in the first account, interest rates are referred to as the target, whereas in the second account inflation is the target. So which is it; does the Fed target interest rates or does it target inflation? Rather than debate semantics, let's figure out what it is *actually doing* (at least before 2008.)

To make sense of all this, we need to understand that there are time lags in the way that monetary policy affects the economy. Just as a ship captain leaving New York might say, "I'm steering the ship toward the Verrazano-Narrows Bridge with the ultimate goal of crossing the ocean and reaching London," a Fed official might say, "We are doing enough open market purchases to cut interest rates to 3 percent, with the hope of eventually returning inflation to 2 percent." The ship captain is steering toward the bridge leading to the open ocean, but also steering toward London. The Fed official is targeting interest rates in the short run, but in the long run is targeting inflation.

Nonetheless, it would be less confusing if we didn't use the term *target* in these two different senses. Alternatively, we might say that interest rates are a short-run target, and inflation is a long-run target. In the next section, we'll see that monetarists view the M2 money supply as a short-run target.

This confusing terminology can cause real harm. If the Fed targets interest rates at a constant level, then it probably cannot control the money supply or inflation. This fact has led some Modern Monetary Theorists to claim that money is "endogenous" and that the Fed cannot control inflation. But this claim ignores the fact that the Fed can and does adjust its interest rate target in such a way that the money supply moves in such a way as to control inflation. One way of responding to this Modern Monetary Theory claim is to point out that when the central bank targets inflation, it is the interest rate that becomes endogenous.

Recall that the description of monetary policy in Wikipedia says, "or decreasing the money supply by changing interest rates."

That's not necessarily false, but it is a confusing way to explain the traditional process by which the Fed controlled the money supply. Before 2008, the Fed directly changed the

monetary base via open market operations. A purchase of \$50 million in bonds immediately raised the monetary base by \$50 million. A \$75 million bond sale immediately reduced the base by \$75 million. Those actions also indirectly affected interest rates. But the effect of OMOs on interest rates was not primarily because the Fed bought or sold bonds, and hence changed their price. The number of securities purchased by the Fed was far too small to have a significant *direct* effect on interest rates.

Interest rates were affected by OMOs mostly because the Fed added or removed liquidity from the financial system. Before 2008, a Fed injection of new base money would have affected interest rates in essentially the same way regardless of whether the new money was used to buy bonds or was dropped out of a helicopter. Thus, it would be more accurate to say that (before 2008) the Fed raised interest rates by decreasing the money supply, than to say it decreased the money supply by raising interest rates.

After 2008, the Fed also began using changes in the interest rate paid on bank reserves as a policy tool. Now, it does make sense to talk about one specific interest rate as a policy tool, not just a target.⁴ When the Fed raises IOR, it increases the demand for base money (specifically reserves). This action is contractionary, tending to reduce the price level. In this case, the monetary base is not directly affected by higher rates, but broader aggregates such as M2 tend to decline. In relation to this identity,

$$P = Ms/md,$$

a higher IOR tends to increase money demand if you define *money* as the monetary base, and it reduces the money supply if you define money as an aggregate, such as M2. Either way, it is contractionary, other things equal, tending to reduce the price level. Similarly, lower IOR reduces base money demand and is expansionary, *ceteris paribus*.

In summary, the Fed has a set of policy tools that it uses to target variables in both the short and long run. Interest rates are the most popular short-run target, although later we'll look at the monetary aggregates and exchange rates. The most popular long-run target is the price level (inflation), although other long-run targets, such as NGDP growth, have been proposed.

This tools-targets-goals framework will allow us to develop a better understanding of where the “people of the concrete steppes” went wrong. As we will see, both economists and noneconomists have often relied on bad indicators of the stance of monetary policy because of a perceived lack of good alternatives.

We've seen that the most popular indicator of monetary policy (interest rates) is highly flawed. In the next two sections, we'll see that major problems also exist with alternatives such as the money supply and exchange rates. The only way interest rates would

4. Even with IOR, however, other interest rates continue to be determined by the market, and hence are *outcomes* of monetary policy.

adequately convey the stance of monetary policy is if we could directly measure the equilibrium interest rate. Unfortunately, we cannot.

The people of the concrete steppes make three types of errors when describing monetary policy in terms of interest rates:

1. Wrongly assuming that low rates are easy money and high rates are tight money
2. Wrongly assuming that interest rate cuts are expansionary and interest rate increases are contractionary
3. Wrongly assuming that small changes in interest rates reflect small changes in monetary policy

All three errors occurred frequently during the Great Recession of 2007–2009. People wrongly assumed that declining interest rates in 2008 indicated monetary easing. People wrongly assumed that very low interest rates in 2009 indicated easy money. And people wrongly assumed that the Fed’s decision to pay interest on bank reserves was not a significant policy error, as the interest rate paid in 2009 was “only” 0.25 percent above zero.⁵

Once again, a transportation analogy might be useful. It is true that depressing a car’s gas pedal tends to make a car go faster. It is not necessarily true that a car will accelerate when the gas pedal is depressed. When going up a steep hill, a car may slow even as the gas pedal is depressed. Cutting the interest rate paid on bank reserves will make monetary policy more expansionary, other things equal. However, monetary policy is not necessarily expansionary during periods when IOR is being reduced—the equilibrium interest rate might be falling even faster.

What about the Money Supply?

Proponents of the interest rate approach to monetary policy are not the only people of the concrete steppes. Monetarists suggest that rather than using interest rates as a policy indicator, we’d be better off if monetary policy were described in terms of *changes in the money supply*.

I have some sympathy for this approach. As we’ve seen, before 2008, it was natural to view changes in the monetary base as the concrete action, and the resulting movement in interest rates as an outcome of open market operations. Unfortunately, even at that time, the traditional monetarist approach to policy had some of the same defects as the (Keynesian) interest rate approach. Changes in the money supply are not a reliable indicator of the stance of monetary policy, as money demand can also change.

5. Scott Sumner, “Why Does a Measly Quarter Point Matter?,” *The Money Illusion* (blog), December 10, 2021.

One problem is how best to define the money supply. Money has many different definitions, and these definitions often give dramatically different readings of the stance of monetary policy. Here, I will focus on two basic approaches to defining the money supply, the monetary base, and the broader monetary aggregates.

The base is simply currency held by the (nonbank) public and bank reserves. Alternatively, it can be defined as all currency (including vault cash) plus commercial bank deposits held at the Fed. The two definitions are reconciled by the fact that bank reserves include both vault cash and bank deposits at the Fed.

The broader money supply includes aggregates such as M1, M2, M3, and so forth. For our purposes, let's consider a *generic* monetary aggregate that includes cash held by the public and all bank deposits. Whereas the monetary base is directly controlled by the Fed through its open market operations (and discount loans), the broader aggregates are affected by monetary policy only indirectly. As with market interest rates, the monetary aggregates are an *outcome* of policy, not a policy tool. We will begin by examining the monetary base as a potential indicator of monetary policy, and then consider the broader aggregates.

The monetary base

One advantage of using the monetary base as a policy indicator is that the base can be directly controlled by the Fed. Only the Fed can create base money; anyone else doing so is engaged in counterfeiting. Through its control of the monetary base, the Fed can influence a wide variety of other variables, including interest rates, exchange rates, the monetary aggregates, the price level, and nominal GDP. In some respects, this makes the base an ideal monetary policy indicator. So what's wrong with defining *monetary policy* as changes in the quantity of base money?

Several important tools of monetary policy have no impact on the monetary base. Both reserve requirements and the interest rate on bank reserves affect the demand for base money, not the quantity (supply). Thus, if we were to define monetary policy as changes in the size of the monetary base, our definition would fail to account for what most people now view as the Fed's single most important policy tool—the interest rate on bank reserves.

I happen to favor abolishing both reserve requirements and interest on bank reserves. In my view, the Fed should rely on a single policy tool—OMOs. But even if policy were to be reformed in this fashion, I would still oppose defining monetary policy as changes in the supply of base money. Changes in the demand for base money are much too important to ignore. To see why, consider the following thought experiment:

Imagine we are back in the early 2000s, when the Fed relied almost exclusively on open market operations that affected the monetary base. At the time, the base was roughly 98 percent currency (both nonbank cash holdings and vault cash). Because banks preferred to hold only very small amounts of excess reserves, as a practical matter monetary policy

mostly consisted of adjusting the currency stock via OMOs in order to influence variables such as interest rates, inflation, and unemployment. Now assume that an international financial crisis causes people in developing countries to hoard large amounts of US currency. Global demand for dollars quickly rises by 10 percent at the existing price level. What happens next?

Most likely, the Fed would accommodate that increased currency demand by doing enough open market purchases to increase the monetary base by 10 percent. Doing so would prevent the surge in international demand for dollars from affecting US interest rates or inflation. If we used the monetary base as an indicator of the stance of monetary policy, that accommodative action would look like an expansionary policy change, despite no change in US interest rates.

Now consider a counterfactual case where the Fed refused to accommodate the increased demand for US currency. In that case, the currency hoarding would likely have five effects:

1. The money multiplier would fall sharply, as would the broader monetary aggregates.
2. Nominal GDP would decline, as would inflation and real GDP. The economy would enter a deep recession.
3. The dollar would appreciate in the foreign exchange markets.
4. Short-term interest rates might increase sharply in the short run, and then decrease as the economy slumped.
5. Debt defaults would rise sharply, as would the unemployment rate.

Keynesians would see a sharp rise in interest rates leading to recession, and blame the outcome on a tight monetary policy. Monetarists would see a big drop in the broader monetary aggregates, and also blame tight money for the recession. Almost no one would argue, “Monetary policy did not change, because the Fed did not change the monetary base.” Both economists and noneconomists would correctly see that the base was providing a highly misleading indicator of the actual stance of monetary policy during the emerging markets financial crisis.

Of course, this is just one hypothetical. There are cases where changes in the monetary base do provide a useful indicator for changes in the stance of monetary policy. One good example occurred between July 2007 and May 2008, when the growth rate of the monetary base slowed to near zero, plunging the United States into the Great Recession. And yet even in that case—a time when the base was a useful policy indicator—almost no one was paying attention. Go back and search both the popular press and the written opinions of academic economists in the spring of 2008. You will be hard-pressed to find a single example of an economist citing the slowdown in monetary base growth as a factor pushing the economy into recession.

In the 1960s and 1970s, the growth rate of the monetary base accelerated sharply, triggering the Great Inflation of 1966–1981. Once again, this fact was widely ignored by

economists, who focused on other indicators, such as interest rates and the broader monetary aggregates, or even factors entirely outside monetary policy. To summarize, economists have tended to ignore the monetary base during the many periods when it was not a useful policy indicator, but they also ignored the base during those periods *when it was a useful a policy indicator*.

There's just one exception to the previous generalization, a situation where economists do tend to focus on the monetary base. Unfortunately, it is not one of those cases where the base is a useful policy indicator, just the opposite. During periods when interest rates fall to near zero, demand for base money soars dramatically higher. Central banks often respond with large open market purchases, which dramatically expand the size of the monetary base. Many people (both economists and noneconomists) regard these quantitative easing (QE) programs as representing an expansionary monetary policy. In most cases, QE does not result in policy being expansionary, even when the bond purchases are beneficial at the margin.

The QE programs observed in recent years are analogous to the hypothetical emerging markets financial crisis discussed earlier. Rather than representing an expansionary monetary policy, the liquidity injections associated with QE programs are generally an attempt to prevent policy from becoming excessively contractionary. Unfortunately, economists almost universally ignored the sharp slowdown in base growth in late 2007 and early 2008, when the base really was telling us something important about the stance of monetary policy; instead, they focused on rapid base growth during the various QE programs, when the monetary base is not a reliable indicator of the stance of policy.

To be clear, I am not suggesting that QE has no effect. Other things equal, a given increase in the monetary base represents a more expansionary policy than a counterfactual where the base is not increased. What I deny is that changes in the base can, in and of themselves, tell us whether monetary policy is easy or tight, or even whether it is becoming easier or tighter.

The broader monetary aggregates

We've seen that outside of the special case of QE programs, very few people use the monetary base as a policy indicator. In contrast, there is an important group of economists who do favor using the broader aggregates as an indicator of the stance of monetary policy. Milton Friedman and other monetarists argued that the most useful definition of money includes not just cash held by the public, but also money held in bank deposits. They argue that the stance of monetary policy is represented by changes in these broader monetary aggregates.

The M1 money supply definition traditionally included cash plus checking account balances, while the more expansive M2 definition included all of M1 plus time deposit balances as well. These definitions have become more complex with recent financial

innovation, but for our purposes, I'll refer to a generic monetary aggregate composed of cash plus all bank deposits.⁶

There are two advantages of using a broader aggregate when defining the money supply. First, the aggregates better reflect the definition of money as a medium of exchange and store of value. Checking account balances are especially easy to spend; today, one can also write checks on assets such as money market mutual funds. Thus, physical cash seems too narrow a definition of *money*.

More importantly, it is often the case that changes in the broader aggregates better correlate with economic trends than do changes in the monetary base. The most famous example occurred during the severe contraction of 1929–1933, a period when the monetary base actually increased sharply. The contractionary nature of monetary policy during the Great Depression was much more visible in the broader aggregates, which declined by roughly 30 percent over that four-year period.

Unfortunately, there are also periods when the base seems to be a better indicator than the broader aggregates. As already noted, growth in the monetary base fell close to zero between July 2007 and May 2008, pushing the economy into recession. A monetarist focusing on M2 might have missed that policy mistake, as the M2 money supply grew at an annual rate of 6.8 percent over that 10-month period.

Milton Friedman focused on the broader monetary aggregates rather than the monetary base. This was not for theoretical reasons, however; rather, he believed that M1 and M2 were more closely correlated with the macro variables that economists are interested in explaining, and perhaps controlling. But even if it is true that the broader monetary aggregates better correlate with inflation and the business cycle, it is not obvious why that makes the broader aggregates a useful indicator of the stance of monetary policy. Among the many variables that are only indirectly influenced by Fed policy, there are likely to be some superior policy indicators. Why should we view M2 as an indicator of monetary policy, and not some other variable that is even more closely correlated with inflation and the business cycle?

Recall the equation of exchange:

$$M*V = P*Y = NGDP$$

Economists are very interested in explaining changes in nominal spending (i.e., aggregate demand) a variable that influences both the price level and (in the short run) real output. Unfortunately, because velocity changes over time, the money supply (however defined) does not always provide a useful indicator of the stance of monetary policy.

6. Some (but not all) of the downside of using the monetary aggregates can be eliminated with a Divisia index of the money supply, which weights different types of money by their “moneyness.”

Back in 2003, Ben Bernanke noted that neither interest rates nor the money supply provides a useful indicator of the stance of monetary policy:

The imperfect reliability of money growth as an indicator of monetary policy is unfortunate, because we don't really have anything satisfactory to replace it. As emphasized by Friedman (in his eleventh proposition) and by Allan Meltzer, nominal interest rates are not good indicators of the stance of policy, as a high nominal interest rate can indicate either monetary tightness or ease, depending on the state of inflation expectations. Indeed, confusing low nominal interest rates with monetary ease was the source of major problems in the 1930s, and it has perhaps been a problem in Japan in recent years as well. The real short-term interest rate, another candidate measure of policy stance, is also imperfect, because it mixes monetary and real influences, such as the rate of productivity growth. In addition, the value of specific policy indicators can be affected by the nature of the operating regime employed by the central bank, as shown for example in empirical work of mine with Ilian Mihov.

The absence of a clear and straightforward measure of monetary ease or tightness is a major problem in practice. How can we know, for example, whether policy is "neutral" or excessively "activist"? . . .

Ultimately, it appears, one can check to see if an economy has a stable monetary background only by looking at macroeconomic indicators such as nominal GDP growth and inflation.⁷

That sounds a lot like the *outcomes* approach I've been advocating, which suggests that this book is not as far outside the mainstream as it might first appear. There are few economists more respected or more mainstream than Ben Bernanke.

Both the public and professional economists care a lot about inflation and NGDP growth. (The public isn't familiar with the term *NGDP*—but ask them about their dollar incomes and see if they care!) If inflation or NGDP growth is too high, then we can say that monetary policy is too expansionary. If these variables are below target, then policy is too contractionary. But is saying policy is too expansionary the same as saying that it is expansionary in an absolute sense? This is where I run into resistance.

One counterargument runs as follows: Saying that high inflation represents easy money implicitly makes it almost a *tautology* that high inflation is caused by easy money. That definition of easy money basically rules out any alternative causes of high inflation. So we need to be very careful when moving from definitions to notions of *causality*.

Here, it might be useful to return to the analogy of the captain steering a ship. Does it make sense to always blame the captain when a ship has gone off course? My answer would be, "Yes, if the ship captain had the ability to prevent the ship from going off

7. Ben S. Bernanke (remarks, Federal Reserve of Dallas Conference on the Legacy of Milton and Rose Friedman's *Free to Choose*, Dallas, October 24, 2003).

course.” Thus, I would not consider “wind and waves” to be a valid excuse for a large cruise ship being 200 miles off course, if the captain could have easily compensated for the wind and waves with an adjustment of the ship’s wheel. In that case, the ship’s path across the ocean really does represent the captain’s “steering policy.”

Alternatively, consider an old-fashioned sailing ship, buffeted by a Category 5 hurricane. The captain might have been unable to maintain the ship’s course despite his best effort. In that case, it would make no sense to blame the steering policy for the ship’s being off course.

The old sailing ship analogy might apply to two monetary situations. First, a central bank might be constrained by a fixed exchange rate where the price of the currency is pegged to gold, the dollar, or the euro. In that case, it might be unable to adjust policy sufficiently to hit its inflation target without breaking the exchange rate peg. Second, a central bank may have trouble increasing inflation if nominal interest rates are stuck at zero, even under a freely floating exchange rate. I will examine these issues in much more detail in later chapters.

It is true that any approach based on “outcomes” used to identify the stance of monetary policy implicitly assumes that policymakers are responsible for these outcomes. And that does make many people uncomfortable with using aggregates such as inflation or NGDP growth as policy indicators. Unfortunately, using the broader monetary aggregates does not solve this problem. They are also an outcome of “concrete” policy actions by the central bank, and it is equally unclear that the central bank can control the monetary aggregates.

Paul Krugman developed the modern framework for thinking about liquidity traps.⁸ Krugman showed that a large injection of reserves into the banking system might fail to significantly boost inflation when the economy is stuck at the zero lower bound for interest rates. This possibility is not because large increases in the “money supply” (i.e., the broader aggregates) would fail to boost inflation. Rather, Krugman showed that a large increase in bank reserves would not even boost the broad money supply if the base money injection were viewed as temporary. Instead, banks would just sit on the extra excess reserves and the money multiplier would fall as the monetary base increased. As a result, the broader aggregates would be largely unaffected.

In the years after Krugman wrote the paper, major central banks did inject large quantities of base money into their economies on a number of occasions, and in many cases, these injections had relatively little impact on inflation or the broader money supply. Instead, the extra base money was mostly held as excess reserves, just as Krugman predicted.

8. Paul R. Krugman, “It’s Baaack! Japan’s Slump and the Return of the Liquidity Trap,” *Brookings Papers on Economic Activity* 2 (1998): 137–87.

Later, I will offer a different interpretation of what is going on in a liquidity trap, which suggests that policy is not impotent. But Krugman is correct that in a world where central banks are incapable of increasing inflation and NGDP growth, they are equally likely to be incapable of increasing the M2 money supply. Thus, although people focused on concrete steps might have a valid concern that defining easy money as high inflation assumes away the important question of causality, defining easy money as rapid growth in M2 *does not solve that problem*.

In the next section I will offer a third approach to identifying the stance of monetary policy—the price of money approach. First, however, let’s summarize the problems with other definitions of monetary policy to see where we need to go next.

We have seen that traditional definitions of monetary policy focus on interest rates and the money supply. We’ve also seen that these various definitions are inconsistent. It is unclear how we should view the stance of monetary policy at a time when one definition points to money being easy, while the other suggests that it is tight.

If we try to choose a single policy indicator, then we inevitably run into problems. One set of indicators contains policy tools that are directly controlled by the central bank. This includes policy tools that affect the supply of base money (OMOs and discount loans) and policy tools that affect the demand for base money (reserve requirements and IOR). But no single policy tool is a reliable policy indicator. Interest rates are distorted by the Fisher effect, among many other factors, and the base is distorted by shifts in the demand for base money.

Other indicators of the stance of monetary policy, such as M2, might be slightly more reliable, but still suffer from the problem of shifts in money demand (or the velocity of circulation). Furthermore, the monetary aggregates are an outcome of policy, not directly controlled by the central bank. If we are going to use a policy outcome as a policy indicator, then why not use the outcomes that we really care about, say inflation or NGDP growth? But if we use one of those macro variables as an indicator of policy, then we are sweeping under the rug all the important questions about what monetary policy is capable of doing.

This is a very unsatisfactory state of affairs; thus, we need to find a third way, an approach to identifying the stance of monetary policy that is useful for policymakers who are struggling with the problem of achieving the proverbial “stable prices and maximum employment.”

The ultimate goal is to find a policy indicator that is as clearly controllable as the monetary base or short-term interest rates, and as closely linked to our policy goals as inflation or NGDP growth. The *price of money* approach discussed in the next section will provide the first step toward achieving that goal.

The Price of Money

A great deal of confusion has resulted from people erroneously viewing interest rates as the “price of money.” In the 1960s, for example, Milton Friedman correctly argued that an expansionary monetary policy was pushing up interest rates.⁹ Some prominent economists wondered how an increase in the supply of something (money in this case) could raise its price. But interest rates are not the price of money; the interest rate is the price of credit.¹⁰ Friedman was right—an increasing money supply was pushing inflation higher, and this raised interest rates via the Fisher effect.

Many people find this claim to be quite confusing, as it implies that the Fed’s purchase of bonds during the 1960s had the effect of reducing bond prices. The paradox can be resolved if we consider the fact that the reduction in bond demand caused by the higher inflation was even larger than the boost to bond demand from the Fed purchases.

The price of money can be defined in numerous ways. Because the nominal price of a dollar bill in itself is always one, we are interested in the price of money in relation to something else. This approach to the price of money can confuse people, as we are used to thinking of money as a unit of account, a measuring stick of value. We think of a gallon of gas costing \$4, not a dollar costing a quarter gallon of gas.

Throughout history, there are three common ways of defining the price of money. It can be defined in terms of a single commodity such as gold, or by a basket of goods making up an economic index, such as the consumer price index, or by the money used in another country. I will begin with the foreign exchange rate as a familiar way of illustrating this approach, but later we will see that the price of money in relation to goods will prove more useful.

Foreign exchange rates

Suppose you are living in a country such as Argentina, which has a history of financial crises and a highly unstable monetary policy. Where would you be most likely to first notice a change in monetary policy? Because of the Fisher effect, a highly expansionary policy might not result in low interest rates. You could look at money supply or inflation data, but government statistics in these countries are not always timely and reliable.

For residents of many developing countries, the exchange rate is the most reliable monetary policy indicator available in real time. If a new populist government is elected, the exchange rate might fall 20 percent in a day. Residents would understand that this is

9. Milton Friedman, “The Role of Monetary Policy,” *American Economic Review* 58, no. 1 (1968): 1–17.

10. Alternatively, the nominal interest rate is the *rental cost of money*, the opportunity cost of holding zero-interest money balances.

an indication that higher inflation is almost certainly on the way, even if stores haven't yet adjusted their prices.

To see the advantages and disadvantages of using the price of money as a monetary policy indicator, one can compare the foreign exchange rate with the monetary base. Recall the identity linking the nominal money supply, real money demand, and the price level:

$$P = Ms/md$$

Now consider an analogous identity involving the nominal exchange rate, the real exchange rate, and two different price levels:

$$P = e*Pf/E, \tag{1.3}$$

where P is the domestic price level, e is the real exchange rate, Pf is the foreign price level, and E is the exchange rate (domestic currency priced in foreign currency). Other things equal, a lower nominal price of the domestic currency implies a higher price level for goods and services.

Identities don't tell us anything about causation, however, unless we are willing to make some restrictive assumptions. The most famous case is the assumption of purchasing power parity (PPP), the assumption that arbitrage equalizes prices across international boundaries when priced in the same currency. If PPP holds, the real exchange rate (e) is always precisely 1. If PPP holds and if we also assume the foreign price level is held fixed, then the domestic price level moves inversely to the exchange rate. Thus, Argentine residents seeing a sudden 20 percent depreciation in their currency might expect the domestic price level to eventually rise by the same proportion.¹¹

In the real world, PPP does not always hold and the foreign price level might also change. Thus, the nominal exchange rate is a very imperfect measure of the stance of monetary policy, just as the money supply is an imperfect indicator. For instance, if all countries have an expansionary monetary policy and all countries experience high inflation, then you would not necessarily expect to see any specific currency depreciate in the foreign exchange market, even if PPP held true.

As with the money supply, the exchange rate is a more useful policy indicator in some situations than in others. Generally speaking, changes in the exchange rate provide more reliable information about the stance of monetary policy in highly inflationary economies, much less so in places like the United States, Europe, and Japan.

11. Which in this case would be a 25 percent increase.

Commodity prices

One can imagine a world without any foreign exchange rates—where all countries use the same currency. In that hypothetical world, exchange rates obviously could not be used as an indicator of the value of money. Fortunately, the price of money has many alternative definitions. The most common definition of the price of money is the inverse of the price of gold.

From 1879 to 1933, the value of a dollar was equal to 1/20.67 ounce of gold, which meant that the US dollar price of gold was \$20.67 per ounce. Between 1933 and 1934, the value of a dollar fell to 1/35 ounce of gold, where it remained until 1968. After we completely left the gold standard in March 1968, the price of gold moved around much like any other commodity. Some supply-side economists began using changes in the dollar price of gold as a monetary policy indicator. Soaring gold prices during the 1970s were viewed as an indicator of a highly expansionary monetary policy.

Unfortunately, gold prices can also move around for reasons unrelated to monetary policy. During the 2000s and early 2010s, the real value of gold again soared dramatically higher. Unlike during the 1970s, this rise was not an indication of a highly expansionary monetary policy. Rather, it reflected surging demand for gold in rapidly growing developing countries such as India and China. Inflation in the United States remained low.

Ideally, one might wish to use a price index for all goods, not just gold. However, the overall price level (whether consumer price index, personal consumption expenditures price index, or GDP deflator) is measured with a long lag, which means we don't know the current rate of inflation until several months later. Thus, some supply-side economists suggested looking at a broad index of actively traded commodity prices as a monetary policy indicator. This approach might provide a more reliable indicator of broad inflation trends than just gold prices, and yet commodities such as wheat, copper, and oil can be measured in real time in the same way as gold.

Unfortunately, even broad commodity price indices are highly unreliable, as the real (or relative) prices of commodities tend to be quite procyclical—rising sharply during economic booms and falling during recessions.

Thus, monetary policymakers face a dilemma. The timeliest indicators of the stance of policy—such as interest rates, the money supply, and the price of commodities or foreign exchange—are unreliable indicators of the stance of monetary policy. More reliable policy indicators, such as the price level and NGDP, are measured with a long delay, and thus do not provide a timely indicator of whether policy is off course. In chapter 5, I'll suggest a way of resolving this dilemma—we should identify the stance of monetary policy by looking at financial market forecasts of the goal variables.

A Monetary Babel

By early 2022, many pundits claimed that the Fed was “behind the curve.” But what exactly does that mean? It certainly sounds like a transportation metaphor. A bus driver might begin turning the steering wheel too late when approaching a sharp curve in the highway to the right. Although the driver eventually turns the steering wheel somewhat to the right, it is not soon enough. The bus ends up in ditch on the left side of the road. Fed critics were suggesting that the Fed is tightening policy too late, and hence that policy was too expansionary.

The bus driver analogy nicely illustrates one of the problems with defining what we mean by monetary policy. Does monetary policy consist of movements in the central bank’s policy instrument (its “steering wheel”), or is it the path of the economy? But the bus driver analogy doesn’t even come close to identifying all the problems with defining monetary policy. What if the bus had five different steering mechanisms, and drivers could not agree on which one actually controlled the path of the bus? What if they could not agree on which road they wished to travel along? What if they could not agree on whether the steering mechanism was effective or ineffective?

There is no theory-free way of approaching the topic of monetary policy. I favor an outcomes-based approach to defining the stance of monetary policy, but that only works if the central bank is capable of achieving various alternative outcomes. If monetary policy is ineffective, then there is no sense in defining a declining NGDP as “tight money.” In that case, we are left with nothing but “concrete steps.”

In the chapter 2, we’ll consider the first five years of the Great Depression, which provide an almost perfect illustration of many of the issues raised in this chapter. There were two “buses,” that is, two ways of thinking about the monetary system—the international gold approach and the domestic money approach. Each bus had multiple steering mechanisms, including various interest rates, various definitions of the money supply, the price of gold, and the central bank’s gold reserve ratio, among others. There were multiple possible “roads” for the bus to travel, including a stable price level, a stable NGDP, and a stable price of gold. There was a vigorous debate as to whether the bus driver could control the path of the bus, that is, could achieve a desired macroeconomic outcome. But first let’s try to sum up the message of this chapter.

The Essence of Monetary Policy

So far, we’ve looked at a bunch of monetary policy tools, which can affect the supply and demand for base money. In the short run, these tools affect some intermediate variables that many economists view as being especially important, such as the broader money aggregates, short- and long-term interest rates, or the price of foreign exchange. Ultimately, the monetary policy process affects macroeconomic variables that policymakers (and the public) care the most about, including inflation, unemployment, and national income. But what is the essence of monetary policy? What’s actually driving the process?

No one knows *how* monetary policy works. I have my own views, but first I'd like to discuss what's wrong with the traditional debate over the monetary policy transmission mechanism. It is a debate that seems sterile to me, entirely devoid of practical application. And pragmatists like me believe that if a debate has no practical implications, then it has no important theoretical implications.

To illustrate the puzzling nature of the so-called transmission mechanism, I'd like to image a thought experiment where the central bank of Canada suddenly boosts the monetary base by 10 percent using open market purchases of securities. Let's suppose that this policy action has the following impacts:

1. Canadian M2 money supply rises by 8 percent.
2. Canadian short-term interest rates fall by 0.5 percent (50 basis points).
3. The Canadian dollar depreciates by 12 percent.

Also assume that this action causes Canadian inflation to rise and that the unemployment rate declines for several years. Don't worry about whether the specific numbers are plausible; I'd like to focus on the transmission mechanism of the monetary policy.

A monetarist economist might argue that although the monetary action affects many variables, the essence of the policy is that the M2 money supply increases. As the public spends their excess cash balances, aggregate demand rises. This boosts inflation and employment in Canada. Other variables such as interest rates and exchange rates are also affected by policy, but the essence of the monetary policy is the change in the money supply.

A Keynesian economist might argue that although the monetary action affects many variables, the essence of the expansionary policy is that the interest rate decreases. This decrease leads to more investment and more purchases of consumer durables, which boosts inflation and employment in Canada. Other variables such as the money supply and exchange rates are also affected, but the essence of the monetary policy is the change in the interest rate.

A Mundellian economist using the price of money approach might argue that although the monetary action affects many variables, the essence of the expansionary policy is that the exchange rate depreciates. That leads to more exports and fewer purchases of imported goods, which boost aggregate demand. Prices also rise because of the effect of PPP. Other variables such as the money supply and interest rates are also affected, but the essence of the monetary policy is the change in the exchange rate.

But what is actually at stake in the debate over the "essence" of monetary policy? I'm not sure. In many people's minds, however, this question seems to be somehow linked with the question of what policy instrument is best. In fact, just because a certain variable is the optimal policy instrument doesn't mean that same variable plays an important role in the transmission of monetary policy to the broader economy.

To see why the transmission mechanism doesn't tell us much about the best policy instrument, imagine a world where the optimal policy instrument is something like five-year Treasury Inflation-Protected Securities (TIPS) spreads, which is roughly the bond market forecast of inflation over the next five years. Suppose economists decide that the optimal policy is to use the Fed's various policy tools to stabilize the five-year TIPS spread, at 2 percent inflation. Clearly, that decision would not imply that economists believed the TIPS spread is what *caused* monetary policy to affect the economy. After all, the TIPS market did not even exist before 1997, and yet monetary policy was obviously affecting the economy before 1997. One can imagine a world without any exchange rates (i.e., with a global currency). One can even imagine a world with no interest rates, as in a primitive economy with just cash and goods).

At various times in history, central banks have targeted the money supply, interest rates, and exchange rates. But that fact doesn't tell us anything about the transmission mechanism by which monetary policy affects macroeconomic variables. Nor does the fact that a central bank targets a particular variable necessarily imply that that variable is a useful policy *indicator*.

I suspect that many people link the concepts of policy instrument and policy indicator, but even that association is dubious. Some monetarists favor using interest rates as an instrument of monetary policy, while using a broader aggregate like M2 or M3 as an indicator of the stance of monetary policy. Rapid growth in the money supply would be an indicator that policy is too expansionary, and would call for the central bank to raise its interest rate target (instrument).

So let's say that monetary policy is a sort of black box, where policy tools affect the broader economy according to a poorly understood transmission mechanism. Policy tools are adjusted, a wide variety of intermediate targets are affected, and over the next few months and years we see changes in the macroeconomy. In that case, debates over the "essence" of monetary policy are sterile. We don't know if easy money is expansionary because it raises the money supply or because it lowers interest rates or because it depreciates the exchange rate. In that case, what is the question we should be focusing on? What question has practical implications?

Here are the important questions:

1. Which policy instrument is optimal?
2. Which policy indicator is optimal?

I've already suggested that these two questions do not necessarily have the same answer. Nonetheless, in the end, I will argue that they do in fact have roughly the same answer, at least under a fiat money system. The optimal policy instrument or indicator is not the money supply, the interest rate, or the exchange rate. Instead, the optimal instrument or indicator is some sort of financial asset price that is closely linked to the macroeconomic goal variables. Thus, if the goal is 4 percent NGDP growth, then the optimal instrument is the price of NGDP futures contracts, and the optimal policy indicator is also the price of

NGDP futures contracts (and also the central bank's net short or long position on those contracts).

The basic problem with using the money supply, the interest rate, or the exchange rate as a policy instrument is that the equilibrium value of those variables changes in a way that is hard to estimate (in real time). When the real demand for money changes, a money supply indicator will fail. When the equilibrium interest rate changes, an interest rate policy indicator will fail. When the equilibrium exchange rate changes, an exchange rate policy indicator will fail. The only reliable policy indicator is a financial asset that is closely linked to the goals of monetary policy, such as NGDP futures.

In the next chapter, we will look at a wide variety of policy instruments and indicators during the 1929–1934 period, including the monetary base, the broader monetary aggregates, gold reserve ratios, the interest rate, the wholesale price index, and the price of gold and foreign exchange. One goal is to show a few situations where my proposed optimal policy instrument-indicator approach *might not work*. I don't want readers to think, "Of course, how could it be otherwise?" I might be wrong about monetary policy indicators, and thus I'd like you to see a case where I would be wrong. My hope is that this will give you a better reason to accept my argument (in chapter 5) that NGDP futures targeting would be best for the 21st-century economy.

A second goal is to make your thinking about monetary policy more flexible. I'd like to convince you that monetary policy shocks that look invisible according to one policy indicator might look very important using another indicator. I'd also like to convince you that the price of money approach has one very important advantage over both the quantity of money approach (M2) and the interest rate approach. And finally, I'd like to give you a better understanding of the role of the *medium of account* by looking at an economy with two media of account, gold and cash. Think of the next chapter as intellectual stretching exercises, before delving into the problem of controlling monetary policy in a pure fiat money regime.

Chapter 2: The Strange World of Interwar Monetary Policy

The opening chapter looked at monetary policy from a conceptual perspective. Now, let's make these ideas more concrete by looking at a case study of monetary policy in the early 1930s. This period is almost ideal for several reasons.

To begin with, during the early 1930s, the United States had a dual media of account system, gold and government currency. The US dollar was defined as 1/20.67 ounce of gold, but it was also a dollar bill. The government maintained a fixed exchange rate between these two media of account until April 1933. My hope is that seeing a regime with two media of account will make it easier to understand the role of a medium of account.

Policy was not unconstrained in the 1930s. The Federal Reserve's ability to maintain macroeconomic equilibrium was constrained somewhat by the international gold standard. My hope is that seeing a regime where policy was somewhat constrained will make it easier to see why policy in a fiat money regime is effectively unconstrained.

All three approaches to monetary policy—the quantity of money (M), the interest rate (i), and price of money (E)—were used in very important ways between 1929 and 1934. My hope is that seeing a wide variety of policy instruments will make it easier to get past the illusion that monetary policy always is and must be about interest rates.

Monetary shocks during the 1929–1934 period look very different when viewed from the perspective of the three major approaches to policy. Indeed, even within the broad concept of the money supply, policy looked extremely expansionary using one definition of money and extremely contractionary using another. My hope is that observing how different indicators were giving a radically different reading of the stance of monetary policy will make it easier to see why many of the widely used policy indicators are unreliable.

I spent much of my professional life studying monetary policy during the 1930s, and thus can draw on a wide variety of evidence to illustrate the concepts discussed in chapter 1. My hope is that you will find these examples to be as interesting and enlightening as I did.

A Gold Exchange Standard

A pure gold standard has a single medium of account—a fixed weight of gold. Thus, a dollar might be defined as one gram of gold, while a British pound might be defined as

five grams of gold. In that case, the exchange rate would be £1 = \$5. Under that sort of simple regime, there is no “monetary policy” beyond the definition of the unit of account for each country. Private banks could issue currency notes that can be redeemed in gold. These currency notes are credit, much like a bond.

In a pure fiat money system, in contrast, the medium of account might be a dollar bill (or a dollar of bank reserves deposited at the central bank). Monetary policy consists of a set of actions taken by the monetary authority that affect the supply or demand for base money (cash + reserves). I discussed those policy tools in the previous chapter.

The gold exchange standard of the late 1920s and early 1930s was an intermediate case. Both gold and dollar bills served as media of account. In that dual media of account system, a 1 percent rise in the purchasing power of gold was identical to a 1 percent rise in the purchasing power of a dollar bill. In either case, there would be a 1 percent fall in the price of goods and services.¹ Because the nominal price of gold was fixed at \$20.67 an ounce, the two media of account moved in tandem, like conjoined twins. Price inflation in terms of money meant price inflation in terms of gold, and vice versa.

This fact raises an interesting puzzle. How does monetary policy work under a gold exchange standard? How can we explain the fact that Fed policy always affected the purchasing power of gold and currency in exactly the same way? At first glance, it seems like the value of a US currency note should in some sense be determined by domestic factors in the United States, whereas the value of gold should be determined by global factors. And yet under a gold exchange standard, one US dollar bill always had exactly the same value (purchasing power) as 1/20.67ounce of gold. How is that possible?

To keep things simple, let’s first consider a single country in isolation. Or if you prefer, consider the following as a model of the global economy circa 1929, or at least those countries on the gold standard. Recall the identity linking the price level with the nominal quantity of money and the real demand for money:

$$P = Ms/md \tag{2.1}$$

The same identity applies to the ratio of the nominal and real stock of gold:

$$P = Gs/gd \tag{2.2}$$

As a matter of accounting, any change in the price level is due to some combination of a change in the nominal quantity of the medium of account, and the real demand for the medium of account.

If we think of the medium of account as gold, then the Great Deflation of 1929–1933 was mostly caused by an increase in real gold demand. The physical stock of gold did not decline. If we define money as America’s M2 money supply, then the deflation (in the

1. Here, I am defining *percentage changes* as first difference of logs.

United States) was mostly caused by a large reduction in the nominal supply of money. There was little change in the real demand for (M2) money.

Was this deflation caused by a contractionary monetary policy? I'll try to show that the answer is yes, with some qualifications. But this is a tricky issue with other plausible interpretations.

In the previous chapter, I pointed out that monetary policy can affect both the supply of and the demand for the medium of account (assumed to be the monetary base in a fiat money regime). But how does monetary policy work under a gold standard? How does it affect the value (purchasing power) of gold?

As a first approximation, central banks have virtually no control over the global supply of gold, which tends to increase at 2 percent or 3 percent per year. Thus, if monetary policy affects the global price level, *and it does*, it does so by affecting the real demand for gold. Keep in mind that by 1929, a large share of all the gold that had been mined throughout human history was held by just a few major central banks, so this claim is not at all implausible.

In an accounting sense, the Great Deflation of 1929–1933 was caused by central banks (and the public) hoarding too much gold. Alternatively, one could argue that the Great Deflation of 1929–1933 was caused by central banks' allowing the global M2 money supply to fall sharply. But these accounting relationships are only the beginning of the analysis. We need to look at what central bank tools were available during the gold exchange standard, how those tools were employed, and what other policy approaches would have been superior.

Money and Interest Rates during 1929/30

In the year before the Great Depression, the Fed repeatedly raised interest rates on discount loans, to a peak level of 6 percent in September 1929. That was not done because the economy was wildly overheating; the price level actually fell slightly during the 1927–1929 economic expansion. Nominal GNP grew rapidly, however, so somewhat higher interest rates were appropriate. In retrospect, the Fed went too far, and the economy tipped into a severe recession in the fall of 1929.

When the stock market crashed in September and October 1929, the Fed began cutting rates. Unfortunately, the equilibrium interest rate fell even faster, and thus monetary policy became progressively more contractionary during 1930, despite lower nominal rates. Here are some economic data from the period from October 1929 to October 1930:

- US discount rate: declined from 6.0 percent to 2.5 percent
- US monetary base: declined by 7.2 percent
- US M2 money supply: declined by 4.6 percent
- US nominal GNP: declined by roughly 17.6 percent

- US real GNP: declined by roughly 13.0 percent
- US GNP deflator: declined by roughly 5.2 percent

The first year of the Great Depression was an almost perfect example of a garden-variety demand-side recession. Indeed, the data during the severe slump of 1920/21 had been fairly similar, except the declines in money, prices, and output were even steeper in 1920/21 than in 1929/30. Interest rates also fell sharply in 1920/21. Mercifully, the 1920/21 depression was quite short, and was followed by a quick recovery. In contrast, the severe 1929/30 recession was followed by a much deeper slump in 1930–1933. But for the first year of the Great Depression, the contraction looked like a milder version of 1920/21.²

After October 1930, things became much more complicated, as a series of banking panics led to currency hoarding, which reduced the money multiplier. It became much harder to read the stance of monetary policy, and much harder to figure out what the Fed could have done differently. But the first year of the Great Depression was basically a very simple monetarist story—tight money led to falling prices and falling output. Milton Friedman and Anna J. Schwartz covered this episode quite effectively in their *Monetary History*.³

Gold Supply and Demand during 1929/30

Critics of the Friedman and Schwartz account of the Depression focus on the fact that they looked at the United States in isolation, largely ignoring the role of the international gold standard. In the standard model of an international gold standard, individual countries have little or no control over monetary conditions. Interest rates, the money supply, and the price level are all endogenous, determined by changes in the global supply and demand for gold.

It's true that Friedman and Schwartz paid too little attention to the role of the international gold standard. But that does not mean their account of the role of Federal Reserve policy in the Great Depression was wrong, just incomplete. As we will see, a tight money policy at the Fed did help trigger the Great Depression, but the Fed was not the only culprit.

2. There's another important similarity between these two downturns; both appear to have been caused by tight money policies at the Federal Reserve. In 1920, the Fed had jacked up interest rates to 7 percent with the goal of stopping rapid post-World War I inflation. The policy was so effective that it led to the most severe deflation in US history. Between October 1920 and October 1921, the monetary base was reduced by an astounding 14.6 percent, even as the Fed cut rates from 7.0 percent to 4.5 percent. The GDP deflator fell by nearly 20 percent.

3. Milton Friedman and Anna J. Schwartz, *A Monetary History of the United States, 1867–1960* (Princeton, NJ: Princeton University Press, 1963).

So what does monetary policy look like in an international gold standard model, where changes in the global price level are determined by changes in the global supply and demand for gold? If we assume that central banks do not operate gold mines, then it seems clear that if central banks have any influence on the value of gold (and thus the price level of goods and services), it must be by affecting the real demand for gold. Indeed, in a gold-standard model with completely open capital markets and goods prices equalized via international trade, the only policy lever for a central bank is to affect the global real demand for gold. An increase in gold demand raises the purchasing power of gold, which is deflationary.

Conversely, a central bank's only way to boost prices is to reduce the global demand for gold (which reduces its purchasing power). That means that the international gold standard featured an important asymmetry, with highly contractionary monetary policies being less constrained than highly expansionary policies. The demand for gold cannot be reduced below zero, and hence a single central bank can only do so much to stimulate its economy during a depression. If it runs out of monetary gold, then it would be forced to leave the gold standard. In contrast, a central bank can always reduce the price level by increasing its real demand for monetary gold. The only limiting factor was the ability of its fiscal authorities to accumulate additional gold.

Readers familiar with fixed exchange rate regimes such as Bretton Woods or the (pre-euro) European Monetary System might recognize this asymmetry. Countries trying to stimulate their economies during a recession (such as Britain) occasionally ran low on international reserves, which put them under great pressure to devalue their currencies. Countries adopting a contractionary policy to control inflation (such as Germany) merely accumulated additional international reserves.

Models of the gold standard and other fixed exchange rate regimes often distinguish between "large" and "small" countries. A small country is assumed to be unable to affect global macroeconomic conditions, and hence its policy indicators (interest rates and the money supply) are assumed to be endogenous. In that case, it is unable to control its price level, which entirely reflects changes in the global purchasing power of gold.

Canada has a well-functioning banking system and is often cited as an example of a country dragged into the Great Depression through no fault of its own, as gold hoarding in other countries pushed the Canadian price level much lower during the early 1930s. Canada had to reduce its monetary base to stay on the gold standard at a lower price level. The falling Canadian monetary base might look like a discretionary (tight) monetary policy, but it merely reflected a lower Canadian demand for base money at a lower global price level. Today, some economists wrongly claim that money is "endogenous" under our current fiat money system. Not so. But it really was endogenous for small countries under the international gold standard.

Of course, the United States is not a small country. Monetarists such as Friedman and Schwartz argued that the United States was large enough to effectively control its monetary conditions, and hence a closed economy model was appropriate. The US government's monetary gold stock in 1929 was roughly 40 percent of the total world

monetary gold stock, and thus it could print more money without worrying too much about an outflow of gold.

In my 2015 book on the role of gold in the Great Depression, I tried to come up with some hard data to address this debate.⁴ In my view, the small country–large country framing of the debate is a bit misleading, or at least incomplete. Economic historians need to first determine the role of central banks considered as a whole. How much of the Great Depression was caused by contractionary monetary policies of the major central banks *viewed as a group*? Once that is determined, we can try to estimate the contribution of each central bank to that global policy stance. Even relatively small countries like Belgium occasionally had a nontrivial impact.

After collecting data, one fact quickly became clear: global monetary policy suddenly became extremely contractionary after October 1929. The real demand for monetary gold soared dramatically higher between October 1929 and October 1930. The increase in real gold demand was a function of two factors: the change in the nominal stock of gold and the change in the global price level. We have good data on the nominal supply of monetary gold; it rose by 5.25 percent between October 1929 and October 1930.

The real demand for gold is harder to estimate, as it also depends on the change in the global price level. In my book, I estimate a 9.32 percent decline in the global price level in the 12 months after October 1929. But that probably overstates the decline, as it relied heavily on volatile wholesale price indices, which fall much faster than consumer prices during depressions. Most likely, the decline in the global price level was closer to the 5.2 percent decline in the US GDP deflator. Indeed, although the Great Depression was quite severe in most developed economies, it was especially bad in the United States.

If we add the 5.25 percent increase in the world's nominal gold stock to a roughly 5.0 percent decline in the global price level, then the real demand for monetary gold among all the major central banks rose by about 10.25 percent. But why would central banks choose to hold much larger real gold balances during 1929/30? Why hoard so much gold?

Gold reserves were held to back government-issued base money, such as currency notes that could be redeemed for gold. Under the so-called rules of the game, it was expected that central banks would hold a fairly stable fraction of gold reserves to base money. If gold flowed into the country, central banks were supposed to increase the money supply, and vice versa.

Although central banks did not rigidly follow the rules of the game, the gold reserve ratio provides a useful metric to think about the causes of changes in monetary policy. Did the world's central banks hold much larger real gold stocks because they needed to back

4. Scott Sumner, *The Midas Paradox: Financial Markets, Government Policy Shocks, and the Great Depression* (Oakland, CA: Independent Institute, 2015).

much larger money stocks, or because they chose to sharply increase their gold reserve ratios? Only the latter would clearly represent a *discretionary* policy decision.

When I ran the numbers, I was shocked by the results. Here are the 12-month percentage changes in the global nominal gold stock, the global monetary base, and the global gold reserve ratio (gold stocks divided by the base):

- Global gold stocks: increased by 5.25 percent
- Global monetary base: decreased by 4.37 percent
- Global reserve ratio: increased by 9.62 percent

Recall that the global price level probably declined by roughly 5.0 percent. If we use that estimate, then the global real stock of gold increased by 10.25 percent (5.25 percent + 5.0 percent). And that increase was almost entirely due to the world's central banks' increasing their gold reserve ratio by 9.62 percent. Only the remaining 0.63 percent (5.0 percent – 4.37 percent) represented the increase in the public's real demand for base money.

It is hard to overstate the startling nature of this dramatic change in the gold reserve ratio. Without looking at the numbers, I might have assumed that the Great Depression was triggered by a rush for liquidity, perhaps due to problems in the banking system. If the public hoarded lots of currency, then central banks might have demanded larger real gold reserves to back that extra currency demand.

But that's not at all what happened, at least during the first year of the Depression. Between October 1929 and October 1930, there was no surge in the real demand for base money. Holdings of currency and bank reserves fell at roughly the same rate as the price level. Instead, the world's central banks violated the rules of the game and sharply increased their gold reserve ratios, boosting total real gold demand and triggering a severe deflation.

Under an international gold standard, financial instability could easily lead to a rush for liquidity. If central banks lacked adequate gold reserves to fully meet that demand, the world economy might end up in depression. That's what I would have expected when I ran the numbers. That's the impression given by the history books. But that's not actually what happened in 1929/30; rather, the world's central banks made a *discretionary* decision to hoard huge quantities of gold, boosting the purchasing power of a given weight of gold, and thus sharply depressing the global price level. *Central banks drove the world into depression.*

In my 2015 study, I found that it was possible to partition “blame” by looking at how much of the 9.62 percent increase in the global gold reserve ratio was explained by central bank policies in each country. I found that nearly half the 9.62 percent global increase was caused by Fed policies (4.69 percent), over one-fourth by Bank of France policies (2.49 percent), and over one-eighth by Bank of England policies (1.38 percent). Barely a tenth of the damage was caused by rising gold reserves ratios in all other countries combined (1.06 percent).

These policy changes had a variety of motivations. The Fed tightened policy to pop what it viewed as a dangerous stock market bubble. France accumulated gold to rebuild stocks depleted during and after World War I. The British accumulated gold to make up for a previous outflow caused by an attempt to stimulate their economy after returning to the gold standard in 1925.

Recall that smaller countries can only stimulate their economies by reducing their demand for gold. By late 1929, British gold levels were viewed as having fallen to dangerously low levels because of previous expansionary policies. This view led the British to begin rebuilding their monetary gold stocks. The policy actions of these three central banks—Bank of England, Bank of France, and the Federal Reserve—done for three different reasons, created a sort of perfect storm that drove the global economy into a severe recession.

Eventually, the Great Depression became so severe that banking problems did develop, especially in countries where counterproductive government regulation made the banking system highly fragile, such as the United States. Now the explanation in the history books begins to be more accurate. As an aside, less heavily regulated Canada suffered no significant banking problems during the Great Depression, or during the 1980s' savings and loan crisis, or during the 2008 banking crisis—notice a pattern?

In the next section, we'll look at how financial instability further boosted the demand for gold, and we'll see how much more difficult it becomes to allocate blame for harmful monetary policies. To what extent was the continued economic decline of 1930–1933 attributable to explicit tight money policies, to what extent was it attributable to central bank errors of omission, and to what extent was the Depression attributable to forces completely beyond the control of central banks?

But first, let's summarize the role of monetary policy at the onset of the Great Depression. We'll look at three competing measures of the stance of monetary policy: interest rates, the money supply, and the global gold reserve ratio. How well did each of these indicators do in measuring the stance of monetary policy during 1929/30?

Interest rates were by far the worst monetary policy indicator. Rising interest rates during 1928/29 did not appreciably slow the economy, at least until the final increase in September 1929. And the dramatic decline in the Fed's discount rate did absolutely nothing to ease monetary policy during 1929/30, as the equilibrium interest rate was declining much more rapidly. Prices, the money supply, and nominal gross domestic product (NGDP) all fell rapidly.⁵

Of course, a fall in prices and NGDP represents the *outcome* of monetary policy. As we saw in the previous chapter, this is a controversial way of ascertaining the stance of

⁵ Data in this chapter are for GNP, which in the US is quite similar to GDP. The estimates are from Balke and Gordon. <https://www.nber.org/system/files/chapters/c10036/c10036.pdf>

policy. But the Fed's interest rate cuts did not just fail to boost variables that might be beyond its control, the rate cuts even failed to improve variables that the central bank *clearly can control*, such as the gold reserve ratio. The US gold reserve ratio grew at a double-digit rate during 1929/30, indicative of extremely tight money in the United States. Monetary policy was not just tight in terms of policy outcomes; it was tight in terms of the one clearly *exogenous* measure of each individual country's policy effort under a gold standard regime.

The monetary base and broader measures like the M2 money supply did somewhat better as a policy indicator at the onset of the Depression, declining significantly during 1929/30 (both in the United States and globally). But as we've seen, the money supply of each country is at least partly endogenous under an international gold standard; thus for a given central bank, the control over that variable is not unlimited. For smaller economies such as Canada, the monetary base had to be reduced to stay on the international gold standard. The declining Canadian monetary base didn't reflect any specific discretionary action taken by the Canadian government; it was an endogenous response to a falling global price level.

Under a gold standard, the gold reserve ratio was one policy indicator that was clearly under the control of each central bank. The large increase in the global gold reserve ratio during 1929/30 was an indication that the world's central banks, considered as a whole, had adopted a highly contractionary monetary policy, at least relative to the so-called rules of the game (which implied a stable gold reserve ratio). And unlike with the monetary base, looking at the gold reserve ratio allows us to estimate the contribution of each central bank to the global stance of monetary policy. There's a reason why economic historians criticize the Fed and the Bank of France much more heavily than the central banks of other gold-standard countries.

If this were a horse race between the three monetary policy indicators, then the gold reserve ratio would edge out the money supply by a few lengths, with the interest rate being like an old plow horse lagging 50 lengths behind. But after October 1930, things began to look somewhat different.

The Secondary Deflation of 1930–1933

Whereas the first year of the Great Depression was a garden-variety demand shock caused by tight money at the major central banks, the next several years saw a much more complicated picture. Falling aggregate demand continued to be the number one problem, but the causes were considerably more complex. A series of banking crises began in November 1930 and gradually worsened over the next two and a half years. This led to significant hoarding of base money (especially currency notes, but also bank reserves). Fears of currency devaluation also led to the hoarding of gold. As we have seen, both types of hoarding are deflationary.

Here's one way to think of the problems that occurred during the second phase of the Great Depression, sometimes termed a *secondary deflation*. Unlike the relatively simple

situation of 1929/30 when a discretionary decision by the major central banks boosted gold demand by raising gold reserve ratios, the secondary deflation was caused by a much wider variety of factors:

- Gold ratios continued to rise in some countries, particularly France and other members of the “gold bloc.”⁶ This was clearly tight money.
- Private gold hoarding increased, which partly offset the boost in the flow of newly mined gold triggered by the rise in gold’s relative price. Recall that the nominal price of gold is fixed under the gold standard, even as other prices and wages fell sharply. So a monetary deflation should cause more gold output, and it did. But the stabilizing effects of this extra gold were outweighed by increased gold hoarding.
- Currency hoarding (and hoarding of bank reserves) increased sharply, as panicky depositors feared bank failures, especially in the United States. Banks responded by holding more reserves, in order to have money on hand if there was a run on their bank.

All of these changes had a single ultimate cause—panic. But “panic” doesn’t come out of nowhere; several factors caused the demand for currency and gold to increase sharply during 1930–1933, notably increased bank failures and fear of currency devaluation.

After October 1930, the United States was hit by a series of increasingly severe banking crises, culminating in the severe panic of March 1933, which led to a temporary shutdown of the entire US banking industry (called a *bank holiday*). A financial crisis also hit Germany in 1931. In September 1931, Britain left the gold standard and sharply devalued the pound. Countries that had held British sterling assets as a supplement to their monetary gold stocks, especially France, lost faith in paper assets and began to accumulate more gold reserves. Individuals in other gold-standard countries, including the United States, began to fear currency devaluation. That fear led to increased private hoarding of gold. Thus, individuals, commercial banks, and even central banks were all trying to hold more liquidity, that is, more currency and more gold, in fear of bank failures and currency devaluation.

Let’s step back from this messy picture, which is even more complicated than what I’ve outlined here, and focus on the central macroeconomic problem that triggered all these various financial crises—falling NGDP. First, we’ll look at how the Great Depression fed on itself, as falling nominal incomes led to gold and currency hoarding, which caused nominal incomes to fall even more sharply. Then, we’ll see why the gold exchange standard of 1929–1933 was especially susceptible to this problem.

6. The most important members of the gold bloc were France, Belgium, the Netherlands, and Switzerland. Italy was also a member. Britain devalued in 1931 and Germany instituted capital controls.

Many contracts in both the labor market and the financial markets are written in nominal terms (both then and today). If NGDP falls sharply, individuals, companies, and even governments have too little income to pay wages and service nominal debts, at the price contracted before the deflationary shock. This situation leads to mass unemployment (recession) and financial crisis. In that environment, people will hoard the safest assets, currency and gold. But since currency and gold represent the dual media of account, this hoarding is deflationary—driving NGDP even lower. The system seems inherently unstable.

You might argue that the previous analysis explains too much. We've had only one Great Depression, and the next biggest recessions (1893, 1921, 1982, 2008, etc.) were all far milder. If the system is inherently unstable, why aren't capitalist economies hit by frequent Great Depressions? It turns out that both the pre-World War I international gold standard and post-World War II fiat money regimes had stabilizing properties that the mixed interwar system lacked.

Under the so-called classical gold standard, the long-run price level tended to reflect the cost of mining gold. If prices and NGDP fell during a recession, the public might rationally expect prices to later recover to a more "normal" level, or at least not fall much further. Alternatively, under a fiat money regime, governments tend to meet surges in the demand for currency and bank reserves in a crisis by issuing more base money, a policy now known as quantitative easing (QE). Again, this limits the amount of deflation.

The interwar system represented the worst of both worlds. After World War I, central banks made some effort to prevent prices from immediately falling back to prewar levels. Thus, the price level during the 1920s was held artificially high, relative to the underlying cost of gold production. In this environment, a sharp fall in the price level and NGDP would not necessarily lead to expectations of a rebound to more normal levels, because the price level during the 1920s was still far above normal.

The purchasing power of gold had been artificially depressed as a result of gold dishoarding by European powers during World War I, which pushed the global price level much higher. This was a fragile transitory system where the major central banks did just enough to prevent the system from working automatically (as under a pure gold standard), but not enough to rescue the economy when gold and currency hoarding soared during periods of financial turmoil.

In my 2015 book, I used a foreign policy analogy.⁷ The US intervention into European affairs in 1917 was sufficient to ensure that the Allied powers won World War I, but not permanent enough to ensure a subsequent peace, as Europe's strongest power lost the war. The Fed's activism was enough to stabilize prices during the 1920s, but not

7. Sumner, *The Midas Paradox*.

persistent enough to prevent deflation in the early 1930s, as gold was undervalued after World War I.

In the realm of foreign policy, there were sharp disagreements about whether the United States should remain involved in European affairs after World War I. In the field of monetary policy, there were sharp disagreements as to whether the Fed should continue trying to stabilize the economy after World War I. In both cases, policy seesawed between intervention and passivity. When the intervention ended, the fragile regimes that had been built on intervention fell apart.

Money and Interest Rates during 1930–1932

Unlike during the first year of the Great Depression, during 1930–1933, the monetary base and the broader M2 money supply began giving radically different readings on the stance of monetary policy. Between October 1930 and March 1933, the monetary base actually *rose* by 23.4 percent. During this same 29-month period, the M2 money supply *declined* by 25.1 percent. Looking at the monetary base gives the impression that policy was highly expansionary, whereas the M2 money supply suggests a highly contractionary policy stance.

Given that the price level (GNP deflator) fell by 22 percent between October 1930 and March 1933, and NGNP fell even more sharply, it is easy to understand why monetarists like Friedman and Schwartz argued that M2 was a much better indicator of the stance of monetary policy than the monetary base. During banking panics, the demand for base money (especially currency) rises dramatically, especially if there is no deposit insurance. That reduces the so-called money multiplier (often defined as the ratio of M2 to monetary base $[M2/MB]$).

Friedman looked at the sharp fall in the M2 money supply and argued that the Fed caused the Great Depression. Paul Krugman looked at the rising monetary base and suggested that Friedman had misled the public.⁸ In Krugman's view, the most one could say is that the Fed had failed to prevent the Depression, and it wasn't even clear that this was possible because of the zero-bound problem with interest rates (which we'll consider in the next chapter). Other economists argued that it was the constraints of the international gold standard that prevented the Fed from adopting the sort of monetary stimulus that would have prevented the Great Depression.

My own view is that Friedman's claim was defensible; I suspect the Fed could have prevented the Depression without the United States leaving the gold standard. Then again, the various policy counterfactuals are so complex and uncertain that we'll never

8. See Paul R. Krugman, "Who Was Milton Friedman?," *New York Review of Books*, February 15, 2007.

know for sure. Thus, I'll set aside this issue until we've taken a deeper look at policy during the early 1930s.

Interest rates during 1930–1933 were higher than what one might have expected given the severity of the Depression. The Fed cut rates from 2.5 percent in October 1930 to 1.5 percent in the summer of 1931. Then the Fed raised its discount rate to 2.5 percent in October 1931, and then 3.5 percent a week later. The discount rate fluctuated between 2.5 percent and 3.5 percent until the spring of 1933, although T-bill yields peaked at 2.5 percent and fell close to zero in late 1932. When viewed from a Keynesian (interest rate) perspective, the 200 basis point rise in the discount rate looked inappropriately tight, especially when viewed against the backdrop of the severe deflation occurring during this period.

Between October 1930 and December 1932, the world's gold reserve ratio continued to rise, increasing by another 4.25 percent. This increase put further downward pressure on the world price level and NGDP. But the biggest problems after October 1930 lay elsewhere, as the hoarding of gold by private individuals directly reduced the price level, and the hoarding of base money induced a higher demand for gold to back up the extra currency demand. Both gold and cash were hoarded by the public, commercial banks, and governments.

The Stance of Monetary Policy during 1930–1933

In chapter 1, I suggested that fiat money central banks should be judged on the basis of outcomes, particularly NGDP growth rates. They have essentially unlimited control of nominal aggregates, and hence it makes sense to view excessive nominal spending growth as easy money, and vice versa.

In this chapter, I argued that monetary policy during the onset of the Great Depression was unambiguously contractionary, despite the fact that central banks have only limited control over NGDP under an international gold standard. Under a gold standard, rapidly falling NGDP doesn't necessarily indicate tight money, but it just so happens that during 1929/30 it did, as evidenced by the fast-rising gold reserve ratio.

The secondary deflation of 1930–1933 is a more complex case, where reasonable people may have different interpretations of central bank policies. The rising monetary base might lead some to argue that policy was expansionary, but that the headwinds faced by central banks (such as gold and cash hoarding) were simply too strong. Alternatively, one can make a plausible argument that a more expansionary monetary policy (say a lower gold reserve ratio at the major central banks) would have greatly reduced cash and gold hoarding.

Readers familiar with the butterfly effect in chaos theory will recognize this problem. Let's assume that (as I've argued) the contractionary policy mistakes of the first year of the Great Depression triggered the onset of a deep global slump in 1929/30. Also assume that falling NGDP led to financial distress, increasing the demand for currency and gold.

Should we think of this hoarding as an indirect impact of the earlier tight money policy, amplifying its effects? Or should it be viewed as a separate (exogenous) “shock” that central banks may have been powerless to offset under an international gold standard?

And if an alternative central bank policy path could have prevented the Great Depression, at what point was it too late for effective remedial policy? At what point did the hoarding become so extreme that an attempt to overcome the problem would have depleted the central bank’s stock of reserves, forcing the country off the gold standard?

In the real world, the Fed never even came close to exhausting its gold reserves, a point emphasized by monetarists like Milton Friedman. They really could have done much more. On the other hand, when President Herbert Hoover announced in early 1932 a plan to allow the Fed to operate with a lower minimum gold reserve ratio, that is, allow for an easier money policy, stocks soared higher on the news. A day later, congressional leaders indicated support for the plan, and stocks soared again. The two-day increase in the Dow Jones Industrial Average was the largest in American history. It’s pretty hard to argue that the gold standard constraints didn’t matter for policy, when news of an initiative to loosen the constraints immediately led to the largest stock market rally in history!

But natural experiments in macroeconomics are rarely unambiguous. Did stocks rally because the Fed finally had enough flexibility to act? Or did the Fed already have sufficient policy space, but the Hoover initiative made it less timid about using its (ample) gold reserves? And what should we make of the fact that the QE program of March–June 1932, which followed the loosening of the gold reserve ratio, was perceived as a failure? The Fed injected reserves by purchasing government bonds, which increased the monetary base. But the effects were mostly offset by a gold outflow from the United States, perhaps due to fear that the United States would eventually devalue its currency (fears that later turned out to be correct).

And what should we make of the two 100-basis-point increases in the discount rate during October 1931? Monetarists like Friedman and Schwartz argued that this was a tragic policy mistake, a tight money policy by the Fed.⁹ Alternatively, these rate increases might be viewed as an endogenous response to the decision by Great Britain to sharply devalue the pound in late September 1931. The British decision led to fears regarding the soundness of the dollar, and increased the hoarding of currency and gold. (Currency was hoarded because of the fear of bank failures; gold was hoarded in fear of dollar devaluation.) Perhaps higher nominal interest rates merely compensated dollar holders for the increased risk of holding US dollars.

To summarize, during the secondary deflation of 1930–1933, policy evaluation becomes much more difficult. It is not enough to look at changes in interest rates, the monetary

9. Friedman and Schwartz, *Monetary History*.

base, and the M2 money supply, as it's unclear whether central banks had the ability to set interest rates and the money supply at the appropriate level, at least without leaving the gold standard. Of course, leaving the gold standard is also an option, and indeed was the option that would be chosen by President Franklin D. Roosevelt in 1933. But the Fed lacked the authority to make that decision on its own, and hence any evaluation of central bank policy must account for the political constraints that central banks operate under.

But this is not the only way to evaluate monetary policy. Voters might reasonably care about the entire policy-making regime, including the president, Congress, and the Fed. From this perspective, it does make sense to view subpar NGDP growth as tight money and excessive NGDP growth as easy money. Constraints on monetary policy *are always artificial*, and can be removed by government authorities.

Thus, it is certainly fair to blame the US government for the Great Depression. What is not clear is whether the specific blame lies with the Fed, or with Congress's decision to adopt a highly flawed gold exchange standard. (I would argue that both are to blame.) Concepts such as "blame" and "causation" are implicit references to policy counterfactuals. When monetarists claim that the Fed was to blame, they are at least implicitly saying that the Fed had the authority to adopt an alternative policy that would have prevented the Great Depression.

The secondary deflation of 1930–1933 offers another important lesson. Policy instruments don't always provide useful information about the stance of monetary policy. A central bank may be cutting rates or injecting base money in response to depressed economic conditions created by a previous tight money policy.

Many pundits make the same mistake when interpreting contemporary monetary policy. They focus on QE programs and movements in interest rates that are often (I'd say usually) a response to changing macroeconomic conditions, and they fail to see how these macroeconomic conditions are created by changes in the underlying monetary regime. The best way to see this distinction is to examine the dollar devaluation program of 1933/34, the most important and revealing policy initiative in US monetary history. This really was a radical shift in the stance of policy. And it worked.

Bold and Persistent Experimentation

During the Great Contraction of 1929–1933, the Fed used both open market operations and discount rate changes as tools of monetary policy, with varying degrees of effectiveness. Reductions in the monetary base during 1929/30 triggered the onset of the Depression. Later increases in the base had less impact, as these actions merely accommodated increases in currency and reserve demand during banking crises. Interest rate cuts lagged the decline in the natural interest rate, and the Fed pushed short-term interest rates 200 basis points higher after Britain left the gold standard in September 1931.

By 1932, T-bill yields had fallen to very low levels. Aggressive Fed open market purchases in the spring of 1932 had a disappointingly small effect, as an outflow of gold prevented the purchases from substantially increasing the monetary base. By early 1933, the United States was in the midst of its worst-ever banking crisis, and there were widespread doubts as to the effectiveness of monetary stimulus.

After FDR took office in March 1933, he called for “bold and persistent experimentation.” By far the most important experiment was the decision to devalue the dollar by raising gold prices from \$20.67 an ounce to \$35.00 an ounce, which occurred in steps between April 1933 and February 1934. This decision was partly in response to the monetary theories of George Warren and Irving Fisher.¹⁰

As we will see, the dollar devaluation program differed from the monetary policy initiatives of the Hoover administration in two important respects. First, rather than focusing on the supply of money or interest rates, dollar devaluation uses the *price of money approach*. Second, the policy was far more effective than earlier policy actions that relied on the quantity of money approach (open market operations) or the interest rate approach (discount rate changes).

Here are some monetary policy data from February 1933 to February 1934:

- Monetary base: fell from \$8.81 billion to \$8.41 billion
- M2 money supply: fell from \$43.4 billion to \$42.4 billion
- Three-month T-bill yield: rose from 0.01 percent to 0.08 percent
- Price of gold: rose from \$20.67 an ounce to \$35.00 an ounce

The two quantity of money measures show no evidence of an expansionary monetary policy. The interest rate data show no evidence of a change toward a more expansionary monetary policy. In contrast, the price of money data show overwhelming evidence of a highly expansionary monetary policy shift, especially when one considers that in early 1933 the price of gold had been pegged at \$20.67 an ounce for 54 years. Most people working on Wall Street could not even recall a time when gold was not priced at \$20.67 an ounce.

Table 2.1 provides some (stunning) macroeconomic data on the economy.

Table 2.1: US Macroeconomic Data, 1933/34

	1933: Q1	1933: Q3	1934: Q1
Nominal GNP	\$49.8 billion	\$61.6 billion	\$62.9 billion
Real GNP	\$206.4 billion	\$238.9 billion	\$234.3 billion
GNP deflator	24.1	25.8	26.8

10. I discuss their views in *The Midas Paradox*.

In percentage terms, NGNP soared by an astonishing 26.3 percent in just 12 months. Even more impressive is the fact that almost all of the increase occurred in just the first two quarters after dollar devaluation began. Prices rose somewhat more gradually, with an overall increase of 11.3 percent. Even that figure is extraordinary for an economy that had just experienced severe deflation and still had roughly 25 percent unemployment. Various price indices also increased throughout that period, with the commodity-intensive wholesale price index rising much more sharply than the broader GNP deflator. Real output rose by 13.5 percent over the 12-month period, despite falling slightly in the final 6 months. So what caused this rapid growth?

During 1933/34, the United States clearly experienced a dramatic boost in nominal spending that also boosted output. This effect was caused by monetary policy, as the dollar price of gold increased sharply between March 1933 and March 1934. To better understand this period, it will be useful to also look at index numbers for industrial production and wholesale prices, which are available monthly (see table 2.2).

Table 2.2: High-Frequency Macro Data, 1933/34

	March 1933	July 1933	March 1934
Industrial production	100	157	146
Wholesale prices	100	114	123

If one looks at even more fine-grained data, the same pattern shows up. High-frequency movements in all sorts of asset prices were highly correlated with movements in the price of gold. Stock and commodity prices soared on days the dollar depreciated, while corporate bond risk spreads narrowed. It is as if the markets thought the dollar devaluation program would boost inflation and corporate profits, and also reduce default risk for bonds. And it did.

In my book on the Depression, I showed that the evidence for causation from devaluation to reflation is overwhelming.¹¹ Indeed, there is probably no more clearly identified monetary shock in all of US history. For instance, many of the movements in the dollar occurred after unexpected policy announcements from President Roosevelt and related political news. Between April and July 1933, I identified 10 such news events, each of which had a dramatic (positive) impact on both the dollar price of gold and asset prices.

After October 1933, the key policy announcements took the form of changes in the official US government buying price of gold. These announcements also impacted the global market price of gold, as well as the broader financial markets. The correlations were obvious at the time to those in the financial markets, and the direction of causation

11. Sumner, *The Midas Paradox*.

was not controversial (although the wisdom of FDR's inflationary policies was highly controversial).

There is one remaining puzzle to consider. Why did real output do extremely well until July 1933, and then decline modestly in late 1933. After all, monetary stimulus was being applied throughout almost the entire period from March 1933 to March 1934.

Unfortunately, this near perfect natural experiment in using the "price of money" approach to monetary stimulus was contaminated by a subsequent decision by the Roosevelt administration to artificially raise nominal wages by roughly 20 percent in late July 1933. This policy was aimed at allowing workers to "catch up" with inflation, but ended up temporarily aborting the recovery. The so-called National Industrial Recovery Act (NIRA) was ruled unconstitutional in May 1935, and a rapid recovery in industrial production resumed immediately after this well-intentioned but misguided policy was repealed.

If you combine the negative supply shock from the NIRA with the dollar depreciation program, then all of the pieces fit together. Dollar devaluation that began in April 1933 sharply boosted prices over the following year. Output rose at an unprecedented rate between March and July 1933, and then fell slightly because of an adverse supply shock. NGNP rose at an explosive rate in the spring and summer of 1933, before rising more gradually in late 1933 and early 1934.

So why was this form of monetary stimulus so much more effective than previous efforts involving interest rate cuts and QE? What is so special about the price of money approach to monetary stimulus? And what lessons does it offer for monetary policy today? These are the key questions we'll be focusing on over the next three chapters.

Why Was Dollar Devaluation So Effective?

Recall that under an international gold standard, inflation was equivalent to a fall in the real value (i.e., purchasing power) of gold. The only way to create inflation was to make gold worth less in terms of other goods. But gold's value was mostly determined in a global market. Indeed, when purchasing power parity holds, gold's value is completely determined in the global market. Thus, for an individual country that was closely integrated into the global economy, reflation was not easy to accomplish while on the gold standard, even with increases in the domestic money supply or cuts in the policy interest rate.

With dollar depreciation, the aforementioned obstacles to reflation suddenly become *advantages*. If the United States raised the dollar price of gold from \$20.67 to \$35.00 an ounce (i.e., reduced the gold content of a dollar from 1/20.67 ounce to 1/35 ounce of gold), then the policy would be especially reflationary *if the United States were completely unable to change the global purchasing power of gold*. As long as the purchasing power of one ounce of gold is unchanged by domestic monetary policy, then raising the dollar price of gold leads to a situation where a given *dollar value* of gold buys fewer goods and

services. This was George Warren's argument, which was viewed as simplistic by his contemporaries (and is still viewed that way by modern economists).¹² But Warren was correct.

As an analogy, if you cannot grow taller, then you can always shrink the length of the yardstick to increase your nominal height. Indeed, this is how many people viewed the concept of inflation in previous centuries, before governments got around to constructing price indices. Inflation was viewed as the debasement of money. As far back as the 1691, John Locke ridiculed arguments for monetary policy ineffectiveness (now called a *liquidity trap*) by pointing out that governments could simply change the definition of a pound to include a smaller quantity of silver.¹³

Today, many economists would view FDR's policy as a sort of *currency manipulation*—dollar devaluation in the foreign exchange market aimed at improving the trade balance. But in 1933, astute observers like Irving Fisher and George Warren understood that the causal mechanism wasn't necessarily a change in the exchange rate, and that the policy would also work in a closed economy. Alternatively, the entire world could have used this approach to get out of the Great Depression, without any single country engaged in a "competitive devaluation" against any other country. So how does the policy work in a closed economy, or at the global level?

Recall that the long-run price level was fairly stable under a gold standard (even as prices rose and fell with the business cycle). In the long run, price indices tend to move toward a level consistent with the marginal cost of mining gold. When the United States sharply raised the dollar price of gold, it also raised the expected long-run price level, as the expected future cost of producing gold (in real terms) was not affected by this action.

Because money is approximately neutral in the long run, monetary shocks should not affect the expected long-run value of real variables, including the real value (purchasing power) of a given weight of gold. This means that raising the nominal price of gold from \$20.67 to \$35.00 should have raised the expected long-run price level in roughly the same proportion.

12. George F. Warren and Frank A. Pearson, *Gold and Prices* (New York: John Wiley, 1935).

13. Here Locke is criticizing the view that currency debasement would not be inflationary:

For I think no body can be so senseless, as to imagine, that 19 Grains or Ounces of Silver can be raised to the Value of 20; or that 19 Grains or Ounces of Silver shall at the same time exchange for, or buy as much Corn, Oyl, or Wine as 20; which is to raise it to the *Value* of 20. For if 19 Ounces of Silver can be worth 20 Ounces of Silver, or pay for as much of any other Commodity, then 18, 10, or 1 Ounce may do the same. . . . And so a single Threepence, or a single Penny, being call'd a Crown, will buy as much Spice or Silk, or any other Commodity, as a Crown-piece, which contains 20 or 60 times as much Silver; which is an Absurdity so great, That I think no body will want eyes to see, and Sense to disown.

See John Locke, *The Works of John Locke*, vol. 2 (London: Parker, Symon, Hitch, and Pemberton, 1740).

In the short run, the overall price level rose by considerably less than the increase in the price of gold, due to two factors. First, purchasing power parity does not hold perfectly, and thus dollar depreciation also led to a real depreciation in the US exchange rate in the short run. Second, devaluation increased gold hoarding, as frightened savers feared further currency depreciation in the United States and Europe. Gold hoarding by both the public and central banks raised the global value of gold in real terms. But these secondary effects were not strong enough to prevent dollar devaluation from having a powerful reflationary effect in the United States. Raising the dollar price of gold was the key step in ending deflation and beginning the recovery from the Great Depression.

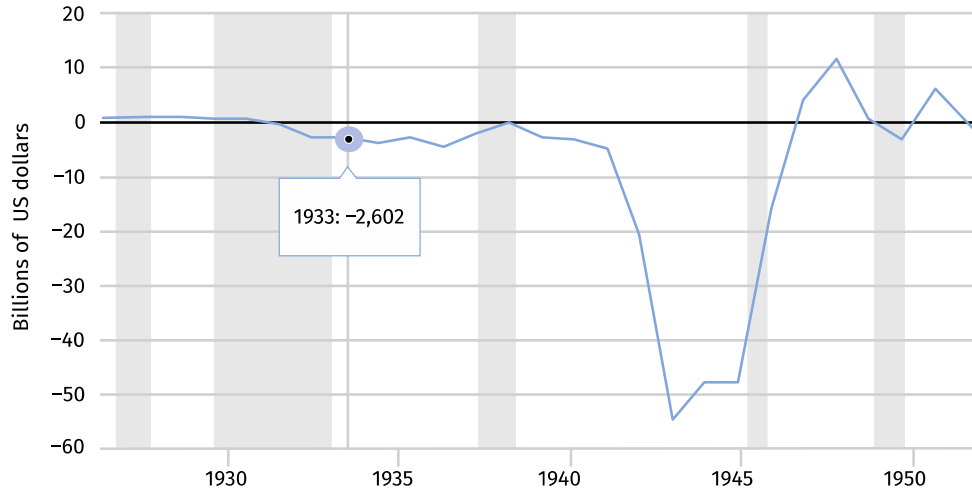
Would FDR's Gold Program Work Today?

Roosevelt's dollar depreciation program was an ingenious strategy for economic stimulus. If not for the NIRA, raising the price of gold would have led to an almost complete recovery from the Great Depression in just a few years. Today, it is difficult to see what made the policy so effective in an environment with near-zero interest rates. Many economists seem to have misjudged the nature of the policy, because they look at events through the lens of contemporary macro models, with their focus on the money supply and interest rates.

Barry Eichengreen titled his 1992 book on the interwar gold standard *Golden Fetters*.¹⁴ This metaphor captures the popular modern view that the gold standard was a policy constraint, which prevented governments from adopting expansionary monetary and fiscal policies. But as we've already seen, prices and output soared immediately after the devaluation was announced, even without any increase in the money supply or any cut in interest rates. Even the change in fiscal policy was relatively modest. There must have been some other "transmission mechanism."

14. Barry Eichengreen, *Golden Fetters: The Gold Standard and the Great Depression, 1919–1939* (New York: Oxford University Press, 1992).

Figure 2.1: Federal Budget Deficit or Surplus, 1926–1959



Source: FRED (Federal Reserve Economic Data), Federal Reserve Bank of St. Louis, <https://fred.stlouisfed.org/>.

Note: Gray bars indicate periods of recession as defined by the National Bureau of Economic Research (NBER).

Ironically, FDR’s radical program benefited from the conservatism of the era. His program of dollar depreciation was especially effective precisely because the public expected the United States to eventually return to the gold standard. And those expectations were correct; in February 1934, the price of gold was pegged at \$35 an ounce, where it stayed until March 1968. Raising the dollar price of gold was a *credible signal* about the future path of monetary policy.

In contrast, imagine a modern president trying to stimulate the economy by raising the US government’s dollar price of gold. It’s not clear that this policy would send any important signal about the future path of monetary policy. Rather, it might be viewed as little more than a commodity price support program. Indeed, Friedman and Schwartz wrongly thought FDR’s gold-buying program was ineffective, comparing it to an agricultural price support program.¹⁵ But agricultural price support programs don’t send credible signals about future monetary policy.

As Roosevelt drove the price of gold higher, market participants continually revised their forecast of the future price at which the dollar would be repegged to gold. That’s why the policy had such a powerful impact. It was an early example of a set of policies that Princeton economist Lars Svensson would later term a “foolproof” way of escaping from a liquidity trap.¹⁶ Even when nominal interest rates are stuck at zero, the price of money approach offers a powerful tool for boosting prices and NGDP.

15. Friedman and Schwartz, *Monetary History*.

16. Lars E. O. Svensson, “Escaping from a Liquidity Trap and Deflation: The Foolproof Way and Others” (NBER Working Paper No. 10195, National Bureau of Economic Research, Cambridge, MA, December 2003).

Today's policymakers are not able to use the specific tool employed by FDR. But in chapter 5 we will consider alternative ways of using the price of money approach, which provide the single most effective way of conducting monetary policy. Indeed, this approach completely eliminates the problem of monetary policy ineffectiveness—the so-called liquidity trap.

Concluding Remarks

In chapter 1, I examined three alternative approaches to monetary policy: the quantity of money, interest rate (the rental cost of money), and price of money approaches. In this chapter, we looked at a historical period where events look very different depending on whether policy is evaluated using the quantity of money, the nominal interest rate, or the price of money. This period highlights many of the difficulties of identifying the stance of monetary policy.

Under a fiat money regime, the stance of monetary policy is best identified by looking at *policy outcomes*, as central banks have effectively unlimited control over nominal aggregates. But under a gold standard, central banks face important constraints that may limit their ability to control nominal spending. In that environment, the gold reserve ratio is a useful indicator of monetary policy “effort,” with larger central banks having a greater impact on the global gold reserve ratio, and thus global monetary conditions.

If the macroeconomic situation becomes sufficiently desperate, countries on the gold exchange standard have the option of currency devaluation, which involves moving from a dual media of account (gold and currency) to a single medium of account (currency).¹⁷ Even when nominal interest rates are stuck at zero, the price of money approach offers a powerful tool for monetary stimulus. In the end, policymakers should always be judged by *outcomes*. Artificial constraints are never an excuse for failure.

Gold standard constraints are not the only policy limitations that worry economists; the zero lower bound on interest rates is also a major concern. Can a fiat money regime hit any nominal target when interest rates are stuck at zero?

In chapter 3, we'll examine what I call the Princeton School of Macroeconomics. We will consider five economists who provide theoretical and empirical support for many of the ideas in this book. Paul Krugman developed the essential model for evaluating monetary policy in a liquidity trap.¹⁸ In his model, the effectiveness of policy depends almost entirely on the Fed's ability to change the future expected path of policy.

17. During the 1990s, Argentina operated with a dual media of account system, pesos and US dollars.

18. Paul R. Krugman, “It’s Baaack! Japan’s Slump and the Return of the Liquidity Trap,” *Brookings Papers on Economic Activity* 2 (1998): 137–87.

His core idea influenced several other Princeton economists. Ben Bernanke looked at the situation in Japan and showed that policy variables such as the money supply and the interest rate did not provide a reliable indicator of the stance of monetary policy. Gauti Eggertsson showed how FDR's dollar depreciation policy changed expectations about the future path of policy. Michael Woodford showed that when nominal rates are stuck at zero, a policy of NGDP-level targeting could be more effective than inflation targeting, as it creates expectations of more expansionary future policy. Lars Svensson showed how manipulating the exchange rate could provide a "foolproof" way of escaping from a liquidity trap.

These economists were mostly operating within the New Keynesian intellectual tradition. In my view, that approach continues to rely too heavily on the interest rate as a policy indicator and instrument, despite all the other valuable insights provided by the Princeton School. Thus, in chapter 4, I critique the interest rate approach to monetary policy. These first four chapters provide the basic theory and evidence required to evaluate the price of money approach to monetary policy, which I explain in chapter 5.

My goal is to get people to look at monetary policy from a new perspective. We will see that questions such as "Does QE work?" and "Are interest rate changes effective?" are essentially meaningless. The more important question is what happens to interest rates and the monetary base when central banks use the price of money approach to achieve their macroeconomic objectives? The question is not, "Can an increase in the money supply or a cut in interest rates raise inflation to 3 percent?" Rather the question is, "What is the public's demand for money and what is the equilibrium interest rate when a central bank raises market inflation expectations to 3 percent?"

Chapter 3: The Princeton School and the Zero Lower Bound

During the late 1990s and the first decade of the 21st century, a small group of economists revived the debate over liquidity traps and developed a framework for monetary policy at the zero lower bound. Because the key members of this school of thought were all teaching or studying at Princeton University during the early 2000s, I call this group the Princeton School of Macroeconomics. Paul Krugman’s 1998 Brookings paper¹ provides the basic model that underlies much of the new view, but work by Ben Bernanke, Michael Woodford, Gauti Eggertsson, and Lars Svensson also played an important role in reshaping the view of stabilization policy at the zero bound.²

By the late 2010s, their ideas had begun to influence policy at central banks, including the Federal Reserve. Indeed, research by Krugman and other Princeton School members provided the rationale for the Fed’s new policy of flexible average inflation targeting, which is the most important shift in the Fed’s policy regime in several decades.

In the 1930s, Keynes argued that very low interest rates could limit the effectiveness of monetary stimulus in a deep recession.³ Macro models based on his *General Theory*, however, proved inadequate for addressing policy issues in a fiat money world with large and unanticipated changes in the trend rate of inflation. The Chicago School of monetarists led by Milton Friedman was better able to explain phenomena such as the Great Inflation, especially the large variation in inflation rates and nominal interest rates over time and across countries from 1950 to 1990. The New Keynesian model that emerged in the 1980s incorporated ideas from both the Keynesian and monetarist camps,

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1. Paul R. Krugman, “It’s Baaack! Japan’s Slump and the Return of the Liquidity Trap,” *Brookings Papers on Economic Activity* 2 (1998): 137–87.

2. Note that some of the key work was done during the late 1990s, before several of these economists had moved to Princeton, thus creation of the school may have resulted from Princeton’s hiring people with common interests.

3. John Maynard Keynes, *The General Theory of Employment, Interest, and Money* (New York: Harcourt, Brace & World, 1936).

and this model resulted in a policy regime that incorporated the “Taylor principle,” which led to a period of relative policy stability from the mid-1980s to 2007.⁴

The consensus New Keynesian model of the 1990s was upended by the global shift toward near-zero nominal interest rates, which increasingly seem like the new normal of the 21st century. Today, it has become hard to even imagine a US recession where nominal interest rates don’t fall to zero for an extended period. In Europe and Japan, there is little expectation of rates rising above zero even during a boom period. Going forward, central banks will struggle to achieve their inflation targets if they ignore the insights of the Princeton School.

The first section of this chapter discusses Krugman’s key 1998 paper and uses the Coase theorem as an analogy to show how the policy “message” in a theoretical model often depends on some subtle distinctions that are easy to overlook. In my view, the most important insights of the Princeton School are still not well understood, and I hope to provide some context for interpreting these studies, which can be read in multiple ways. For instance, Krugman’s paper has been read as both a defense of using a certain type of monetary policy at the zero bound and as an explanation of why monetary policy might be ineffective in that situation.

The second section discusses Ben Bernanke’s forceful critique of the Bank of Japan’s policy during the 1990s and the difficulty Bernanke faced in persuading his colleagues at the Fed to adopt an aggressive policy stance, especially given the strongly conflicting views among policymakers.

The third section shows how Eggertsson and Woodford built on the insights of Krugman’s 1998 paper to show how various policy rules might overcome the zero-bound problem and how those models could provide a tool for explaining some key events in monetary history.

The fourth section discusses two important papers by Lars Svensson, one of which provides a “foolproof” method for escaping from liquidity traps, while the other explains why an efficient monetary policy rule should equate the policy goal (target) and the policymaker’s forecast of the goal variable.

The chapter will conclude by showing some surprising links between the Princeton School and heterodox theories such as NeoFisherism and market monetarism. By looking at both the similarities and differences between the models, we can understand all three approaches better than if each were viewed in isolation.

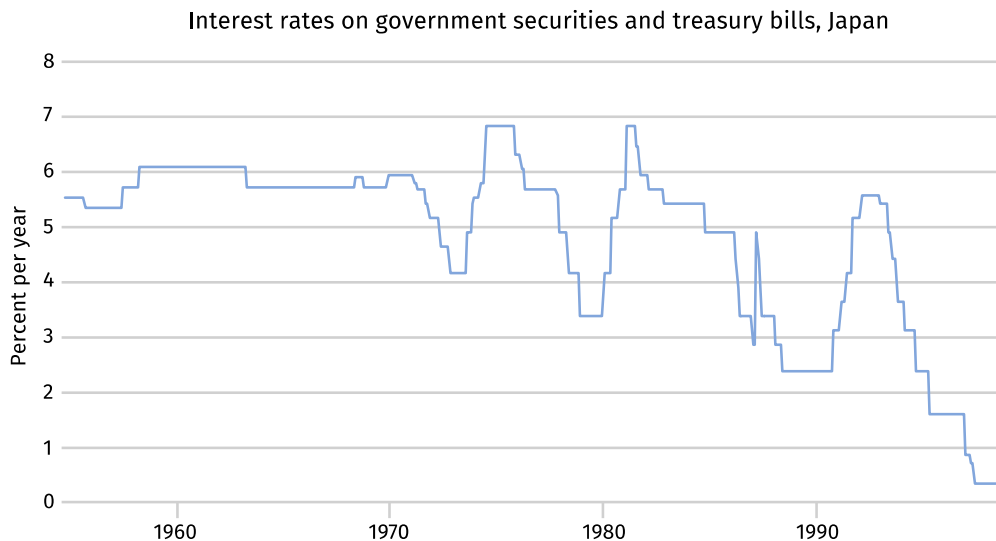
4. Under the Taylor principle, the central bank’s policy rate rises by more than one for one with an increase in inflation so the rate can ensure a contractionary policy stance to push inflation back down to the target (and vice versa).

Paul Krugman’s Expectations Trap

More than two decades after it was published, Paul Krugman’s 1998 Brookings paper (“It’s Baaack: Japan’s Slump and the Return of the Liquidity Trap”) seems strikingly prescient in anticipating many of the zero-bound issues faced in recent years.⁵ It may well be the most important macro article of the past 40 years and is the obvious place to begin when trying to understand the role of monetary and fiscal policy in the 21st century.

Recall that in 1998, the United States and most other developed economies were not even close to being in a liquidity trap, and very few people expected that situation to change soon. Even Japan had been at the zero bound for only a short period (see figure 3.1), and that fact could be fairly easily dismissed as an economic overhang from the banking crisis of the early 1990s.

Figure 3.1: Japan’s Interest Rates, 1950s–1990s



Source: International Monetary Fund, retrieved from FRED (Federal Reserve Economic Data), Federal Reserve Bank of St. Louis, <https://fred.stlouisfed.org/>.

From this relatively modest zero-bound episode, Krugman made some pretty expansive claims:

1. Banking problems are not the root cause of a liquidity trap; rather, the root cause is the hoarding of base money at zero nominal interest rates.

5. Krugman, “It’s Baaack!”

2. A liquidity trap can occur in a flexible-price model. This point is important because it suggests that a liquidity trap can persist for a long period, even after wages and prices have adjusted.
3. A liquidity trap can occur in an economy with full employment (which occurred in Japan in the late 2010s).
4. A liquidity trap can occur in an economy with highly productive capital because stocks have a large equity premium.
5. A very large increase in the monetary base, that is, quantitative easing (QE), will be largely ineffective if the public expects it won't be permanent (relative to the change in money demand).⁶
6. Monetary stimulus at the zero bound is not necessarily a “beggar-thy-neighbor” policy, even if it leads to currency depreciation.
7. Europe might be next. Here's how Krugman concluded his paper:

Germany and France currently have short-term interest rates of only 3.5 percent, and Europe faces Japanese-style demographics; could a liquidity trap happen to the European Monetary Union? Economists now know that the liquidity trap is not a historical myth: it can and does really happen sometimes, and we had better try to understand it.⁷

Clearly, this danger was not obvious at the time, because the eurozone did not make any sort of effective plans for dealing with a zero rate environment.

Early in the 1998 paper, Krugman summarizes his core insight:

The central new conclusion of this analysis is that a liquidity trap fundamentally involves a credibility problem—but it is the inverse of the usual one, in which central bankers have difficulty convincing private agents of their commitment to price stability. In a liquidity trap, the problem is that the markets believe that the central bank will target price stability, given the chance, and hence that any current monetary expansion is merely transitory. The traditional view that monetary policy is ineffective in a liquidity trap, and that fiscal expansion is the only way out, must therefore be qualified: monetary policy will in fact be effective if the central bank can *credibly promise to be irresponsible*, to seek a higher future price level. [Emphasis added]⁸

Notice that Krugman does not say that the core problem in a liquidity trap is that central banks cannot cut interest rates any further. The zero lower bound can create problems,

6. The effectiveness of permanent increases in the monetary base has recently declined because of a combination of persistently low equilibrium interest rates and the decision to pay interest on bank reserves during periods when market rates rise above zero.

7. Krugman, “It’s Baaack!,” 183.

8. Krugman, “It’s Baaack!,” p. 139.

but only if paired with additional assumptions about the public's expectations for the future path of policy. A central bank is unable to stimulate the economy at the zero bound if either of the following two conditions is met:

1. For institutional reasons, a central bank is unwilling to promise higher future inflation.
2. A central bank promises higher future inflation, but its promises are not credible.

When analysts are evaluating the potential for monetary stimulus, it is all too easy to conflate “cannot” and “will not.” This distinction is crucial when thinking about whether the focus should be on fixing the monetary regime or relying more heavily on fiscal policy. Because Krugman's paper is often misunderstood, it will be useful to compare his analysis with another important paper that has also been widely misunderstood—Ronald Coase's famous 1960 article about the problem of social cost.⁹

Coase began by exposing serious flaws in the traditional Pigovian theory of externalities, which had suggested that government regulation was appropriate when one party imposed external costs on another. But Coase didn't stop there; he rebuilt the theory of externalities on a stronger foundation—the concept of *transaction costs*. Traditional Pigouvian taxes became a special case, appropriate where transaction costs prevent private parties from negotiating an optimal solution. This paper had a major effect on the field of law and economics.

Similarly, Krugman began by exposing serious flaws in the traditional Keynesian theory of liquidity traps. Even at the zero bound, permanent monetary expansion should be able to create expectations of future inflation and hence depress current real interest rates. But Krugman didn't stop there; he rebuilt the theory of monetary policy at the zero bound on a stronger foundation—the concept of *policy credibility*. Traditional Keynesian solutions such as fiscal stimulus became a special case, appropriate for situations where central banks could not or would not commit to a credible policy of inflation, perhaps because of the time-inconsistency problem. Krugman's paper has had a major influence on the debate over stimulus options at the zero lower bound.

Coase's paper is frequently misunderstood by readers who focus on only a portion of his analysis. Thus, some conservatives who favor free markets might claim, “Coase showed that externalities don't require regulation.” Progressives might argue, “Since transaction costs do exist, we can ignore the rest of Coase's analysis.” In fact, Coase's analysis is richer than either caricature.

Although it is tempting to find a liberal and conservative reading of Krugman's paper, I'll steer clear of those terms for two reasons. First, Krugman clearly thinks it is worth giving important consideration to fiscal policy at the zero bound, but he believes it is important

9. Ronald H. Coase, “The Problem of Social Cost,” *Journal of Law and Economics* 3 (1960): 1–44.

for central banks to try to be more aggressive in forward guidance at the zero bound (the “promise to be irresponsible,” as he put it). Second, Krugman is clearly not a conservative, so calling either view conservative is misleading. In addition, if we take the standard assumption that fiscal policy is the more liberal option, we are forced to label the monetary option—a central bank’s “promise to be irresponsible”—as the conservative option. Political labels seem more likely to confuse than illuminate.

Instead, I’ll call a focus on the monetary policy option at the zero bound the “New Keynesian view,” whereas the old Keynesian view will denote a focus on the fiscal policy option. This labeling makes sense for two reasons. First, during the so-called New Keynesian period (roughly 1984–2007), monetary policy was widely viewed as the appropriate tool for stabilizing aggregate demand and inflation. Second, policy expectations play a big role in the New Keynesian model, and the expectations channel is crucial for making monetary policy effective at the zero bound. Indeed, Krugman used a set of assumptions that might be regarded as relatively classical (flexible prices, rational expectations, Ricardian equivalence, etc.), but not because he thought they were realistic; rather, he wished to demonstrate that a liquidity trap really could occur, even under the most “conservative” assumptions.

Of course, there is more than one way to interpret the implications of Keynes’s *General Theory* for monetary policy. Some pundits insist that Keynes viewed a liquidity trap as a mere theoretical curiosity, whereas both the British economist John R. Hicks and Milton Friedman claimed that the liquidity trap was the *General Theory*’s most important innovation, upon which much of the rest of the analysis relied.¹⁰ Back in 1988, when few people worried about the zero-bound issue, Allan Meltzer wondered why, if Keynes was so worried about monetary policy ineffectiveness, he didn’t just recommend an inflation target high enough to ensure that nominal interest rates never fell to zero.¹¹ In that case, monetary policy would always be effective, and fiscal stabilization policy would be superfluous.

Of course, Meltzer was a monetarist, and Keynesian advocates of fiscal policy might be tempted to dismiss this advice. And yet during the Great Recession, a number of prominent Keynesian economists did advocate raising the inflation target to 4 percent for essentially the reasons cited by Meltzer. Indeed, the 2 percent inflation target that many

10. Keynes, *General Theory*; J. R. Hicks, “Mr. Keynes and the ‘Classics’: A Suggested Interpretation,” *Econometrica* 5, no. 2 (1937):147–59; Milton Friedman, “Comments on the Critics,” *Journal of Political Economy*, 80, no. 5 (1972): 906–50.

11. Allan H. Meltzer, *Keynes’s Monetary Theory: A Different Interpretation* (Cambridge: Cambridge University Press, 1988).

central banks settled on in the 1980s and 1990s was chosen partly because it was viewed (wrongly, in retrospect) as being high enough to avoid the zero-bound constraint.¹²

The point here is not to argue that Meltzer was correct that a higher inflation target eliminates the need for fiscal policy—there are other possible justifications for fiscal stimulus beyond the zero-bound issue—rather, that it represents one plausible reading of the *General Theory*. The policy message of a model is not always obvious.

To illustrate this point, consider the following statement by Krugman in 1999 from a working paper criticizing stabilization policy in Japan:

What continues to amaze me is this: Japan's current strategy of massive, unsustainable deficit spending in the hopes that this will somehow generate a self-sustained recovery is currently regarded as the orthodox, sensible thing to do—even though it can be justified only by exotic stories about multiple equilibria, the sort of thing you would imagine only a professor could believe. Meanwhile further steps on monetary policy—the sort of thing you would advocate if you believed in a more conventional, boring model, one in which the problem is simply a question of the savings-investment balance—are rejected as dangerously radical and unbecoming of a dignified economy.

Will somebody please explain this to me?¹³

Notice that Krugman is taking a much more New Keynesian approach than in his post-2008 policy statements. In 1999, he was strongly advocating more monetary stimulus while being somewhat skeptical of the efficacy of fiscal policy. And yet this paper was written just a year after the Brookings paper. So why did Krugman's policy preference seem to change after 1999?

I suspect that much of the shift in Krugman's views can be attributed to subsequent events. First, as time went by, it became apparent that the Bank of Japan (BOJ) was unable or unwilling to adopt a "promise to be irresponsible" approach, at least to the required extent. Second, the liquidity trap problem spread to many other countries and lasted much longer than expected. Third, ultralow interest rates became the new normal, easing worries about debt sustainability. All these factors pushed many New Keynesian economists toward a greater willingness to embrace fiscal stimulus, thus Krugman's shift in emphasis is consistent with the recent evolution of mainstream Keynesianism.

In 1999, the Great Moderation was still in its heyday, and the New Keynesian approach to monetary policy still seemed adequate for most developed countries, even without the assistance of fiscal stabilization policy. In that sort of environment, it was natural to suggest that the Japanese first try to use monetary policy more effectively. And as this

12. If policymakers had anticipated the fall in the equilibrium real interest rate during recent decades, then an even higher inflation target might have been chosen.

13. Paul R. Krugman, "Time on the Cross: Can Fiscal Stimulus Save Japan?" (working paper, Massachusetts Institute of Technology, Cambridge, MA, 1999).

chapter will show, Krugman was not the only Western economist who at that time was frustrated with what seemed an overly cautious approach on the part of the BOJ.

Later, Krugman revisited the Brookings paper with a new paper titled “It’s Baaack, Twenty Years Later.” In this retrospective, Krugman provides clear evidence that he continues to view both interpretations of the 1998 model as important. For instance, he notes that most central banks have been unwilling to pursue the sort of aggressive regime change that he recommended in 1998, but he also points to Abenomics as coming closest to what he had in mind:

When he became Prime Minister in 2012, Shinzo Abe—heretofore known as a conservative on many issues—surprised the world by endorsing a fairly radical monetary experiment. “Abenomics” was supposed to contain three “arrows”—fiscal stimulus and structural reform as well as monetary expansion. In practice, however, fiscal policy has if anything tightened slightly, while structural reform, as often happens, is in the eye of the beholder. There has, however, been a very visible shift not just in the Bank of Japan’s actions but in its underlying attitude: while it still professes the conventional 2 percent target, it gives every indication of being willing to be far more adventurous than in the past in its efforts to achieve that target.¹⁴

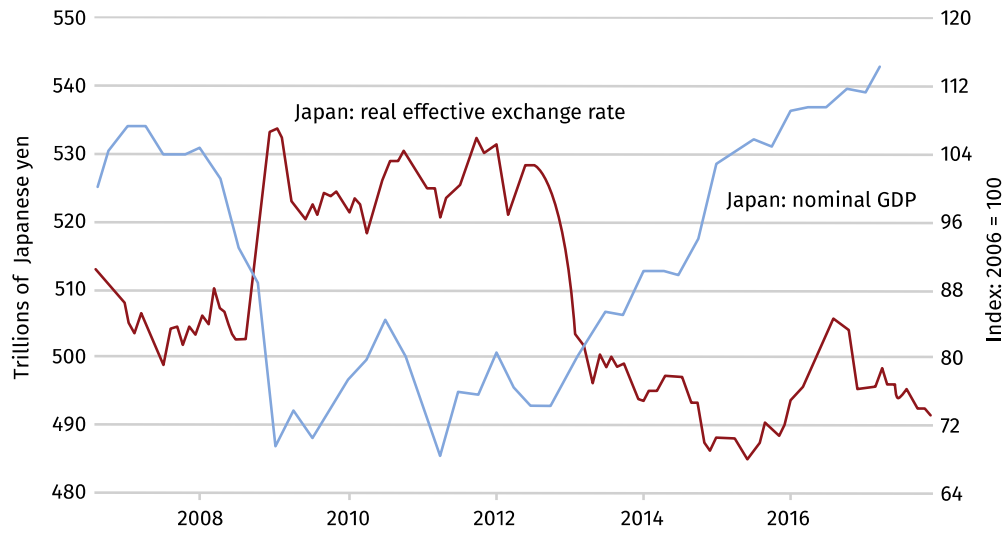
And Abe’s policies did achieve some success (see figure 3.2):

So how is Kurodanomics—a much better description in practice than Abenomics—working? Figure 6 [figure 3.2 in this chapter] shows two indicators, nominal GDP and the real effective exchange rate. Despite being at (or slightly below) the zero lower bound, the Bank of Japan evidently managed to achieve considerable traction. It has not so far managed to achieve the inflation target, but at least the Japanese experiment suggests some support for the view that monetary regime change can be effective even at the zero lower bound. Credibly promising to be irresponsible makes a difference; the problem is that central bankers won’t do it.¹⁵

14. Paul Krugman, “It’s Baaack, Twenty Years Later” (CUNY working paper, City University of New York, February 2018), 19.

15. Krugman, “Twenty Years Later,” 19–20.

Figure 3.2: Comparison of Japan’s Exchange Rate and Nominal GDP, 2007–2018



Source: Paul Krugman, “It’s Baaack, Twenty Years Later” (CUNY working paper, City University of New York, February 2018), 19. Republished with permission of the author.

Note: “Kurodanomics,” the original title of this figure, refers to the Bank of Japan’s Governor Haruhiko Kuroda. He became the bank governor in March 2013.

Note that Krugman says “won’t do it,” not “can’t do it”—an important distinction. Also note that the partial success of Abenomics occurred without the BOJ ever committing to any of the sort of catch-up inflation that had been recommended by Krugman in 1998 and later by other Princeton economists. The inflation target was raised to 2 percent, but the biggest change was psychological; the BOJ loudly proclaimed a desire to see inflation move higher. The Japanese yen began plunging in late 2012, almost immediately after then-candidate Abe signaled an intention to promote a more inflationary monetary policy.

In recent years, there has been some interest in a model called Modern Monetary Theory (MMT), which posits that monetary policy has little or no effect on inflation. Thus, it is worth noting that Krugman’s 1998 model explains Abenomics much better than does MMT, a theory that suggests it is fiscal policy, not monetary policy, that determines inflation. According to the MMT model, Abe’s policies of tax increases and a shrinking budget deficit should have led to a slowdown in Japan. Monetary policy clearly matters, even at the zero bound.

By contrast, Krugman’s 2018 retrospective also found plenty of support for the old Keynesian interpretation of the 1998 Brookings paper:

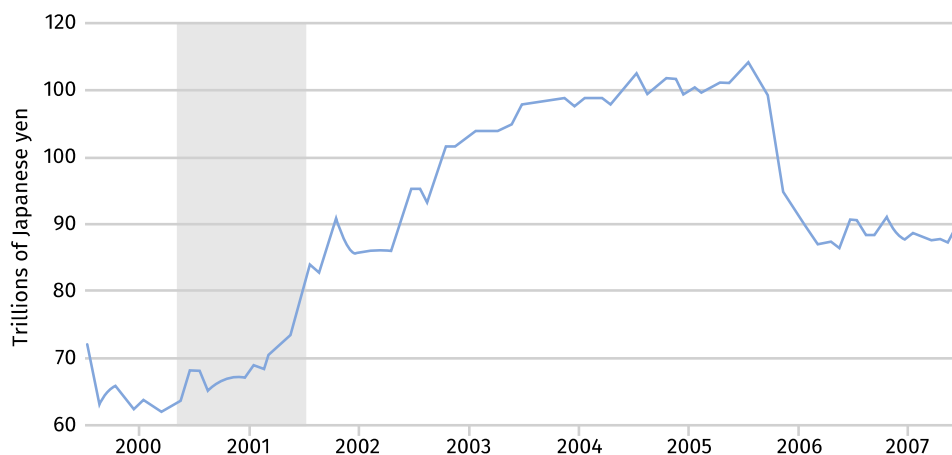
The result of these simplifications was an extremely minimalist model, with an immediate, striking implication. If, for whatever reason, the natural rate of interest in the first period was negative—that is, it would require a negative nominal rate to achieve full employment—the proposition that money issuance must raise the price level was false. Or if you like, it was missing a word: permanent money issuance would raise

the price level. But a monetary expansion the private sector expected to be temporary, to be wound down after the crisis had passed, would do nothing at all: the extra monetary base would just sit there.

Furthermore, it was reasonable for the private sector to assume that even large increases in the monetary base in a liquidity-trap economy would be temporary. We saw this in practice when Japan adopted a policy of quantitative easing in the 2000s. As figure 2 [figure 3.3 in this chapter] shows, this policy was quickly reversed once the economy appeared to be recovering.¹⁶

This is certainly a feather in his cap for Krugman, because not only did he predict the likely ineffectiveness of quantitative easing; he also described (in 1998) *the specific policy reversal that would explain that failure*. To be clear, this fact doesn't mean that QE "doesn't work"; studies often suggest a modest positive effect. Rather, the point is that it works only to the extent that it is a *signal of future monetary stimulus*; in the case of Japan from 2000 to 2006, the signal was quite weak (see figure 3.3).

Figure 3.3: Japan's Monetary Base, 2000–2006



Source: Krugman, "Twenty Years Later," 6. Republished with permission of the author.

Note: Gray bar denotes NBER-defined recession.

Much of the 2018 paper focuses on the case for fiscal stimulus, which is perhaps not surprising given the way that Krugman's views have evolved over time. In my view, he

16. Krugman, "Twenty Years Later," 5.

slightly overstates the extent to which the 1998 paper supports the case for fiscal stimulus— also the empirical evidence in favor.¹⁷

For instance, there is no discussion of the fact that US economic growth actually sped up a bit after some pretty significant fiscal austerity in 2013, when the deficit plunged from \$1,061 billion to \$561 billion.¹⁸ In fairness, that decrease is only one data point, and Krugman does cite a cross-sectional study showing the effectiveness of fiscal policy. But these studies rely heavily on individual eurozone countries where there is little prospect of fiscal shocks being offset by monetary policy. That fact is important, because the most likely explanation for the surprisingly strong US growth in 2013 is that the Fed announced some fairly aggressive QE and forward guidance at the end of 2012, partly to offset the effects of the imminent fiscal austerity. Cross-sectional studies of fiscal stimulus would do better to focus on countries with independent central banks.¹⁹

Although I have some reservations about the case for fiscal policy, there is no denying that Krugman's 2018 paper justifies his preference for fiscal policy with some very insightful observations on the psychology of central bankers:

Given the way experience has undermined much of the original case for a 2 percent inflation target, and given the severity of the economic crisis, you might therefore have expected some revision—a rise in the inflation target, or a shift to some other kind of targeting—price level or nominal GDP targeting. But that hasn't happened.

Even though a 2 percent inflation target is an essentially arbitrary number, it has become a focal point, a sort of token of respectability that almost no central bankers are willing to meddle with. (In this sense it resembles the role once played by the gold standard.)

This is quite remarkable. If the worst economic crisis since the 1930s, one that cumulatively cost advanced nations something on the order of 20 percent of GDP in forgone output, wasn't enough to provoke a monetary regime change, it's hard to imagine what will.

17. Ironically, several discussants of his Brookings paper actually criticized Krugman for being too dismissive of fiscal policy. Recall that he had used the assumption of Ricardian equivalence not because he thought it was true, but rather because he hoped to convince conservatives that liquidity traps were real and could occur in even some quite "classical" models.

18. I use calendar year deficits, because the fiscal austerity began on January 1, 2013.

19. If central banks do offset fiscal policy, then fiscal stimulus in one eurozone country would steal growth from other members of the common currency. Many economists don't think that is likely to occur at the zero bound, but then many economists didn't foresee the Fed's successfully offsetting US fiscal austerity in 2013. State-level cross-sectional studies of fiscal stimulus in the United States also fail to account for monetary offset.

This in turn might seem to suggest that while monetary policy could in principle offer a solution to the problem of the zero lower bound, fiscal policy ends up being the only realistic tool.²⁰

The second paragraph is Keynesian in both a substantive and rhetorical sense, and is reminiscent of Keynes's famous barbarous relic comment.

I would encourage people to reread Krugman's 1998 Brookings paper and the 2018 follow-up; then read the comments of various discussants at the end of the Brookings paper. In almost every case, Krugman's choices as to modeling strategy and policy recommendation are quite persuasive in hindsight, and a number of the commenters seemed to have underestimated the extent to which the zero interest rate bound could become a semipermanent problem or the degree to which a radical monetary regime change was appropriate.

Interestingly, Krugman's pessimism about the willingness of central bankers to adopt regime change may have been a bit premature. Indeed, the Fed's 2020 decision to adopt average inflation targeting (AIT) is a sort of vindication for Krugman's 1998 claim that central banks should commit to a period of above-target inflation after exiting from a liquidity trap. The Fed has now committed to a period of above 2 percent inflation as the nation emerges from the COVID-19 recession.

Krugman didn't know about the Fed's recent AIT decision when he wrote the 2018 paper, but nonetheless he takes a well-deserved victory lap in the conclusion:

If economists were like natural scientists, we'd be celebrating the success of our standard model. Confronted with conditions very different from those encountered in the past, the model made predictions very much at odds with the expectations of many policymakers and market participants. And those predictions proved correct.²¹

Paul Krugman was not just a Princeton economist during this period; he was also an important public intellectual with an influential column in the *New York Times* and a recent Nobel Prize. Next, this chapter will consider an equally well-known Princeton economist, who had a chance to put his theories into action when he joined the Federal Reserve in 2002.

Ben Bernanke's Critique of Policy Paralysis

In the previous section, I argued that Paul Krugman's 1998 paper was more nuanced than readers might suppose and that the policy message was somewhat ambiguous, or at least

20. Krugman, "Twenty Years Later," 17–18.

21. Krugman, "Twenty Years Later," 22.

context specific. Here, I'll argue that Ben Bernanke's contribution to theory and policy has also been misunderstood.

The standard view is that Bernanke was a harsh critic of the BOJ in the late 1990s and early part of the 21st century, and then he discovered that his criticism had been unfair once he joined the Fed and discovered that his preferred monetary strategy was ineffective at the zero bound. Nonetheless, many economists believe that the Fed did a pretty good job in providing monetary stimulus during the Great Recession, given the zero-bound constraint.

In my view, this interpretation is almost completely wrong. Bernanke's earlier criticisms of the BOJ were right on the mark, and the severity of the Great Recession was partly due to the fact that Bernanke was unable to convince other Fed officials to adopt the policy approach he recommended to the Japanese. In terms of its impact on aggregate demand, US monetary policy was effectively contractionary during the Great Recession.

The key document here is a paper by Bernanke titled "Japanese Monetary Policy: A Case of Self-Induced Paralysis?"²² The paper makes five important claims:

1. The Japanese were misdiagnosing the liquidity trap as reflecting financial system distress, whereas the more fundamental problem was a lack of aggregate demand. Furthermore, some of the so-called structural problems were themselves made worse by demand deficiency.
2. Japanese monetary policy was not expansionary, because neither interest rates nor money supply changes are reliable indicators of the stance of monetary policy.
3. Central banks never run out of ammunition, because the central bank can buy an unlimited amount of assets. They should buy as many assets as necessary to hit their target.
4. The BOJ was inappropriately worried about balance sheet risk, which is not a serious problem from the perspective of the consolidated government balance sheet.
5. The BOJ should commit to something like level targeting (or average inflation targeting), which involves above-target inflation for a period after exiting the zero bound.

Bernanke begins by citing a wide variety of indicators that suggest a deflationary bias to BOJ policy, including near-zero nominal gross domestic product (NGDP) growth, a strong yen, and falling asset prices (stocks and real estate). Then he addresses the widespread perception that monetary policy is already accommodative:

22. Ben S. Bernanke, "Japanese Monetary Policy: A Case of Self-Induced Paralysis?" (working paper, Princeton University, Princeton, NJ, December 1999).

The argument that current monetary policy in Japan is in fact quite accommodative rests largely on the observation that interest rates are at a very low level. I do hope that readers who have gotten this far will be sufficiently familiar with monetary history not to take seriously any such claim based on the level of the nominal interest rate. One need only recall that nominal interest rates remained close to zero in many countries throughout the Great Depression, a period of massive monetary contraction and deflationary pressure. In short, low nominal interest rates may just as well be a sign of expected deflation and monetary tightness as of monetary ease.²³

Bernanke suggests that real interest rates are a better policy indicator, but then he adds that even the low level of real rates is misleading because of weak credit demand; he suggests instead looking at the gap between the actual and expected price level. In a 2003 speech, Bernanke suggested that neither real nor nominal interest rates, nor the money supply, are good indicators of the stance of monetary policy, and he suggested instead looking at both inflation and NGDP growth.²⁴ Correctly evaluating the stance of policy is important, because confusion on this point has led to widespread misunderstanding about what actually happened in Japan, particularly the efficacy of Bernanke's recommendations. Did the BOJ try to inflate but failed during the decade after 2000, or did it not really try at all?

Monetary policy by the Bank of Japan

In his 1999 critique of the BOJ, Bernanke made two key arguments. First, that a central bank could always create inflation with a suitably large injection of base money:

The general argument that the monetary authorities can increase aggregate demand and prices, even if the nominal interest rate is zero, is as follows: Money, unlike other forms of government debt, pays zero interest and has infinite maturity. The monetary authorities can issue as much money as they like. Hence, if the price level were truly independent of money issuance, then the monetary authorities could use the money they create to acquire indefinite quantities of goods and assets. This is manifestly impossible in equilibrium. Therefore money issuance must ultimately raise the price level, even if nominal interest rates are bounded at zero. This is an elementary argument, but, as we will see, it is quite corrosive of claims of monetary impotence.²⁵

In Krugman's 2018 paper, he criticizes Bernanke for having claimed that printing money is effective at the zero bound. It is true that Bernanke's 1999 critique of the BOJ has a more monetarist orientation than Krugman's 1998 paper, and in retrospect Bernanke did

23. Bernanke, "Japanese Monetary Policy," 10.

24. Ben S. Bernanke (remarks, Federal Reserve Bank of Dallas Conference on the Legacy of Milton and Rose Friedman's *Free to Choose*, Dallas, October 24, 2003).

25. Bernanke, "Japanese Monetary Policy," 14–15.

seem a bit overly optimistic about the prospects for QE to boost spending. However, I interpret Bernanke's QE claim a bit differently from how his critics do. Bernanke is not so much suggesting that central banks should buy up an infinite amount of assets; rather, he is pointing out that a determined central bank has the ammunition to hit any inflation target.

If a credible regime of monetary stimulus were adopted, then the size of monetary injections would depend on the demand for base money when inflation expectations are on target. And the higher the inflation target, the lower the demand for base money as a share of GDP (assuming no interest is paid on bank reserves). Ironically, the largest central bank balance sheets will occur in the countries with the lowest trend rates of inflation. In the long run, a central bank with a credible commitment to do "whatever it takes" will likely end up doing *much less* QE than a more timid central bank. I will return to this point later, because confusion about "running out of ammunition" has led to excessive pessimism about the potency of monetary policy at the zero bound.

Bernanke's second argument is that the BOJ should commit to a zero interest rate policy until inflation rises to the 3 percent to 4 percent range:

A problem with the current BOJ policy, however, is its vagueness. What precisely is meant by the phrase "until deflationary concerns subside"? Krugman (1998) and others have suggested that the BOJ quantify its objectives by announcing an inflation target, and further that it be a fairly high target. I agree that this approach would be helpful, in that it would give private decision-makers more information about the objectives of monetary policy. In particular, a target in the 3–4% range for inflation, to be maintained for a number of years, would confirm not only that the BOJ is intent on moving safely away from a deflationary regime, but also that it intends to make up some of the "price-level gap" created by eight years of zero or negative inflation.²⁶

In a 2003 speech, Bernanke was even more explicit, calling for a price-level target rising at 1 percent a year.²⁷ This rise would force the BOJ to make up for any near-term undershooting of its price level with above-normal future inflation.

Next, Bernanke addresses the question of whether the BOJ has the tools necessary for boosting inflation. He begins by recommending yen depreciation in the foreign exchange market and responds as follows to those who worry about the effect of this policy on Japan's trading partners:

Whatever validity this political argument [against depreciation] may have had at various times, it is of no relevance at the current moment, as Japan has recently been urged by its most powerful allies and trading partners to weaken the yen—and refused!

26. Bernanke, "Japanese Monetary Policy," 16–17.

27. Ben S. Bernanke, "Some Thoughts on Monetary Policy in Japan" (speech, Japan Society of Monetary Economics, Tokyo, May 31, 2003).

Moreover, the economic validity of the “beggar-thy-neighbor” thesis is doubtful, as depreciation creates trade—by raising home-country income—as well as diverting it. Perhaps not all those who cite the “beggar-thy-neighbor” thesis are aware that it had its origins in the Great Depression, when it was used as an argument against the very devaluations that ultimately proved crucial to world economic recovery.²⁸

Responding to arguments that the BOJ might be incapable of depreciating the yen, Bernanke again pointed to the *reductio ad absurdum* argument that Japan could theoretically buy up unlimited quantities of foreign assets with zero interest yen-base money.

Bernanke also discusses several other options, such as money-financed fiscal deficits that increase the money supply (the so-called helicopter drop), and very large open market purchases of assets (later termed *quantitative easing*). He noted that BOJ officials seemed to be concerned that large asset purchases would expose the BOJ to balance sheet risk and then argued that this sort of “risk” was largely illusory given that a central bank balance sheet is effectively part of the broader fiscal authority balance sheet:

BOJ officials have pointed out that if the BOJ purchased large quantities of long-term government bonds, and interest rates later rose, the Bank would suffer capital losses. Under current law these losses would not be indemnified, even though they would be precisely offset by gains by the fiscal authority. This concern has led the BOJ to express reluctance to consider engaging in such operations in the first place.

Perhaps the Bank 201 of Japan Law should be reviewed, to eliminate the possibility that such trivial considerations as the distribution of paper gains and losses between the monetary and fiscal authorities might block needed policy actions. An alternative arrangement that avoids the balance-sheet problem would be to put the Bank of Japan on a fixed operating allowance, like any other government agency, leaving the fiscal authority as the residual claimant of BOJ’s capital gains and losses.²⁹

The 1999 paper concludes with a fairly harsh indictment of the BOJ, which echoes the title of the paper:

Japan is not in a Great Depression by any means, but its economy has operated below potential for nearly a decade. Nor is it by any means clear that recovery is imminent. Policy options exist that could greatly reduce these losses. Why isn’t more happening? To this outsider, at least, Japanese monetary policy seems paralyzed, with a paralysis that is largely self-induced. Most striking is the apparent unwillingness of the monetary

28. Bernanke, “Japanese Monetary Policy,” 19–20. This window of opportunity closed in 2003, when the United States began pressuring Japan to stop depreciating its currency.

29. Bernanke, “Japanese Monetary Policy,” 24–25.

authorities to experiment, to try anything that isn't absolutely guaranteed to work. Perhaps it's time for some Rooseveltian resolve in Japan.³⁰

Some might argue that subsequent events in the United States and Europe showed that Bernanke was too harsh in his criticism of Japan. And indeed, Bernanke later softened his criticism when he acquired a better understanding of the political and institutional barriers faced by central bankers' contemplating radical change.

Nonetheless, Bernanke's 1999 critique still seems valid, at least in a technical sense. Japan refused to take Bernanke's advice from 1999 and actually adopted an explicitly contractionary monetary policy in the decade after 2000. Indeed, the BOJ *raised interest rates in 2000, and again in 2006*. And as noted earlier, the BOJ sharply reduced the monetary base in 2006. This later decision was especially unfortunate, because Japan's economy was relatively strong at the time and escaping the zero rate bound in 2006 would have been far easier than at any time in the past 12 years.

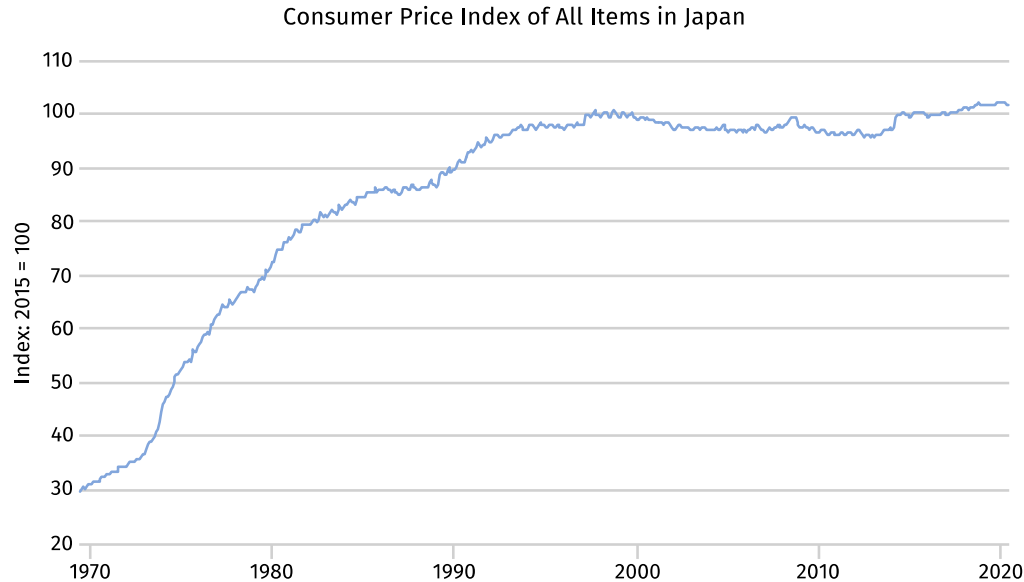
Many pundits missed the fact that Japan had tightened monetary policy in 2000 and 2006, as the interest rate increases were quite modest. Recall, however, that Bernanke had warned that interest rates do not measure the stance of monetary policy; for that stance, you need to look at inflation and NGDP growth. The rate increases did, however, provide evidence of the BOJ's policy intentions; they represented a sort of *confession of contractionary intent*.³¹

A central bank does not raise interest rates unless it is trying to prevent excessive growth in spending or inflation. Because the BOJ's target during the 1990s and first decade after 2000 was "stable prices," because prices (measured by Japan's consumer price index [CPI]) were in fact quite stable after 1993 (see figure 3.4), and because the BOJ repeatedly raised and lowered interest rates during this period, the inference is that the price level was roughly on target. It wasn't a lack of ammunition; the near-zero CPI inflation rate was what the BOJ was aiming for (before the Abe government).

30. Bernanke, "Japanese Monetary Policy," 25–26.

31. Susan Woodward and Robert Hall used similar wording in calling the Fed's explanation for its 2008 decision to pay interest on reserves a "confession of contractionary effect," but the term *intent* better fits their argument. Intentions are highly important when evaluating whether policymakers tried to stimulate and failed, or never tried at all. Susan Woodward and Robert Hall, "Options for Stimulating the Economy," *Financial Crisis and Recession* (blog), December 8, 2008.

Figure 3.4: Japan's Consumer Price Index, 1970–2020



Source: International Monetary Fund 2021 data, retrieved from FRED, Federal Reserve Bank of St. Louis.

Although the rate increases of 2000 and 2006 were small, the signaling effect was both important and detrimental. Those moves persuaded the Japanese public that the BOJ would not allow a positive inflation rate. That view created more bearish expectations and had the effect of lowering the natural (equilibrium) interest rate, in nominal terms. A 25-basis-point increase in the policy rate can be highly contractionary if it leads to a 50- or 75-basis-point fall in inflation expectations and hence a 75- or 100-basis-point increase in the gap between the policy rate and the equilibrium rate.

The perils of decision-making by consensus

There are at least three ways to think about Bernanke's tenure at the Fed. One possibility is that the weak recovery from the Great Recession shows that Bernanke's previous criticism of Japanese policymakers was misguided; his proposed policies were largely ineffective. A second possibility is that Bernanke misjudged the situation in 2008 and 2009, and he failed to act aggressively enough. A third possibility is that Bernanke saw the problem correctly but was unable to persuade his colleagues of the need for aggressive action.

The first view is based on a misconception. After joining the Fed in 2002, Bernanke was never able to persuade his colleagues to adopt either price-level targeting or the "whatever it takes" approach to asset purchases that he recommended to the Japanese. The Fed was also quite averse to any sort of currency depreciation channel, viewing the exchange rate as the purview of the Treasury. It is not that Bernanke's 1999 policy proposals failed when tried at the Fed, but rather that the proposals were never tried. Here is Laurence Ball:

In these early writings, Bernanke advocated a number of aggressive policies, including targets for long-term interest rates, depreciation of the currency, an inflation target of 3–4%, and a money-financed fiscal expansion. Yet, since the U.S. hit the zero bound in December 2008, the Bernanke Fed has eschewed the policies that Bernanke once supported and taken more cautious actions—primarily, announcements about future federal funds rates and purchases of long-term Treasury securities (without targets for long-term interest rates). . . .

In discussing one of Bernanke’s early writings on the zero bound, Christina Romer says, “My reaction to it was, ‘I wish Ben would read this again.’” . . . Paul Krugman (2011b) asks “why Ben Bernanke 2011 isn’t taking the advice of Ben Bernanke 2000.” In criticizing Fed policy, Joseph Gagnon echoes Bernanke’s criticism of the Bank of Japan: “It’s really ironic. It’s a self-induced paralysis.” . . .

[Bernanke’s views] changed abruptly in June 2003, while Bernanke was a Fed Governor. On June 24, the FOMC [Federal Open Market Committee] heard a briefing on policy at the zero bound prepared by the Board’s Division of Monetary Affairs and presented by its director, Vincent Reinhart. The policy options that Reinhart emphasized are close to those that the Fed has actually implemented since 2008; Reinhart either ignored or briefly dismissed the more aggressive policies that Bernanke had previously advocated.³²

I was also critical of Bernanke back in 2011, but over time I’ve taken a more nuanced position. There is a big difference between being an academic who is free to speak his mind and being in charge of a large conservative institution with highly diverse internal policy views. It is not at all clear that an alternative Fed chair would have done any better under the same circumstances—or even as well. Indeed, the closest parallel to the large and decentralized Federal Reserve System is probably the European Central Bank (ECB), which did much worse by almost every single metric. And within the United States, the Fed was mostly being criticized for being *too dovish*.

In my view, pundits tend to overrate the influence of the leader of any large organization, whether a head of state or a Federal Reserve chair. Looking back over the past 100 years, Fed policy has usually reflected the consensus view of economists at the time, even when in retrospect it is clear the Fed made serious errors. During the 1930s, most economists did not blame the Fed for deflation, and during the 1970s, most economists did not blame the Fed for high inflation. And almost all major central banks switched to inflation targeting in the 1980s and 1990s, regardless of who happened to head the central bank. Although I agree with Romer and Krugman that a more expansionary policy would have

32. Laurence M. Ball, “Ben Bernanke and the Zero Bound” (NBER Working Paper No. 17836, National Bureau of Economic Research, Cambridge, MA, February 2012), 1–3.

been appropriate in 2011, that opinion was not the consensus view of US economists, a group that, if anything, favored a bit more hawkish policy.³³

In his memoir, Bernanke conceded that the Fed erred in not cutting interest rates (then 2 percent) at the September 2008 meeting after Lehman Brothers failed.³⁴ It also seems clear that the October decision to pay interest on bank reserves was poorly timed, even if Fed officials deny any contractionary intent.³⁵ But those decisions were not heavily criticized at the time, because the consensus view (wrongly) assumed the banking crisis was the real problem and that a bank bailout would fix the problem. When output continued to fall sharply after the Troubled Asset Relief Program was enacted, both the Fed and the broader profession realized that aggregate demand was plunging much faster than had been anticipated, and policy pivoted toward a more expansionary stance.

The quotations critical of Bernanke and the Fed in Laurence Ball's 2012 paper reflect frustration among "doves" with Fed policy during the long recovery, during which GDP growth was unusually weak.³⁶ Yet the criticism was not particularly widespread. At the time, it was widely believed that banking crises are usually followed by weak economic growth. Actually, previous US banking crises were generally followed by rapid economic growth.³⁷ So why wasn't the Fed more aggressive? Why didn't it adopt level targeting to boost inflation expectations or adopt a much more aggressive QE program, or both?

Bernanke never claimed that the Fed was out of ammunition; indeed, he always insisted that it had the ability to do more if necessary. He also made it clear that the Fed desired a more rapid recovery and appreciated help from the fiscal side. So why not do more? When asked, Bernanke was a bit vague, citing "costs and risks" associated with a more expansionary policy.

Some might argue that—to avoid creating even more bearish sentiment in the financial markets—Bernanke was covering up the fact that the Fed was out of ammunition. That cover-up is possible, but it seems unlikely that Bernanke had abandoned his earlier view

33. Paul Wiseman, "Economists Oppose a New Fed Stimulus," *Philadelphia Inquirer*, June 14, 2011.

34. Ben S. Bernanke, *The Courage to Act: A Memoir of a Crisis and Its Aftermath* (New York: W. W. Norton, 2015).

35. It is true that the motivation for the payment of interest on reserves (IOR) was to allow the Fed to keep short-term rates at its 1.5 percent target. At the time, the Fed was injecting a large quantity of reserves into the economy to address stresses to the banking system. Given that policy decision, the additional decision to pay IOR was indisputably contractionary, when considered in isolation. An interesting counterfactual thought is whether the Fed would have rescued the banking system without congressional authorization for the payment of IOR. I believe the answer is yes, and hence IOR was contractionary. (Also see footnote 31.)

36. Ball, "Ben Bernanke and the Zero Bound."

37. See Michael D. Bordo and Joseph G. Haubrich, "Deep Recessions, Fast Recoveries, and Financial Crises: Evidence from the American Record," *Economic Inquiry* 55, no. 1 (2017): 527–41.

that central banks never run out of ammunition, at least in a technical sense. And why should he have changed his view, which was a correct one? Another hypothesis is that Bernanke had become more aware of institutional barriers to enacting an aggressive policy, and he was unable to be fully candid about the problems. Consider the following three possibilities:

1. Bernanke could not convince a majority of the Federal Open Market Committee (FOMC) that more monetary stimulus would not risk excessive inflation and that if a modest inflation overshoot occurred, it would be appropriate.
2. Bernanke convinced the FOMC that faster growth in spending was desirable, but the committee worried about the costs and risks of an extremely large bond portfolio, which might result in enormous losses if interest rates rose during a recovery.
3. Bernanke was able to convince most of the FOMC, but three or four members refused to go beyond the actual policy that was enacted. Moreover, Bernanke feared that having that many dissenters would reduce the credibility of Fed promises to make up for any shortfall in near-term inflation.

For this perspective, it is easy to understand why Bernanke had a hard time answering questions as to why the Fed wasn't doing more. We know that Bernanke had previously argued (correctly) that the BOJ should not have been concerned about balance sheet risk. But a Fed chair is also a diplomat. If he had worked hard to get as much stimulus through the FOMC as possible, with a minimum number of dissents, it would not be helpful to throw his colleagues under the bus by suggesting that their fears about doing more were based on ignorance. Ball suggests that Bernanke has a reputation for being polite, but there are also sound reasons for the head of an organization such as the Fed to avoid antagonizing people whose support the head needs to fashion a credible policy.³⁸

In my view, the Fed would have done a bit better if Bernanke had had a free hand. But research on the "wisdom of crowds" suggests that, on average, a committee such as the FOMC will make better decisions than will a single individual. To criticize Bernanke for making the FOMC more collegial is analogous to arguing that a dictatorship is superior to democracy based solely on the impressive results achieved by Lee Kuan Yew in Singapore. A single example doesn't prove a point. Although a few smaller central banks in places like Australia did better than the Fed, it is easier for a small open economy to inflate because the currency depreciation channel is more available than in large countries.

38. Ball, "Ben Bernanke and the Zero Bound."

The closest comparison to the Fed is the ECB, which presides over a similar-size economy and is an unusually decentralized central bank. The ECB did far worse than the Fed did—in terms of both policy inputs and economic outcomes. Even though the global crisis began in the United States and centered on the US housing and banking sectors, the recession ended up being worse in Europe, *even before the failure of Lehman Brothers*. Indeed, the ECB actually raised its interest rate target in mid-2008 and then raised rates twice in 2011, triggering a severe double-dip recession (which the United States avoided). The ECB was not even at the zero bound throughout 2008–2012, so those policy failures were not merely errors of omission nor just a failure to do unconventional policies. Rather, the ECB’s management of *conventional policy tools*, such as its interest rate target, was quite inept.

In the United States, the Fed faced a great deal of pressure from politicians to do less and very little pressure to do more. Council of Economic Advisers chair Christina Romer suggested that she had difficulty convincing President Obama that the Fed *could* do more.

The Princeton School showed that at the zero lower bound, the expected future path of monetary policy matters far more than does the current policy stance, and this fact made Bernanke’s job especially difficult. In the early 1980s, Fed Chair Paul Volcker occasionally forced through policy changes over the objections of a significant number of FOMC voters. Because there is no upper bound on interest rates, however, a highly contractionary policy was relatively easy to implement (in a technical sense).

In contrast, Bernanke’s task was made more difficult by the zero lower bound—hence the need to convince the public that the policy strategy would persist even after he was no longer Fed chair. Bernanke would have needed a high degree of consensus within the FOMC to make a credible “promise to be irresponsible,” which would be carried out at a future date when he might no longer be Fed chair.

In 2012, Ball argued, “There is no doubt that Ben Bernanke’s views on zero-bound policy have changed over time.”³⁹ Ball cited the fact that Bernanke stopped advocating price-level targeting after he became Fed chair. Today, however, Ball’s claim is very much in doubt. After Bernanke left the Fed, he resumed his advocacy of price-level targeting. A much more plausible interpretation is that Bernanke’s views on the optimal policy never changed significantly—what changed is his appreciation of the political difficulties facing central bank governors.

Although the Fed’s 2020 decision to adopt average inflation targeting is not exactly the temporary price-level targeting regime that Bernanke proposed,⁴⁰ it is relatively close. Academic ideas often must be debated for years or even decades before being adopted as

39. Ball, “Ben Bernanke and the Zero Bound,” 34.

40. Ben S. Bernanke, “Temporary Price-Level Targeting: An Alternative Framework for Monetary Policy,” *Ben Bernanke’s Blog*, October 12, 2017.

policy, as is appropriate for policy decisions with such powerful effects on the economy. During the 1970s, even inflation targeting would have been regarded as a wildly unrealistic and utopian proposal; by the 1990s, it was standard in much of the world. It is the job of an academic to propose policies that might be politically infeasible at the moment but have a chance of becoming accepted over time. It is the job of policymakers to do the best that they can, given institutional constraints. Bernanke did well in both roles.

Gauti Eggertsson and Michael Woodford on Policy Signaling and Level Targeting

Michael Woodford's highly influential 2003 book *Interest and Prices* provided a way of thinking about interest rate rules in a New Keynesian framework with rational expectations.⁴¹ In the same year, Gauti Eggertsson and Woodford coauthored a paper that applied this approach to a situation where interest rate policies are constrained by the zero lower bound:

The key to dealing with this sort of situation in the least damaging way is to create the right kind of expectations regarding how monetary policy will be used after the constraint is no longer binding, and the central bank again has room to maneuver. We use our intertemporal equilibrium model to characterize the kind of expectations regarding future policy that it would be desirable to create, and we discuss a form of price-level targeting rule that—if credibly committed to—should bring about the constrained-optimal equilibrium. We also discuss, more informally, how other types of policy actions could help increase the credibility of the central bank's announced commitment to this kind of future policy.⁴²

Eggertsson and Woodford describe their model as an extension of Krugman's 1998 paper, featuring a more sophisticated and realistic price-setting process and richer dynamics, which allow for more specific policy recommendations:

These richer dynamics are also important for a realistic discussion of the kind of policy commitment that can help to reduce economic contraction during a liquidity trap. In our model a commitment to create subsequent inflation involves a commitment to keep interest rates low for some time in the future, whereas in Krugman's model a commitment to a higher future price level does not involve any reduction in future nominal interest rates. We are also better able to discuss such questions as how the creation of inflationary expectations while the zero bound is binding can be reconciled

41. Michael Woodford, *Interest and Prices: Foundations of a Theory of Monetary Policy* (Princeton, NJ: Princeton University Press, 2003).

42. Gauti B. Eggertsson and Michael Woodford, "The Zero Bound on Interest Rates and Optimal Monetary Policy," *Brookings Papers on Economic Activity* 1 (2003): 143–44.

with maintaining the credibility of the central bank's commitment to long-run price stability.⁴³

This statement doesn't mean Krugman's model was wrong; rather, he used a fairly simple setup to isolate the key policy issues at the zero bound.

Later, this paper will consider how NeoFisherian analysis has raised questions about the implications of commitments regarding the future path of interest rates. Does a long period of low rates actually constitute easy money? Nonetheless, Eggertsson and Woodford point out that this sort of policy commitment is certainly one concrete step available to central banks, even at the zero bound:

Because the central bank can clearly control the future path of short-term nominal interest rates if it has the will to do so, any failure of such a commitment to be credible will not be due to skepticism about whether the central bank is able to follow through on its commitment.⁴⁴

Eggertsson and Woodford also discuss two ways that a helicopter drop could be effective in boosting aggregate spending:

First of all, it is typically supposed that the expansion of the money supply will be permanent. If this is the case, then the function φ that defines interest rate policy is also being changed, in a way that will become relevant at some future date, when the money supply no longer exceeds the satiation level. Second, the assumption that the money supply is increased through a helicopter drop rather than an open-market operation implies a change in fiscal policy as well.⁴⁵

In other words, a helicopter drop might be seen as a commitment to permanently increase the monetary base (which will have implications for the future path of interest rates), or as a commitment to enact a more expansionary fiscal policy, or both.

They repeatedly argue that at the zero lower bound the purely mechanical effects of open market purchases are almost inconsequential; any important effects are from the signaling channel. However, this claim is actually always true, even when rates are positive:

In fact, the management of expectations is the key to successful monetary policy at all times, not just in those relatively unusual circumstances when the zero bound is reached. The effectiveness of monetary policy has little to do with the direct effect of

43. Eggertsson and Woodford, "Zero Bound on Interest Rates," 144.

44. Eggertsson and Woodford, "Zero Bound on Interest Rates," 145.

45. Eggertsson and Woodford, "Zero Bound on Interest Rates," 163.

changing the level of overnight interest rates, since the current cost of maintaining cash balances overnight is of fairly trivial significance for most business decisions.⁴⁶

Thus, in January 2001, September 2007, and December 2007, global equities gained or lost hundreds of billions of dollars within minutes after Fed announcements that were slightly easier or tighter than expected.⁴⁷ Clearly, those dramatic market responses occurred because the Fed announcement led to changes in the expected future path of policy, not because the federal funds rate on that particular day was slightly different from previous market expectations. The adjustment of the fed funds target is, above all else, a *signal of future policy intentions*.

From this perspective, the zero-bound problem is not so much about an inability to further cut interest rates; rather, the central bank's traditional tool for signaling future policy intentions is inoperative. When short-term interest rates cannot be adjusted, a central bank becomes *mute*—unable to signal expansionary policy shifts. It must find a new language for communicating with financial markets. This language might involve commitments to the future path of interest rates, large-scale asset purchases, exchange rate depreciation, or combined fiscal and monetary stimulus. In all four cases, the immediate direct impact is marginal; the signaling effect is paramount.

The most important policy implication of Eggertsson and Woodford is that policy should no longer be purely forward-looking, that is, focused solely on optimizing future outcomes conditional on current conditions. Rather, policy should be *history dependent*, which means that current policy decisions should depend not only on current macroeconomic conditions but also on the previous path of inflation and output. As a practical matter, this principle means that policy should shift from inflation targeting to some form of price-level target, where the Fed commits to return to a previous price-level path after a period where it falls short.⁴⁸

The intuition behind history-dependent policies is that they create expectations regarding the price level or nominal GDP that are themselves stabilizing for the economy. If the public understands that the central bank is committed to reversing previous policy errors, then near-term price-level or nominal spending deviations from the target path are likely to be smaller. For instance, wage negotiations will occur with the understanding that inflation overshoots or undershoots are likely to be reversed in the near future.

46. Eggertsson and Woodford, "Zero Bound on Interest Rates," 165.

47. See Scott Sumner, "A Critique of Interest Rate-Oriented Monetary Economics" (Mercatus Working Paper, Mercatus Center at George Mason University, Arlington, VA, November 2020).

48. More specifically, the optimal policy calls for returning to slightly above the previous price-level trend line after a period at the zero bound, although they also argue that this would be difficult to signal to the public and that a simple price-level target path is nearly as effective. In addition, the optimal policy rule would continue to respond to output gaps.

One can view a history-dependent policy such as a price-level target as an indirect way of achieving Krugman's promise to be irresponsible but without the negative connotations of that phrase. If policy has committed to a target path for the price level, then a period of catch-up inflation after exiting a liquidity trap will be seen as consistent with the announced price-level target, rather than being inconsistent with an inflation target.

Woodford on Nominal GDP Targeting

By 2012, the United States was in the midst of a disappointingly slow recovery from the Great Recession, and Woodford revisited the issue with a highly influential paper that examined monetary policy options at the zero bound.⁴⁹ Woodford begins by reviewing the policy recommendations of the 2003 Eggertsson and Woodford paper,⁵⁰ specifically the idea that at the zero bound a central bank should target the output gap–adjusted price level. Then Woodford considers a forward guidance proposal by Chicago Fed President Charles Evans that would have been easier to communicate to the public but that lacks the important catch-up provision of level targeting. In the end, Woodford suggests that nominal GDP–level targeting might represent a good compromise:

An alternative that I believe should be equally easy to explain to the general public, but that would preserve more of the advantages of the adjusted price-level target path, would be a criterion based on a nominal GDP target path Under this proposal, the FOMC would pledge to maintain the funds rate target at its lower bound as long as nominal GDP remains below a deterministic target path, representing the path that the FOMC would have kept it on (or near) if the interest rate lower bound had not constrained policy since late 2008. Once nominal GDP again reaches the level of this path, it will be appropriate to raise nominal interest rates, to the level necessary to maintain a steady growth rate of nominal GDP thereafter

Essentially, the nominal GDP target path represents a compromise between the aspiration to choose a target that would achieve an ideal equilibrium if correctly understood and the need to pick a target that can be widely understood and can be implemented in a way that allows for verification of the central bank's pursuit of its alleged target, in the spirit of Milton Friedman's celebrated proposal of a constant growth rate for a monetary aggregate. Indeed, it can be viewed as a modern version of Friedman's "k-percent rule" proposal, in which the variable that Friedman actually cared about stabilizing (the growth rate of nominal income) replaces the monetary aggregate

49. Michael Woodford, "Methods of Policy Accommodation at the Interest-Rate Lower Bound," in *Proceedings: Economic Policy Symposium in Jackson Hole* (Kansas City, MO: Federal Reserve Bank of Kansas City, 2012), 185–288. The *Washington Post* called the paper "the year's most important academic paper."

50. Eggertsson and Woodford, "Zero Bound on Interest Rates."

that he proposed as a better proximate target, on the ground that the Fed had much more direct control over the money supply.⁵¹

Because NGDP growth equals inflation plus real GDP growth, and because real growth fluctuations are highly correlated with changes in the output gap (at cyclical frequencies), NGDP-level targeting would likely produce outcomes not much inferior to output gap-adjusted price-level targeting. In addition, it would be easier to communicate and would avoid the difficult problem of estimating the output gap.

Although the Fed has not formally adopted NGDP-level targeting, Woodford's paper did seem to have an effect on the 2012 Jackson Hole meetings. Soon after those meetings, the Fed announced an aggressive policy of monetary stimulus, which included more aggressive forward guidance, as well as a third round of QE.

St. Louis Fed President James Bullard is an NGDP targeting proponent and has described the flexible average inflation targeting (FAIT) regime adopted in 2020 as being "close to" both NGDP targeting and price-level targeting.⁵² Fed Vice Chair Richard Clarida described the new policy as follows:

I believe that a useful way to summarize the framework defined by these five features is temporary price-level targeting (TPLT, at the ELB) that reverts to flexible inflation targeting (once the conditions for liftoff have been reached).⁵³

Recall that Ben Bernanke had recommended temporary price-level targeting in 2017. Thus, the Fed's new FAIT policy has clear links to a line of research that began with Krugman in 1998 and continued in the work of Bernanke, Eggertsson, and Woodford.

If the Fed both wished to *and intended to* adopt NGDP-level targeting, or output gap-adjusted price-level targeting but was worried about the challenges of communicating a new framework that did not include the term *inflation*, then flexible average inflation targeting would be a natural compromise. It would not preclude the Fed from targeting the price level along a path rising at 2 percent a year, because a successful price-level targeting strategy will also generate an average inflation rate of 2 percent. But a FAIT regime would actually contain the phrase "2 percent inflation," which would help reassure the public that the Fed was not abandoning its commitment to low inflation.

51. Michael Woodford, "Methods of Policy Accommodation," 228–29.

52. David Beckworth (@DavidBeckworth), "Called it in September: AIT is the Fed's watered-down version of TPLT," Twitter, November 16, 2020.

53. Richard H. Clarida, "The Federal Reserve's New Framework: Context and Consequences" (speech, "The Road Ahead for Central Banks" seminar sponsored by the Hoover Economic Policy Working Group, Hoover Institution, Stanford, CA (via webcast), January 13, 2021 (emphasis added)).

Eggertsson on the Great Depression

Gauti Eggertsson wrote several insightful papers that applied the Princeton approach to US policy during 1933–1938, a period of near-zero nominal interest rates. Eggertsson and Benjamin Pugsley argued that a series of policy statements and actions during 1936/37 signaled that Franklin Roosevelt was abandoning his long-held policy goal of raising prices to pre-Depression levels.⁵⁴ Importantly, bearish policy signals are especially important at the zero bound, even if the concurrent policy *actions* have a relatively minor direct effect on the economy.

In the concluding paragraph, Eggertsson and Pugsley offered a prescient warning to the Bank of Japan, which would raise interest rates during 2006 because of fears that Japan's economy might overheat:

The most obvious similarity is that Japan is also contemplating a transition from zero interest rates to positive ones. The U.S. experience indicates that economic outcomes can be extremely sensitive to expectations given those circumstances. It appears that Japan might be vulnerable to contractionary spirals. This highlights the importance of clear communication by the Bank of Japan about its future inflationary goals as argued by Eggertsson and Ostry (2005). In particular, the market is very sensitive to signals about the future policy regime. Given the asymmetries documented in the paper, it seems to us more prudent to err on the side of inflation, rather than deflation.⁵⁵

Unfortunately, the BOJ ignored their advice.

From the vantage point of 2021, it is hard not to recall numerous examples of interest rate decisions that seemed inconsequential at the time but may have had a major contractionary impact through the signaling channel. These changes include a small rise in Japanese interest rate targets in 2000 and then again in 2006, similar increases in the eurozone in 2008 and 2011, and even the Fed's decision to pay interest on bank reserves in 2008. Though the direct effects of those actions were presumably quite modest, each policy action signaled complacency about the prospects for achieving moderate inflation, and each action seems clearly mistaken in retrospect. To get a sense of how Eggertsson was going against the conventional wisdom, consider this *New York Times* story from 2006:

Economists applauded the Bank of Japan's interest rate increase, the first in six years, as a long-awaited signal that Japan's \$4.6 trillion economy is finally getting back on track.

They said that by moving pre-emptively on Friday, long before a return of inflation is likely to [become] a threat, the central bank was also hoping to demonstrate that it was

54. Gauti B. Eggertsson and Benjamin Pugsley, "The Mistake of 1937: A General Equilibrium Analysis," *Monetary and Economic Studies* (Institute for Monetary and Economic Studies, Bank of Japan) 24, no. S1 (2006): 151–90.

55. Eggertsson and Pugsley, "The Mistake of 1937," 188.

watching prices carefully, and was therefore up to the task of stewarding Japan's economy, the world's second largest after the United States.⁵⁶

There is a widespread perception that the BOJ tried and failed to raise inflation above zero during the late 1990s and first decade after 2000. This conclusion is somewhat misleading. During that period, the BOJ tried and succeeded in *preventing* inflation from rising significantly above or below zero. Note that at this time the goal of the BOJ was still price stability, before it adopted a 2 percent inflation target in 2013.

In 2008, Eggertsson examined the role of the expectations channel in the recovery from the Great Depression, particularly the radical regime change that occurred after FDR took office in March 1933 and left the gold standard:

Despite the fact that neither the nominal interest rate nor the money supply changed much at the turning point, the paper argues that the elimination of the policy dogmas drastically changed the systematic part of monetary policy, i.e., the framework that governed the policy setting going forward. What changed was expectations about how the interest rate and the money supply would be set in the future, leading to a dramatic change in inflation expectations. One way of seeing this in the data is to observe that the short-term real interest rate, the difference between the short-term nominal interest rate and expected inflation, collapsed around the turning point in 1933, dropping from high levels during 1929–1933 to modestly negative in 1933–1937.⁵⁷

Industrial production soared by roughly 57 percent between March and July 1933, and the wholesale price index rose by nearly 20 percent in the 12 months after March 1933, despite high unemployment. The dramatic turnaround in macroeconomic conditions after March 1933 cannot plausibly be attributed solely to concrete actions such as small changes in the money supply and interest rates, or even modest growth in federal spending. Instead, asset prices soared on monetary and fiscal policy news coming out of the Roosevelt administration, especially the decision to leave the gold standard and devalue the dollar.

The decision to leave the gold standard in April 1933 affected policy expectations in a number of ways. Eggertsson emphasizes the asymmetric nature of an international gold standard, which puts a much greater constraint on monetary stimulus than on monetary contraction. (There is no upper limit to gold accumulation when policy is tightened, but gold reserves cannot fall below zero.) By leaving the gold standard, FDR removed one important constraint on expansionary monetary policy.

In addition, the gold standard had been deeply embedded in American policy for many decades, and thus the decision to devalue was a sort of promise to be irresponsible, a

56. Martin Fackler, "Economists Applaud Japan's Rate Increase," *New York Times*, July 15, 2006.

57. Gauti B. Eggertsson, "Great Expectations and the End of the Depression," *American Economic Review* 98, no. 4 (September): 1476–1516.

clear indication that the Roosevelt administration was serious about reflation. Indeed, several top administration officials resigned in protest, including the treasury secretary. Leaving the gold standard (especially when combined with fiscal stimulus) meant switching to an entirely different and more inflationary monetary policy, which is the sort of regime change required to meaningfully affect aggregate demand at the zero lower bound.

Eggertsson suggests that the gold standard was “abolished” but a better description might be “weakened,” because FDR’s action combined devaluation of the dollar with a prohibition on Americans owning gold. FDR gradually raised the dollar price of gold from its long-standing peg at \$20.67 per ounce, and then in 1934 he set a new gold price peg at \$35 per ounce, which would last for decades. This action reduced the US dollar’s value in foreign exchange markets, because foreigners were able to resume exchanging dollars for gold at \$35 per ounce in 1934.

Eggertsson does not put as much emphasis on the exchange rate devaluation aspect of FDR’s decision, mostly because the action does not seem to have had a significant effect on the trade balance. Thus, it is reasonable to view the dramatic turnaround in the economy as being mostly driven by domestic demand. However, devaluation can also affect the domestic economy through the policy signaling channel, even where the trade balance is not affected. Indeed, currency depreciation can directly raise inflation via the purchasing power parity effect. In the next section, I will show how Lars Svensson emphasized those points in developing a “foolproof” method of escaping from a liquidity trap.

Lars Svensson on Zero-Bound Policies in an Open Economy

As with the other members of the Princeton School, Lars Svensson saw a higher expected future price level as the *sine qua non* in any successful monetary stimulus at the zero bound.⁵⁸ To accomplish this rise in price-level expectations, he suggested a policy of currency depreciation. Svensson’s specific proposal relied on the twin concepts of purchasing power parity and interest parity:

A higher future price level would imply a correspondingly higher future exchange rate (when the exchange rate is measured as units of domestic currency per unit foreign currency, so a rise in the exchange rate is a depreciation, a fall in the value, of the domestic currency). Thus, current expectations of a higher future price level imply current expectations of a higher future exchange rate. But those expectations of a higher future exchange rate would imply a higher current exchange rate, a current depreciation of the currency. The reason is that, at a zero domestic interest rate, the exchange rate

58. Lars E. O. Svensson, “Escaping from a Liquidity Trap and Deflation: The Foolproof Way and Others” (NBER Working Paper No. 10195, National Bureau of Economic Research, Cambridge, MA, December 2003).

must be expected to fall (that is, the domestic currency must be expected to appreciate) over time approximately at the rate of the foreign interest rate. Only then is the expected nominal rate of return measured in domestic currency on an investment in foreign currency equal to the zero nominal rate of return on an investment in domestic currency; this equality is an approximate equilibrium condition in the international currency market But then, at unchanged domestic and foreign interest rates, the current exchange rate will move approximately one to one with the expected future exchange rate. If the expected future exchange rate is higher, so is the current exchange rate. Indeed, the whole expected exchange rate path shifts up with the expected future exchange rate. Thus, we have clarified that the optimal policy to escape from a liquidity trap, which involves expectations of a higher future price level, would result in an approximately equal current depreciation of the currency.⁵⁹

In essence, purchasing power parity links future expected price levels with future expected exchange rates, and the interest parity condition links future expected exchange rates with current exchange rates. The combination of these two relationships implies that for any given domestic and foreign interest rate, currency depreciation will boost inflation expectations.

Is currency depreciation effective at the zero bound?

Svensson calls this approach a foolproof method for escaping from a liquidity trap (correctly, in my view). But on closer inspection, it is not at all clear *why* this policy would work. As I have shown, the other members of the Princeton School have also concluded that a commitment to a higher future price level would be essential, but some doubts were raised as to whether central bank promises to achieve this goal would be credible. Exactly how does exchange rate targeting solve the time-inconsistency problem? More specifically, exactly how does the central bank *cause* the domestic currency to depreciate? How does this approach differ from a policy of printing enough money (i.e., doing enough QE) to raise expectations of the future price level? As I will show, there are no easy answers to such questions.

Monetarists often argue that increases in the monetary base can affect a wide variety of asset prices and not just the yield on short-term bonds. Eggertsson and Woodford, however, showed that swapping base money for T-bills not only would fail to boost aggregate spending, but also might have little or no effect on other asset prices at the zero bound. Because exchange rates are an asset price, can we actually assume that central banks are able to depreciate a currency when at the zero bound? Svensson points to the fact that while an exchange rate peg may be difficult to defend when speculators

59. Svensson, "Escaping from a Liquidity Trap," 10–11.

are pushing it lower, central banks have unlimited ability to meet the demand of speculators trying to push a currency higher:

If this crawling peg would fail, the domestic currency would appreciate back to the vicinity of the exchange rate before the announcement, making the currency a good investment. Thus, initially, before the peg's credibility has been established, there will be excess demand for the currency. This demand is easily fulfilled, however, since the central bank can print unlimited amounts of its currency and trade it for foreign exchange.⁶⁰

This view is quite similar to Bernanke's thought experiment from 1999. Because a central bank can print unlimited amounts of money, potentially buying up all the assets in the world, there is no question that a determined central bank can create inflation. In that case, currency depreciation is indeed a foolproof method of inflation at the zero bound, but then so is ordinary QE, at least if pursued aggressively enough. Again, I believe Svensson is correct on this point and will defend this view later in this chapter. But first, we should consider a reasonable objection to this foolproof method.

Here is Krugman in 2010, criticizing the view that the BOJ could simply devalue Japan's currency to generate some inflation:

Oh, and about the exchange rate: there's this persistent delusion that central banks can easily prevent their currencies from appreciating. As a corrective, look at Switzerland, where the central bank has intervened on a truly massive scale in an attempt to keep the franc from rising against the euro—and failed.⁶¹

One way to reconcile those two views is to think of a liquidity trap not as a zero lower bound on nominal interest rates, but rather as an effective upper bound on the *size of a central bank balance sheet*, perhaps caused by restrictions on the sort of assets the central bank is legally allowed to buy, or perhaps reflecting the maximum amount of risk to its balance sheet to which it is willing to be exposed. Alternatively, trading partners might object to an extremely aggressive currency intervention. Thus, Krugman might concede that a policy of currency depreciation backed by a willingness to buy unlimited assets would indeed succeed in creating inflation, while simultaneously questioning whether such a policy was politically feasible for real-world central banks at the zero bound.

From this perspective, currency depreciation is not so much a tool to be used to achieve an objective; rather, it is essentially the *objective itself*. An assumption that a monetary policy achieves substantial currency depreciation is tantamount to an assumption that the policy is successful in creating higher inflation. A sufficiently depreciated currency will

60. Svensson, "Escaping from a Liquidity Trap," 12.

61. Paul Krugman, "Japanese Monetary Policy (Wonkish)," *Paul Krugman* (blog), *New York Times*, July 30, 2010.

certainly create some inflation—imagine 1,000 yen to the dollar. But that assumption begs the question of whether central banks can actually depreciate their currencies.

Conversely, in mid-2011 (soon after Krugman’s comment), the Swiss did succeed in modestly depreciating the franc and then pegging it to the euro for a period of three and a half years. Denmark has maintained such a peg for decades, even at the zero bound. Later, we will revisit the question of whether a whatever-it-takes approach to monetary stimulus is feasible in the real world.

One argument against Svensson’s foolproof plan is that it would represent a sort of beggar-thy-neighbor policy, stealing growth from the affected country’s trading partners. But Svensson points out that any policy expected to boost the future price level will, by that very act, lead to currency depreciation:

However, we have already seen that the optimal way to escape from a liquidity trap, which involves expectations of a higher future price level, would directly lead to a corresponding depreciation of the currency Thus, opposing a currency depreciation is an argument against any expansionary monetary policy—which seems nonsensical.⁶²

This view is shared by other members of the Princeton School. Svensson also points out that the substitution effect (switching away from more expensive imported goods) is likely to be roughly offset by the income effect (faster growth in domestic demand drawing in more imports). Thus, currency depreciation need not hurt a country’s trading partners.

Nonetheless, a highly aggressive policy of currency depreciation might require extremely large purchases of *foreign financial assets*, and C. Fred Bergsten and Joseph Gagnon provide evidence that such purchases would also boost both domestic saving and the current account surplus because of imperfect substitutability between foreign and domestic assets.⁶³ Thus, the political feasibility of such a strategy for Japan remains in doubt.

In my view, the most interesting aspect of the Svensson proposal is its effect on domestic interest rates. In the optimal version, nominal rates are held at zero during the recovery, but he also discusses an almost-as-effective alternative—sharp depreciation followed by a fixed exchange rate peg, which would actually involve the domestic nominal interest rate *rising* to the level of foreign interest rates:

The constant peg would not be consistent with a zero domestic interest rate; instead the domestic interest rate would have to be raised to equal the foreign interest rate (in order to fulfill the equilibrium condition of approximate equality of the expected rate of return

62. Svensson, “Escaping from a Liquidity Trap,” 17.

63. C. Fred Bergsten, and Joseph E. Gagnon, *Currency Conflict and Trade Policy: A New Strategy for the United States* (Washington, DC: Peterson Institute for International Economics, 2016).

on investments in domestic and foreign currency mentioned above). But, the higher expected future price level and thereby higher expected inflation compensates for the higher interest rate, so the real interest rate would still equal the optimal one.⁶⁴

The intuition is simple. If Japan starts with 0 percent inflation and the United States has 2 percent inflation, then raising expected Japanese inflation to US levels will result in an exchange rate that is expected to remain fairly stable in the long run (assuming changes in the real exchange rate are mostly unforecastable). With expectations of no change in the nominal exchange rate, the interest parity condition requires that Japanese interest rates *immediately* rise to the level of US interest rates. In a later section, I will consider how this example relates to the NeoFisherian hypothesis.

Forecast Targeting as an Alternative to the Taylor Rule

Lars Svensson's critique of the Taylor rule may end up being even more influential than his foolproof plan for escaping a liquidity trap. In his 2003 paper, Svensson argues that "targeting rules" are superior to "instrument rules."⁶⁵ The abstract to a more recent version of the proposal does a nice job of explaining the concept:

Forecast targeting means selecting a policy rate and policy-rate path so that the forecasts of inflation and employment "look good," in the sense of best fulfilling the dual mandate of price stability and maximum employment, that is, best stabilize inflation around the inflation target and employment around its maximum level. It also means publishing the policy-rate path and the forecasts of inflation and employment forecasts and, importantly, explaining and justifying them. This justification may involve demonstrations that other policy-rate paths would lead to worse mandate fulfillment. Publication and justification will contribute to making the policy-rate path and the forecasts credible with the financial market and other economic agents and thereby more effectively implement the Federal Reserve's policy. With such information made public, external observers can review Federal Reserve policy, both in real time and after the outcomes for inflation and employment have been observed, and the Federal Reserve can be held accountable for fulfilling its mandate. In contrast to simple policy rules that rely on very partial information in a rigid way, such as Taylor-type rules, forecast targeting allows all relevant information to be taken into account and has the flexibility and robustness to adapt to new circumstances. Forecast targeting can also

64. Svensson, "Escaping from a Liquidity Trap," 13.

65. Lars E. O. Svensson, "What Is Wrong with Taylor Rules? Using Judgment in Monetary Policy through Targeting Rules," *Journal of Economic Literature* 41, no. 2 (2003): 426–77.

handle issues of time consistency and determinacy. The Federal Reserve is arguably to a considerable extent already practicing forecast targeting.⁶⁶

With an instrument rule, there is a predetermined formula for adjusting the central bank's policy instrument, which is the variable directly under its control. The most famous examples are variants of the Taylor rule, where the short-term interest rate target is adjusted according to past levels of inflation and the output gap. But other policy instruments have also been proposed, including the monetary base and the exchange rate. The exchange rate was the policy instrument in the Svensson proposal discussed in the previous section.

Svensson argued that rather than rely on a rigid formula for adjusting the policy instrument, it is generally preferable to set the instrument at a level expected to produce the optimal outcome, such as 2 percent inflation. Under this *targeting rule* approach, all information relevant to forecasting inflation would be used when setting interest rates—not just the information used in something like a Taylor rule. Thus, forecast targeting involves equating the central bank's goal (target) with the central bank forecast. If the policy goal is 2 percent inflation, then the policy rate is set at a level where the central bank forecasts 2 percent inflation.

Svensson's proposal turned out to be very well timed, because the steady decline in global interest rates has made the Taylor rule approach increasingly problematic. When interest rates fall to zero, the short-term interest rate is no longer a feasible policy instrument. Although a Taylor rule could be modified to allow for QE at the zero bound, doing so would likely involve a move toward a more discretionary policy, which weakens the argument for an instrument rule. An even bigger problem occurs when the equilibrium interest rate is declining, because the Taylor rule formula assumes a stable equilibrium real rate of interest. In recent decades, the equilibrium interest rate has been trending downward. In this environment, a rigid application of the Taylor rule could easily lead to an excessively high policy interest rate and hence a policy that is too contractionary.

A good example of Svensson's forecast targeting approach occurred in 2019. During that year, the Fed cut its policy rate three times to only 1.75 percent, a relatively low level for a booming economy. The cuts were not motivated by Taylor rule considerations, because unemployment was at the unusually low level of 3.5 percent and inflation was only slightly below target. Instead, there were widespread forecasts that President Donald Trump's trade war with China was hurting US manufacturing and investment and was slowing the economy. The rate cuts seemed successful, as shown during early 2020 (before the COVID-19 slump) when the economy continued to behave well, with no indication of overheating or rising inflation, even in forward-looking indicators such as Treasury Inflation-Protected Securities (TIPS) spreads.

66. Lars E. O. Svensson, "What Rule for the Federal Reserve? Forecast Targeting" (NBER Working Paper No. 23993, National Bureau of Economic Research, Cambridge, MA, September 2019).

Svensson served as a deputy governor of the Swedish Riksbank from 2007 to 2013. Unfortunately, he was unable to convince his colleagues of the merits of forecast targeting, and he clashed with his fellow governors when the policy rate was set at levels expected to produce suboptimal results, even according to *the Riksbank's own internal forecasts*. It was as if a ship captain heading across the Atlantic had set the ship's wheel at a position expected to result in the ship's being 200 miles off course when it reached the other side of the ocean. Subsequent events showed that Svensson was correct and that the Riksbank had been too contractionary during the recovery from the Great Recession. There is evidence that the Fed made a similar error in the fall of 2008.⁶⁷

The Princeton School, NeoFisherism, and Market Monetarism

A macroeconomic model can often be better understood by comparing its key tenets with alternative theories, especially when there is some overlap between the models. In the past decade, two heterodox theories have attracted some attention in the economics blogosphere. In each case, there are interesting points of overlap and divergence with the Princeton School. This section first discusses the NeoFisherian model and then considers a set of ideas dubbed “market monetarism.”

NeoFisherian adherents claim that lower interest rates actually represent a disinflationary monetary policy stance, which conflicts with not just the Princeton School but with mainstream macroeconomics in general.⁶⁸ This view also seems to contradict real-world practice among central bankers, where an increase in the policy rate is generally viewed as *contractionary*. And yet as noted earlier, one of Svensson's suggestions for a foolproof monetary stimulus involved *higher* nominal interest rates, even in the short run. Thus, we need to reconcile the two views.

Market monetarists are associated with a bundle of ideas, including an advocacy of NGDP targeting, a preference for using market prices as a guide to monetary policy, and a high degree of optimism regarding the effectiveness of monetary policy at the zero bound. Because of this optimism, the monetarists are more likely to blame demand-side recessions on the failure of monetary policy (often errors of omission) rather than on

67. See Scott Sumner, *The Money Illusion: Market Monetarism, the Great Recession, and the Future of Monetary Policy* (Chicago: University of Chicago Press, 2021).

68. John Cochrane has extensively discussed this view (albeit without necessarily endorsing the idea), as has Stephen Williamson. See John H. Cochrane, “Doctrines Overturned,” *The Grumpy Economist* (blog), February 28, 2015; John H. Cochrane, “Michelson-Morley, Fisher, and Occam: The Radical Implications of Stable Quiet Inflation at the Zero Bound,” in *NBER Macroeconomics Annual*, vol. 32 (Cambridge, MA: National Bureau of Economic Research, 2017); Stephen D. Williamson, “Neo-Fisherism: A Radical Idea, or the Most Obvious Solution to the Low-Inflation Problem?,” *Regional Economist*, Federal Reserve Bank of St. Louis, July 5, 2016.

exogenous shocks to the economy. As I will show, market monetarism also has important connections with the Princeton School.

Interest Rates as a Policy Instrument and Indicator

A 2015 paper by Mariana Garcia-Schmidt and Michael Woodford criticizes the NeoFisherian model.⁶⁹ They begin by discussing the fact that countries with persistently low nominal interest rates, such as Japan, often also experience relatively low rates of inflation, but then they cautioned against drawing any causal implications from this fact:

But some have proposed an alternative interpretation of these experiences, according to which low nominal interest rates themselves may cause inflation to be lower. In this view, the monetary policy reactions to these crises may have actually prolonged the disinflationary slumps by creating disinflationary expectations. Under such a view, actually promising to keep interest rates low for a longer period than would otherwise have been expected—as both the Fed and a number of other central banks have done in the recent period—would be the worst possible policy for a central bank worried that inflation will continue to run below its target, and some (beginning with Bullard, 2010, and Schmitt-Grohé and Uribe, 2010) have proposed that such a central bank should actually raise interest rates in order to head off the possibility of a deflationary trap. As the period over which the U.S. has kept its federal funds rate target near zero has continued, views of this kind, that some have taken to calling “neo-Fisherian,” have gained increasing currency, at least on the internet.⁷⁰

At first glance, the NeoFisherian hypothesis might seem reminiscent of the traditional monetarist critique of using low interest rates as an indicator of easy money. Here’s Milton Friedman in 1997:

Low interest rates are generally a sign that money has been tight, as in Japan; high interest rates, that money has been easy

After the U.S. experience during the Great Depression, and after inflation and rising interest rates in the 1970s and disinflation and falling interest rates in the 1980s, I thought the fallacy of identifying tight money with high interest rates and easy money with low interest rates was dead. Apparently, old fallacies never die.⁷¹

69. Mariana Garcia-Schmidt and Michael Woodford, “Are Low Interest Rates Deflationary? A Paradox of Perfect-Foresight Analysis” (NBER Working Paper No. 21614, National Bureau of Economic Research, Cambridge, MA, October 2015).

70. Garcia-Schmidt and Woodford, “Are Low Interest Rates Deflationary?,” 1.

71. Milton Friedman, “Reviving Japan,” *Hoover Digest*, no. 2 (April 30, 1998), reprinted from the *Wall Street Journal*, December 17, 1997.

Notice the use of past tense in the claim that “money has been easy.” In a monetarist model, an easy money policy will initially reduce interest rates because of the liquidity effect, but it may eventually push rates higher because of the Fisher effect. But the NeoFisherian proponents make a much more radical claim—that a persistent reduction in interest rates is itself disinflationary.

In the previous section, one of Lars Svensson’s proposals for escaping from a liquidity trap was seen to actually involve higher nominal interest rates, *even in the short run*, which is consistent with the NeoFisherian hypothesis. Conversely, Svensson is clearly not an adherent of NeoFisherism. And indeed, seemingly NeoFisherian policy outcomes can occur in a wide variety of New Keynesian models. So how can the two views be reconciled? Why do New Keynesians reject the NeoFisherian view of causality between interest rates and inflation?

To compare NeoFisherism with the mainstream view, consider a monetary shock at time $= t$ that is expected to produce each of two paths (see figures 3.5 and 3.6) for the exchange rate.

Figure 3.5: Exchange Rate Path 1, after Announcement

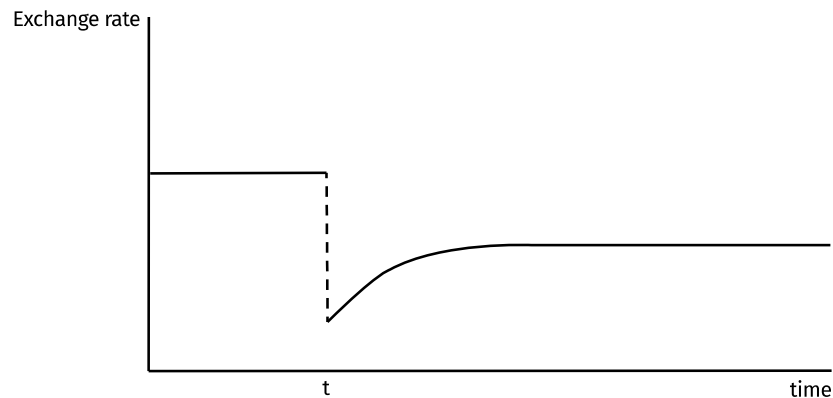
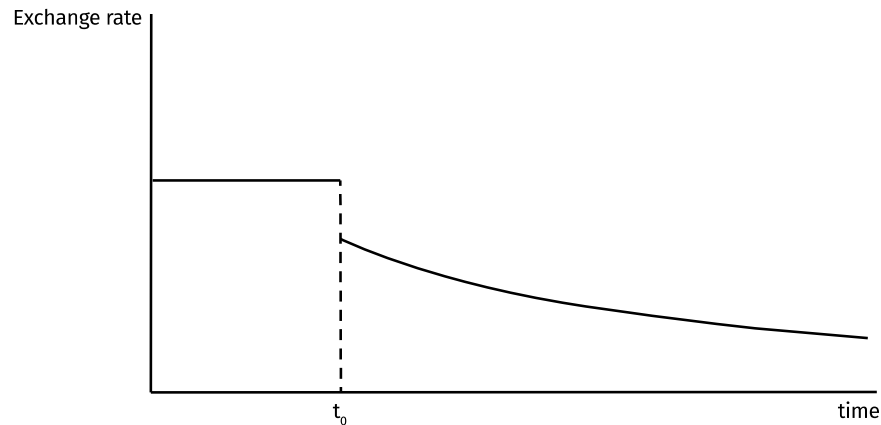


Figure 3.5 illustrates the famous Dornbusch overshooting model, where an expansionary monetary shock depreciates the exchange rate in the long run, thus producing higher expected inflation.⁷² But it also leads to lower nominal interest rates, thereby producing an expected appreciation in the currency after the initial overshoot to the downside. This case is consistent with the mainstream view that lower interest rates represent an inflationary monetary policy. An example occurred in March 2009 when the Fed’s first QE announcement pushed the dollar sharply lower against the euro. At the same time, US interest rates fell relative to foreign interest rates. Because of the interest parity

72. Rudiger Dornbusch, “Expectations and Exchange Rate Dynamics,” *Journal of Political Economy* 34, no. 6 (1976): 1161–76.

condition, the declines meant that the spot exchange rate for the dollar fell more sharply than did the forward exchange rate.

Figure 3.6: Exchange Rate Path 2, after Announcement



In case 2, illustrated in figure 3.6, the exchange rate also falls on the policy announcement. But this time, the exchange rate is expected to fall farther over time. According to the interest parity condition, the domestic nominal interest rate must then increase. This increase leads to a NeoFisherian outcome, where higher nominal interest rates coincide with higher expected rates of inflation. This scenario might occur when a political shock in a developing country (say fear of a populist government) leads to a sharp currency depreciation combined with higher domestic interest rates.

Garcia-Schmidt and Woodford are skeptical of the NeoFisherian view, particularly as a guide to policy in the United States:

Is there, then, reason to fear that a commitment to keep nominal interest rates low for a longer period of time will be deflationary, rather than inflationary? There is one way in which such an outcome could easily occur, and that is if the announcement of the policy change were taken to reveal negative information (previously known only to the central bank) about the outlook for economic fundamentals, rather than representing a pure change in policy intentions of the kind analyzed above. This may well have been a problem with the way in which “date-based forward guidance” was used by the U.S. Federal Reserve during the period 2011–12, as discussed by Woodford (2012); but it is not an inherent problem with announcing a change in future policy intentions, only with a particular way of explaining what has changed.⁷³

If we return to Svensson’s proposal for the Japanese to create inflation by devaluing and then pegging the yen to the dollar, we can see one other reason that a NeoFisherian

73. Garcia-Schmidt and Woodford, “Are Low Interest Rates Deflationary?,” 67.

outcome could occur—without any necessary causal implications for the higher nominal interest rates. In that example, the central bank did not have private information about economic fundamentals, but it did have private information about *its own future policy* regarding the exchange rate.

A good example of this phenomenon occurred in Switzerland in January 2015. After pegging the Swiss franc to the euro at a fixed rate for a period of three and a half years, the Swiss National Bank (SNB) unexpectedly allowed the franc to sharply appreciate. At the same time, the SNB reduced the policy interest rate by 50 basis points. This reduction in the Swiss interest rate (to a level even below the eurozone interest rate) led to expectations of further Swiss currency appreciation. One might almost call the two Swiss policy moves a *foolproof way of remaining in a liquidity trap*. The SNB produced lower interest rates via the Fisher effect, resulting in tighter money.

It is misleading to talk about the effect of a change in interest rates without first examining what caused the interest rate to change, just as it is misleading to discuss the effect of a change in the price of a good without first considering whether the price change was caused by a shift in supply or a shift in demand. A fall in the nominal interest rate can occur with an expansionary monetary policy, but it can also occur in response to a set of policy signals from a central bank that led market participants to expect disinflation, as in the Swiss case.

As this chapter will show, many of the points of disagreement between the Princeton School and market monetarists revolve around the question of how to interpret interest rates and the stance of monetary policy, and hence how to think about the role of central banks in the business cycle.

Monetary Policy Effectiveness Pessimism

Market monetarists share a number of views with the Princeton School. Following Krugman, market monetarists acknowledge that temporary monetary stimulus is mostly ineffective and that effective monetary stimulus requires a commitment to higher future inflation or NGDP growth.⁷⁴ Like Woodford, they believe that NGDP-level targeting is reasonably close to the optimal policy.⁷⁵ Like Eggertsson, they believe that FDR's decision to devalue the dollar was much more important than contemporaneous changes in the

74. See David Beckworth, "Permanent versus Temporary Monetary Base Injections: Implications for Past and Future Fed Policy," *Journal of Macroeconomics* 54, 1 (2017): 110–26.

75. See David Beckworth, "Facts, Fears, and Functionality of NGDP Level Targeting: A Guide to a Popular Framework for Monetary Policy," Mercatus Special Study, Mercatus Center at George Mason University, Arlington, VA, September 2019.

money supply or interest rates.⁷⁶ Like Svensson, they advocate forecast targeting.⁷⁷ And their explanation of the Great Recession in the United States is eerily similar to Bernanke's diagnosis of Japan's policy failures during the 1990s.⁷⁸

Perhaps the biggest difference between the two groups revolves around the question of what causes modern business cycles. Mainstream economists often see business cycles as being caused by demand shocks, and they view the Fed as an institution with a responsibility to come in and clean up the mess after instability occurs in the broader economy. Market monetarists also see business cycles as being mostly demand driven (COVID-19 excepted), but they see the demand instability as being *caused by bad central bank policies*.

Princeton School economists are probably somewhere in between, seeing business cycles as being initially caused by exogenous shocks, but also putting some of the blame on central bank policy regimes that are not sufficiently history dependent.

Paul Krugman was often critical of Fed policy during the 2010s and yet frequently argued that whereas earlier US recessions had been caused by tight money policies, recent recessions (including 2008) were caused by investment shortfalls after the bursting of asset bubbles.

Those differing perspectives have echoes of an earlier dispute over the causes of the Great Depression. Up until the mid-1960s, most economists assumed that the Great Depression was evidence of the inherent instability of capitalism and that monetary policy had been largely accommodative during the Depression. This view largely reflected the fact that nominal interest rates had been very low throughout most of the 1930s.

The standard view of the Depression was challenged by Milton Friedman and Anna Schwartz in their highly influential *Monetary History*.⁷⁹ They argued that the Fed erred in allowing a large decline in the monetary aggregates and that this error turned a mild recession into a major depression. Indirectly, they were also challenging the hypothesis that a market economy is inherently unstable. Market monetarists made a similar claim about the Great Recession, although they focused on the sharp decline in NGDP growth expectations and not on the monetary aggregates.

76. See Scott Sumner, *The Midas Paradox: Financial Markets, Government Policy Shocks, and the Great Depression* (Oakland, CA: Independent Institute, 2015).

77. See Scott Sumner, "Nudging the Fed toward a Rules-Based Policy Regime," *Cato Journal* 36, no. 2 (2016): 315–35.

78. See Sumner, *The Money Illusion*.

79. Milton Friedman and Anna J. Schwartz, *A Monetary History of the United States, 1867–1960* (1963; repr., Princeton, NJ: Princeton University Press, 1971).

At an event celebrating Friedman's 90th birthday, Bernanke seemed to acknowledge that the Fed was mostly to blame for the Great Depression:

Let me end my talk by abusing slightly my status as an official representative of the Federal Reserve. I would like to say to Milton and Anna: Regarding the Great Depression. You're right, we did it. We're very sorry. But thanks to you, we won't do it again.⁸⁰

As far as I know, none of the Princeton School economists blame the Fed for causing the early stages of the Great Recession—nor do most mainstream economists. But why not? One possibility is that economists distinguish between errors of commission and errors of omission. In 2008, the Fed cut interest rates, and in 2009 it engaged in quantitative easing. Economists who focus on those concrete steps might argue that the Fed didn't cause the recession; at worst, the Fed didn't do enough to moderate the slump.

Conversely, one could make a similar errors of omission argument about Fed policy in the 1930s. Indeed, Krugman suggested that Friedman and Schwartz had overstated the Fed's role in causing the Depression, pointing to the fact that the Fed actually increased the monetary base sharply during the 1930s and that the decline in the broader monetary aggregates reflected a fall in the money multiplier.⁸¹ Something similar happened in Japan in the decade after 2000 when large increases in the monetary base had only a small effect on the broader monetary aggregates.

Indeed, a breakdown in the money multiplier is one implication of Krugman's 1998 paper; unless the central bank can boost long-term inflation expectations, QE will not merely fail to boost the overall economy, it will not even boost the monetary aggregates. Thus, it is not clear that the errors of omission versus commission distinction can explain why the Fed's performance in the Great Recession is widely seen as being far superior to its performance during the Great Depression.

This isn't to suggest that the Fed's performance in 2008 was no better than in the early 1930s, rather that the profession doesn't seem to have a consistent criterion for evaluating the role of central banks in causing business cycles. What does a central bank-caused recession look like?

The question of the Fed's role in the business cycle raises some very difficult issues of causality, where terms like *policy stance* and *errors of omission* have unclear meaning. One

80. Ben S. Bernanke (remarks, Conference to Honor Milton Friedman, University of Chicago, November 8, 2002), honoring Milton Friedman's 90th birthday.

81. Krugman actually made two arguments. First, the Fed might not have been able to offset the decline in the money multiplier. Second, later in his life, Friedman oversimplified what was a fairly nuanced account in the *Monetary History*. I'm not convinced by either claim, but these are complex issues with no easy answers. See Paul Krugman, "Who Was Milton Friedman?," *New York Review of Books*, February 15, 2007.

year after his speech honoring Friedman, Bernanke spoke of the difficulty of measuring the stance of monetary policy:

The imperfect reliability of money growth as an indicator of monetary policy is unfortunate, because we don't really have anything satisfactory to replace it. As emphasized by Friedman . . . nominal interest rates are not good indicators of the stance of policy . . . The real short-term interest rate . . . is also imperfect. . . .

Ultimately, it appears, one can check to see if an economy has a stable monetary background only by looking at macroeconomic indicators such as nominal GDP growth and inflation.⁸²

The fact that we don't have an unambiguous indicator of the stance of monetary policy means that it is not clear how to evaluate the role of the central bank in the business cycle. If there were a single widely accepted monetary policy indicator, then the question of whether the private economy is inherently unstable could be resolved by looking at how the economy behaved when monetary policy is in some sense stable, or neutral. But during periods when the central bank does not change the money supply, the interest rate will fluctuate. If the interest rate is held stable, then the money supply will fluctuate. Bernanke pragmatically defines a stable monetary policy in relation to inflation and NGDP growth, but those criteria also make it almost a tautology that central bank policy failures are a major cause of demand-side recessions.

Here is Nick Rowe in 2012:

Some people argue about whether the macroeconomy is inherently stable or unstable. I don't think that's a very useful question. Because . . . it depends. And one of the things it depends on is monetary policy. And that is a useful discussion to have, because we can actually *do something* about monetary policy.⁸³

To see why the errors of omission perspective is not a useful way to think about monetary policy, consider the following thought experiment. Imagine that an economic crisis in Mexico during the mid-1990s led to a big increase in the demand for US currency notes. Also suppose the Fed did not accommodate that demand, keeping the monetary base relatively stable; as a result, interest rates soared much higher, pushing the US economy into recession.⁸⁴ Would people call that an error of omission because the Fed didn't actually do anything to the monetary base? Probably not. The Fed would be widely

82. Bernanke remarks, Federal Reserve Bank of Dallas Conference.

83. Nick Rowe, "Two (Probably) Unstable Macroeconomic Equilibria," *Worthwhile Canadian Initiative* (blog), September 25, 2012.

84. Note that the thought experiment uses the period before the Fed began paying interest on reserves, which would change the result.

blamed for raising interest rates sharply. What looks like an error of omission from one perspective looks like an error of commission if a different policy indicator is used.

So then why do Princeton School economists and market monetarists differ about the role of Fed policy in the Great Recession? Ultimately, this is a dispute about what the Fed can do. It makes no sense to blame the Fed for causing recessions if it lacks the tools to prevent them. Therefore, the issue of Fed culpability hinges on how one thinks about what type of policy could have been successfully implemented. Market monetarists are somewhat more optimistic than are Princeton economists (and are far more optimistic than are most mainstream economists) about the question of the extent to which the Fed could have prevented a serious recession in 2008 with a more expansionary monetary policy.

In the first section, this chapter showed that Krugman's 1998 model had two interpretations. The more optimistic (New Keynesian) interpretation suggested that a central bank could boost aggregate demand by committing to higher future inflation, even at the zero bound. Subsequent research showed that this move might take the form of a price-level or NGDP-level target path. The more pessimistic (old Keynesian) interpretation emphasized the difficulty in convincing the public that a conservative central bank would wish to push inflation higher in future years—the time-inconsistency problem. According to this view, a central bank may be unable to stimulate the economy at the zero bound.

The market monetarist hypothesis can be seen as a fairly extreme version of the optimistic interpretation of Krugman's 1998 model. Recall that in 1999, Krugman was highly critical of the Bank of Japan for not being more aggressive, and he was somewhat skeptical of the need for fiscal stimulus. In the same year, Bernanke wrote his critique of Japanese monetary policy, essentially blaming the BOJ for the problem of deflation. Both articles were written at a time when New Keynesian economics was near its peak of influence among Western economists.

Over the next two decades, however, mainstream opinion became much more skeptical of the efficacy of monetary stimulus at the zero bound. This skepticism can be attributed partly to the fact that the zero-bound problem began to seem less like a temporary phenomenon facing only one country and more like a long-term problem facing many developed economies. Equilibrium interest rates in developed economies have been trending lower for decades, with no end in sight. And the failure of some large QE programs to boost inflation led to even more pessimism about monetary policy, which increased economists' interest in fiscal stimulus.

So why do the market monetarists see the empirical evidence differently? Why do they continue to view monetary policy as being highly effective at the zero bound? Recall that Bernanke had argued that if monetary policy actually were ineffective at the zero bound, then a central bank could buy up an unlimited quantity of assets without creating inflation. The Bank of Japan could print yen and buy up the entire world. Conversely, the BOJ has purchased an extraordinarily large quantity of assets, including equities, without

creating much inflation. Eggertsson and Kevin Proulx looked at this problem and reached the following conclusion:

We first show that, at least in theory, open market operations in real assets can be a useful tool for overcoming a liquidity trap because they change the inflation incentives of the government, and thus change private sector expectations from deflationary to inflationary. We argue that this formalizes Ben Bernanke's arbitrage argument for why a central bank can always increase nominal demand, despite the zero lower bound. We illustrate this logic in a calibrated New Keynesian model assuming the government acts under discretion. Numerical experiments suggest, however, that the needed intervention is incredibly high, creating a serious limitation of this solution to the liquidity trap. Our experiments suggest that while asset purchases can be a helpful commitment device in theory, they may need to be combined in practice with fiscal policy coordination to achieve the desired outcome.⁸⁵

Their study provides strong support for the widespread pessimism about monetary policy at the zero bound among mainstream economists. But this sort of analysis needs to be interpreted with caution. Eggertsson and Proulx are not arguing that monetary stimulus at the zero bound would necessarily require unrealistically large asset purchases. In their model, it is still true that commitments to produce future inflation can be highly effective. Rather, they suggest that if central banks are unable to commit to higher future inflation, then the sort of *brute force* approach of unlimited QE discussed by Bernanke and others might require asset purchases many times larger than GDP, which would presumably impose unacceptable balance sheet risks on the central bank. As a result, monetary policymakers may need assistance from fiscal policy.

To better understand this issue, consider the recent case of Japan. After Prime Minister Abe took office in 2013, the BOJ engaged in a more aggressive policy of monetary stimulus, including massive asset purchases that have increased their balance sheet to more than 140 percent of GDP. And yet inflation rose only very slightly, averaging below 1 percent. Given those facts, how large would the BOJ balance sheet have to be in order to push Japanese inflation up to 10 percent? How many more assets would the BOJ need to purchase?

I don't see any definitive way of answering this question. In models where the effects of QE are linear, the answer would presumably be a very large figure. But this answer cannot be the entire story, because a policy that successfully raised inflation to 10 percent would certainly raise nominal interest rates well above zero. If the BOJ were to refrain from paying interest on bank reserves, then this sort of inflation would cause the demand for base money in Japan (both currency and reserves) to fall sharply, probably from 140

85. Gauti B. Eggertsson and Kevin Proulx, "Bernanke's No-Arbitrage Argument Revisited: Can Open Market Operations in Real Assets Eliminate the Liquidity Trap?" (NBER Working Paper No. 22243, National Bureau of Economic Research, Cambridge, MA, May 2016).

percent to below 10 percent of GDP. So the answer to the question “How much QE would it take for the BOJ to generate 10 percent inflation?” might well be “less than zero.” As soon as the public understood that the BOJ would buy as many assets as required to generate high inflation, the demand to hold yen would fall sharply.

Eggertsson and Proulx rule out this sort of regime change by focusing on the case where central banks fail to use the expectations channel. It is hard to fault them for this assumption given that the BOJ has already boosted its balance sheet by an extraordinarily large amount, without meaningfully shifting inflation expectations. But I worry that their analysis may be misinterpreted. A central bank that adopts a whatever-it-takes approach to using QE to boost inflation will succeed in shifting inflation expectations if the policy is credible. In that case, the amount of QE required will be much lower than the figures cited by Eggertsson and Proulx.

In the previous thought experiment, I assumed policy success and then worked backward to consider the demand for base money if the Japanese public were actually convinced that the central bank would do whatever it took to create high inflation. In contrast, Eggertsson and Proulx assume a skeptical public and estimate how many assets a central bank would need to purchase if it were unable to create expectations of higher future inflation. These are two quite different approaches that use different baseline assumptions. It is not just a question of policies having nonlinear effects; the bigger problem is that there are multiple equilibria, and seemingly ineffective policies can suddenly become highly effective if they can coordinate the public’s expectations on a new equilibrium.

The difference between those two perspectives is easier to see in Eggertsson and Proulx’s interpretation of recent policy in Switzerland:

As another example, the Swiss National Bank bought foreign currency on the order of 90 percent of GDP in order to fight deflation during the crisis, leading to an 800 percent increase in its money supply [monetary base]. They eventually abandoned this policy since the magnitudes involved had become so high that the central bank faced strong political pressures to do so. The effect of this policy on the price level was negligible at best, although for a while the Swiss National Bank did manage to prevent an appreciation of the Swiss franc relative to the Euro.⁸⁶

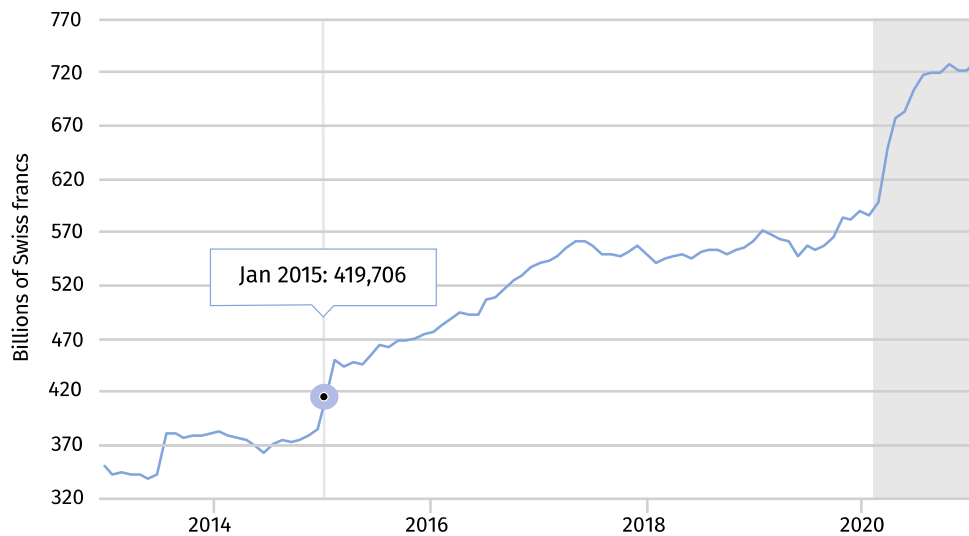
Market monetarists have a very different interpretation of that episode. In the view of market monetarists, the Swiss balance sheet has become unusually large mostly because investors correctly understand that the Swiss franc will be allowed to gradually appreciate over time, making the franc an attractive asset.⁸⁷ Much of the balance sheet increase occurred at the beginning of 2015, when investors correctly anticipated that the

86. Eggertsson and Proulx, “Bernanke’s No-Arbitrage Argument Revisited,” 6.

87. See Sumner, “Critique of Interest Rate–Oriented Monetary Economics.”

SNB was about to abandon the exchange peg that had held for three and a half years, and also in subsequent years when the franc was allowed to float. (See figure 3.7.) Today, the decision to break the peg looks like an unforced error. In contrast, the Danish central bank did not give in to speculative pressure in early 2015, and demand for Danish kroner subsided once investors realized that their currency would not appreciate.

Figure 3.7: Swiss Monetary Base Aggregate, 2012–2021



Source: Swiss National Bank, retrieved from FRED, Federal Reserve Bank of St. Louis, <https://fred.stlouisfed.org/>.
 Note: Gray bar indicates NBER-defined period of recession.

Mainstream economists see ultralow interest rates and large QE programs as a sign of extreme monetary stimulus, and then they ask how much more it would take to actually hit a 2 percent inflation target. Market monetarists see ultralow interest rates as a side effect of extremely low inflation and excessively tight money, and they see the large central bank balance sheets as reflecting the high demand for base money when the opportunity cost of holding cash and reserves falls to zero. They point to countries such as Australia, which never cut rates to zero (and thus avoided QE) during the Great Recession, *precisely because their monetary policy was more expansionary than in the United States and Europe*, allowing for higher trend rates of NGDP growth.

The point here is not that Eggertsson and Proulx are wrong; there are very good arguments to be made on both sides of the issue, and recent history tends to support their pessimism about the ability of QE to be effective unless accompanied by regime change. Rather, the thought experiments demonstrate the sensitivity of this issue to assumptions about what determines policy expectations. In the world of the zero lower bound, successful central banks can do much less in the form of concrete steps and still get by if they can convince the public that their desire to inflate is genuine. That dependence on expectations makes it almost impossible to make hard-and-fast empirical claims about how much QE is necessary, how long interest rates must be held at zero, or how much

assistance from fiscal policy is required. A BOJ promise to buy as many assets as necessary might itself shift expectations in the direction of higher trend inflation, and this rise could actually result in *higher* interest rates and a smaller monetary base.⁸⁸

Targeting the Market Forecast

In his 2019 paper advocating the policy of forecast targeting, Svensson insisted that central banks could not simply rely on market forecasts and would still need to rely on a structural model of the transmission mechanism to predict the effect of changes in the policy instrument:

The policymakers need to have a view or a “model” of the transmission mechanism and the determination of future inflation and unemployment.⁸⁹

In contrast, market monetarists advocate the targeting of an asset price linked to the policy goal, precisely because the true model of the economy is not understood. They view the market forecast of inflation or NGDP growth as the optimal forecast.⁹⁰

In 1997, Bernanke and Woodford provided a framework for reconciling the two approaches.⁹¹ At first glance, their article seemed to support Svensson’s perspective:

An interesting possibility is that the central bank might target current private-sector forecasts of inflation, either those made explicitly by professional forecasters or those implicit in asset prices In a dynamic model which incorporates both sluggish price adjustment and shocks to aggregate demand and aggregate supply, we show that strict targeting of inflation forecasts is typically inconsistent with the existence of rational expectations equilibrium, and that policies approximating strict inflation-forecast targeting are likely to have undesirable properties We conclude that, although private-sector forecasts may contain information useful to the central bank, ultimately the monetary authorities must rely on an explicit structural model of the economy to guide their policy decisions.⁹²

88. Uribe uses a New Keynesian model and “finds that 50 percent of the variance of inflation changes is accounted for by monetary shocks that induce positive short-run comovement in the interest rate and inflation.” See Martín Uribe, “The Neo-Fisher Effect: Econometric Evidence from Empirical and Optimizing Models” (working paper, Columbia University and National Bureau of Economic Research, February 20, 2020).

89. Svensson, “What Rule for the Federal Reserve?,” 55–56.

90. See Scott Sumner, “Let a Thousand Models Bloom: The Advantages of Making the FOMC a Truly ‘Open Market,’” *Berkeley Electronic Journal of Macroeconomics* 6, no. 1 (2006): 1–27

91. Ben S. Bernanke and Michael Woodford, “Inflation Forecasts and Monetary Policy,” *Journal of Money, Credit and Banking* 29, no. 4, part 2 (1997): 653–84.

92. Bernanke and Woodford, “Inflation Forecasts and Monetary Policy,” 653.

They argued that targeting market forecasts of inflation would create a circularity problem. If the markets knew that policy would be adjusted to keep inflation expectations on target, then market signals of inflation (such as TIPS spreads) would never deviate from 2 percent in the first place. The circularity problem occurs any time markets are watching policymakers to determine asset prices at the same time that policymakers are observing asset prices for guidance on policy.

Fortunately, not all market forecast targeting proposals suffer from a circularity problem.⁹³ Rather, a number of market monetarist proposals envisioned the central bank pegging a CPI or NGDP futures price and then allowing the monetary instrument to adjust as needed to keep this asset price constant. In this sort of regime, the targeted asset price doesn't change and hence doesn't provide policy guidance. Rather, the market is implicitly predicting the *instrument setting required to achieve the policy goal*. It is analogous to a fixed exchange rate regime where the market is essentially telling the central bank the level of the monetary base and the short-term interest rate that will keep the price of gold or the foreign exchange rate pegged at a constant level.

Interestingly, Bernanke and Woodford also saw the advantage of this approach:

However, these conclusions do not rule out the productive use of private-sector forecasts in policy making. One can again show that, if forecasters make predictions of variables other than inflation, the central bank may be able to use the information implied by these additional forecasts even if the additional variables being forecasted do not enter the central bank's loss function. For example, suppose that there are available private-sector forecasts of the short-term nominal interest rate, as well as of inflation.⁹⁴

The information that is actually of value to policymakers is not the unconditional private-sector forecast of inflation; rather, it is the forecast of the policy instrument, *conditional on the inflation forecast being on target*. The central bank wishes to know what interest rate setting is most likely to produce 2 percent inflation.

Ironically, Svensson's 2003 proposal for a foolproof method of escaping a liquidity trap also (implicitly) relied on targeting the market forecast, or at least targeting an asset price closely linked to the market forecast of inflation:

Why would the peg induce expectations of a higher future price level? Once the peg is credible, since the expected exchange-rate path has shifted up by the initial

93. Note that I (in 1989 and 2016) proposed targeting an NGDP futures contract, and Kevin Dowd (in 1994) proposed targeting a CPI futures contract. Neither of us recommended that the central bank look at changes in a volatile asset price for policy guidance, and hence both avoided the circularity problem. See Scott Sumner, "Using Futures Instrument Prices to Target Nominal Income," *Bulletin of Economic Research* 41, no. 2 (1989): 157–62; Scott Sumner, "Nudging the Fed Toward a Rules-Based Policy Regime," *Cato Journal* 36, no. 2 (2016): 315–35; and Kevin Dowd, "A Proposal to End Inflation," *Economic Journal* 104, no. 425 (1994): 828–40.

94. Bernanke and Woodford, "Inflation Forecasts and Monetary Policy."

depreciation, the private sector must believe that the future exchange rate will be higher. But then internal consistency requires that the private sector must also expect a higher future price level (since they have no reason to believe that the future relative price between domestic and foreign goods will move in any particular direction). Thus, the initial depreciation, the credible peg and internal consistency forces the private sector to expect a higher future price level.⁹⁵

Svensson is saying that there is no good reason to expect the real exchange rate to either appreciate or depreciate over time. In that case, a forecast of future inflation is roughly equivalent to a forecast of the future nominal exchange rate. And because of the interest parity condition, controlling the current exchange rate is equivalent to controlling the future expected exchange rate.

In practice, central banks are unlikely to adopt the market monetarist proposal to simply peg the price of CPI or NGDP futures contracts. However, central banks already rely to some extent on market forecasts for policy guidance. Here's Richard Clarida in 2020:

Market- and survey-based estimates of expected inflation are correlated, but, again, when there is divergence between the two, I place at least as much weight on the survey evidence as on the market-derived estimates.⁹⁶

As noted earlier, the Fed cut interest rates three times in 2019, despite a booming economy, mostly for forecast targeting reasons. In this case, the Fed decision was at least partly based on *market* forecasts, because sharp declines in various asset markets during the trade war with China provided a signal of a slowdown in manufacturing and investment.

In my view, modern central bank policy is moving increasingly in the direction of forecast targeting, with the specific approach being somewhere between Svensson's structural modeling approach and the market monetarist's target-the-market-forecast approach.

Future Prospects for the Princeton School

Dramatic changes in the macroeconomic environment invariably lead to changes in macroeconomic theory and policy. The Great Depression led to Keynesian economics, and the Great Inflation gave increasing prominence to monetarist ideas. In the 21st century, the decline in equilibrium interest rates to zero or below has forced economists to rethink the issue of stabilization policy.

95. Svensson, "Escaping from a Liquidity Trap and Deflation," 12.

96. Richard H. Clarida, "Models, Markets, and Monetary Policy," in *Strategies for Monetary Policy*, ed. John Cochrane and John Taylor (Stanford, CA: Hoover Institution Press), 13.

The Princeton School has played by far the most important role in rebuilding monetary theory for a low interest rate environment, with Krugman's 1998 paper providing the essential framework for much of the subsequent research. Going forward, it is useful to think about two questions. First, to what extent will the Princeton School influence real-world monetary policymakers? Second, how will we know whether those ideas are effective?

There are already some answers to the first question. The Fed's recent decision to adopt average inflation targeting was clearly influenced by Krugman's paper and also by subsequent level targeting proposals by Eggertsson, Woodford, and Bernanke. The new policy isn't precisely level targeting, but it is quite possible that the Fed has informally decided to adopt temporary price-level targeting, while preserving the more familiar "inflation targeting" label. There is also some evidence that the Fed is moving away from the Taylor rule approach and toward Svensson's forecast targeting framework, particularly in its 2019 decision to aggressively cut interest rates during a period of 3.5 percent unemployment.

If the policy recommendations of the Princeton School are successfully implemented by central banks, then inflation should be averaging close to 2 percent over the 2020s, and some moderation in the business cycle should be present. It may be difficult to isolate the effect of a new monetary regime, however, because there has also been a recent change in the consensus view on fiscal policy. During the 1990s and first decade after 2000, there was great skepticism as to the efficacy of fiscal policy in an environment where central banks were targeting inflation at 2 percent. Since 2008, governments have become increasingly willing to use fiscal stabilization policy; during the COVID-19 recession, the size of the fiscal stimulus in the United States was unusually large, even as a share of GDP.

Policymakers seem increasingly drawn to a sort of belts-and-suspenders approach to stabilization policy, where there is aggressive use of both monetary and fiscal policy. Thus, aspects of both the old and New Keynesian interpretations of the Krugman 1998 paper are having an influence on policy. In this new regime, policymakers commit to higher future inflation during a zero-bound episode, and they accompany that policy with fiscal stimulus in case the expectations channel for monetary policy is insufficient.

As this chapter shows, Krugman's 1998 paper can be interpreted as being relatively optimistic or pessimistic about the effectiveness of monetary policy at the zero bound, depending on one's assumptions regarding the ability and willingness of central banks to adopt bold regime change. Although it's not entirely clear which interpretation of monetary policy efficacy will win out in the long run, it is almost certain that the approaches to monetary policy developed by Krugman and his colleagues at Princeton will continue to shape monetary theory and policy in the 21st century.

Chapter 4: Which Approach to Monetary Policy Works Best?

A successful monetary policy has three components. First, policymakers need some sort of clearly specified target path for growth in a nominal aggregate, preferably some sort of “level targeting” regime. Second, policymakers need a way of credibly committing to a future path for monetary policy that is consistent with the policy target. And third, policymakers must commit to a *whatever-it-takes* approach, to ensure that monetary policy leads to expectations that the nominal target path will be achieved.

As we have seen, the Princeton School of Macroeconomics made important contributions to this agenda, particularly the first two criteria. Its members provided a clear explanation of the rationale for targeting the level of prices or nominal gross domestic product (NGDP), and they emphasized the need for credible signals of the future path of policy—particularly when at the zero lower bound.

Unfortunately, with the exception of Lars Svensson’s “foolproof” plan for escaping a liquidity trap,¹ the Princeton School fell short of a full-throated endorsement of a *whatever-it-takes* approach to monetary policy. In my view, this failure to achieve the full market monetarist program was due to an excessive reliance on interest rates and (surprisingly) the money supply as instruments and indicators of the stance of monetary policy.

The first two-thirds of this chapter will provide a critique of using interest rates and the money supply as a guide to monetary policy. I will show how an excessive focus on interest rates and the money supply leads mainstream economists to misdiagnose the root cause of macroeconomic instability. Because of mistakes in identifying the stance of monetary policy, monetary policy failures are seen as evidence of an inherently unstable market economy. And that same misdiagnosis leads to excessive pessimism about the effectiveness of monetary policy at the zero lower bound, as well as a mistaken assumption that fiscal stimulus might need to supplement monetary stimulus.

In the final third of the chapter, I show that any effective monetary regime must rely on the *price of money* approach to policy. Monetary policy issues that seem quite confusing

Portions of this chapter originally appeared in “Whither Monetarism” in *Economic Affairs* 42, no. 2 (June 2022), published by John Wiley & Sons on behalf of the Institute of Economic Affairs and included here with permission.

1. Lars E. O. Svensson, “The Zero Bound in an Open Economy: A Foolproof Way of Escaping from a Liquidity Trap,” *Monetary and Economic Studies* 19, no. S1 (2001): 277–312.

when viewed from the perspective of the interest rate or quantity of money approach, suddenly become much clearer when evaluated from a price of money approach.

Initially, I will illustrate this new approach using the nominal exchange rate as the policy instrument and indicator. This might seem an odd choice, as I will later argue that the Fed should not use exchange rates as its policy instrument. Indeed, in chapter 5, exchange rates will be replaced with NGDP futures prices. But for purposes of exposition, exchange rates offer some important advantages. To begin with the obvious, NGDP futures contracts do not currently exist, while exchange rates do exist. And throughout history, exchange rates have often played an important role as monetary policy instruments.

What's Wrong with Interest Rates?

To see the problem with visualizing monetary policy in terms of interest rates or the money supply, it will be helpful to consider how those variables would behave under a regime that relied on the price of money approach. Throughout history, the two prices that have played the biggest role in monetary policy are the price of a commodity (usually gold or silver) and the price of a foreign currency (i.e., an exchange rate, often the British pound, the US dollar, or the euro).

Monetary policymakers can use exchange rates in several different ways. One obvious example is a fixed exchange rate system, when the central bank pegs the exchange rate at a constant level. Under that regime, the money supply and interest rates are endogenous, adjusted as necessary to keep the supply and demand for base money in equilibrium at the pegged rate. Hong Kong has operated that sort of monetary regime since 1983.

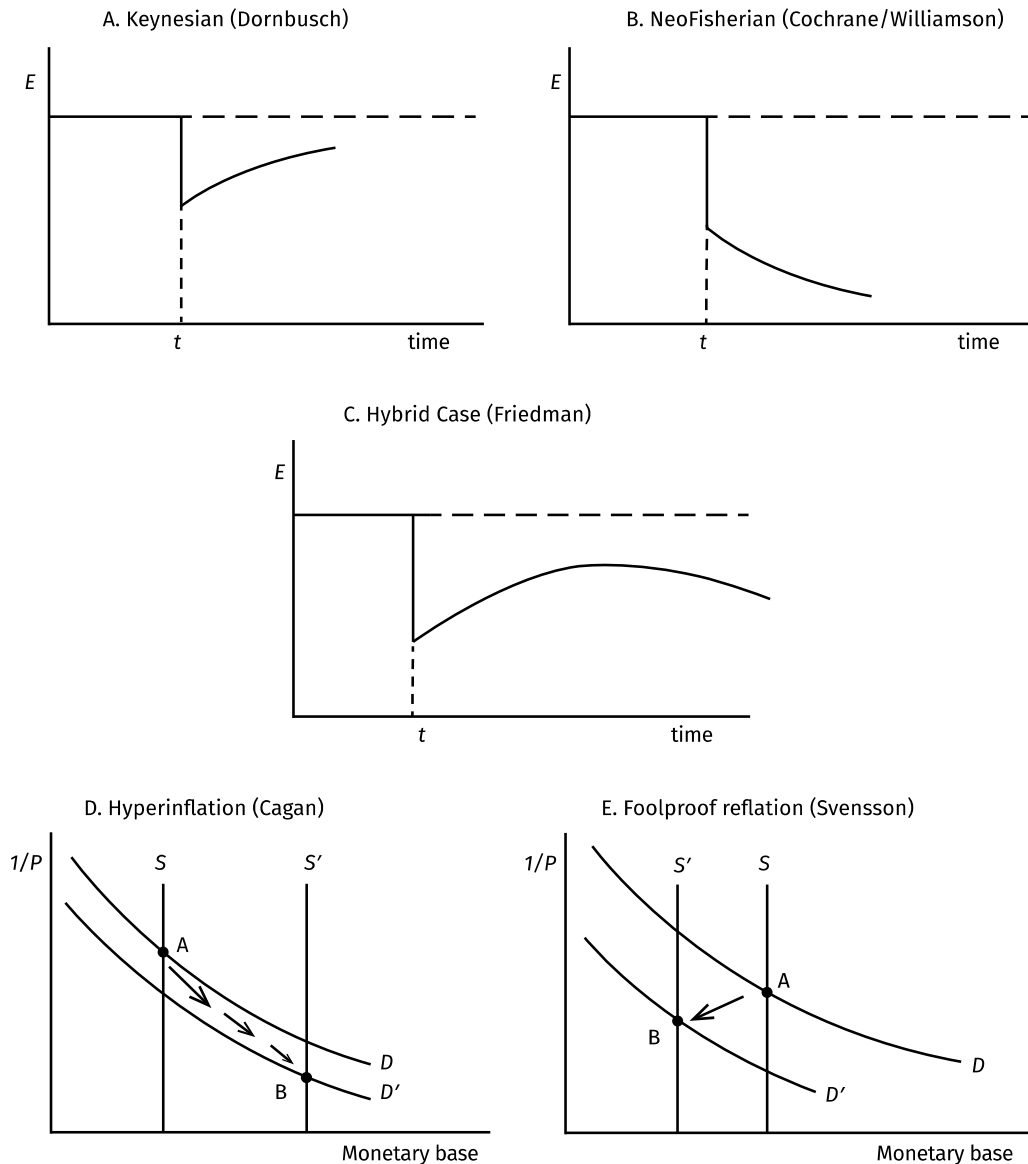
Another example is the so-called crawling peg system. Policymakers might allow the exchange rate to increase or decrease at a steady rate—say 4 percent a year—to achieve a different monetary policy from the United States', while still preventing dramatic swings in the exchange rate. China did this during the years right before and after the Great Recession of 2007–2009, allowing steady appreciation in the yuan against the dollar.

A third example is pure discretion, where the central bank adjusts the exchange rate as needed to achieve its macroeconomic objectives. Under this regime, an overheating economy calls for currency appreciation while a decline in aggregate demand calls for currency depreciation. The central bank of Singapore uses this sort of policy regime.

If you are thinking that this approach might work fine for a small open economy like Singapore, but would not work well for the United States, then you are partly correct. It would not be wise for the United States to target the exchange rate. But as we will see, the United States could and should adopt the *price of money approach*, albeit using NGDP futures prices instead of exchange rates. Nonetheless, we will start with exchange rate targeting, as this will help us see the fundamental issues involved in the three major approaches to monetary policy.

The five panels in figure 4.1 illustrate the effects of five different varieties of expansionary monetary policy. Panels a, b, and c show the expected change in the path of the nominal exchange rate after a new policy is announced at time = t . Note that the exchange rate E is defined as the foreign currency price of domestic currency, which means a declining E is domestic currency depreciation. Later, we will look at the panels d and e, which focus on the money supply.

Figure 4.1: Five Easy Policies



For simplicity, assume that in the first three panels the central bank immediately moves the exchange rate as shown at time = t and then promises additional gradual appreciation or depreciation as shown on the graphs. Those changes in current and

expected future monetary policy have important implications for changes in interest rates, inflation, and NGDP.

In all three panels, the long-run exchange rate ends up lower than before the monetary policy announcement. Because money is neutral in the long run, a monetary policy shock would not be expected to affect the long run *real* exchange rate. That means that if the nominal exchange rate is expected to depreciate in the long run, it must also be true that the monetary policy announcement causes the price level to be expected to rise in the long run. In other words, all three policy announcements illustrated represent expansionary monetary shocks.

The first exchange rate path represents the impact of a sudden one-time increase in the money supply in the Keynesian model (figure 4.1, panel a). The increase in the money supply reduces interest rates via the liquidity effect. Because of the interest parity condition, a reduction in interest rates implies an increase in the expected rate of currency appreciation. Put simply, after interest rates fall because of the easy-money policy, investors are only willing to hold the currency if it is expected to appreciate over time. This relationship is called the *interest parity condition*:

$$\text{Domestic } i\text{-rate} = \text{foreign } i\text{-rate} - \text{expected rate of change in domestic currency} \quad (4.1)$$

But it is also true that an increase in the money supply will raise prices in the long run. Because money is neutral in the long run and monetary shocks are not expected to change the real exchange rate, the expectation of a higher future price level implies an expectation of currency depreciation in the long run. But how can a currency be expected to both appreciate and depreciate? The trick here (discovered by Rudi Dornbusch²) is that the sudden policy announcement at time = t causes the exchange rate to fall so sharply that it overshoots its long-run equilibrium, and then gradually claws back some of that depreciation over time—reflecting the interest parity condition.

This may seem like a relatively far-fetched academic theory, but it is exactly how real-world market participants look at certain types of monetary policy shocks. Thus, when the Federal Reserve announced the initial round of quantitative easing (QE) in March 2009, the US dollar immediately fell by roughly 4 percent against the euro. Because the QE announcement also reduced US interest rates, the fall in the forward market value of the dollar was smaller. The initial dollar depreciation overshoot its expected long-run equilibrium value, and the dollar was expected to eventually regain some of those losses. Indeed, it is difficult to see how any other expected exchange rate path could occur. If the interest parity condition did not hold at least approximately true, then financial market arbitrageurs could easily profit from any discrepancies.

2. Rudiger Dornbusch, "Expectations and Exchange Rate Dynamics," *Journal of Political Economy* 34, no. 6 (1976): 1161–76.

(In 2022, this effect worked in the opposite direction. The Fed raised rates in the United States, while rates stayed close to zero in Japan. The dollar appreciated strongly against the yen, but forward exchange rate markets suggest that the dollar is expected to gradually depreciate against the yen in future years.)

So far, I've treated this like a garden-variety monetary policy thought experiment. A one-time increase in the money supply causes currency depreciation, lower nominal interest rates, and a higher expected future price level. That's all out of International Macro 101.

The next step is much more important, indeed the key to this entire section. I'd like you to reverse the process and assume that the revised exchange rate path *was the monetary shock*. In other words, assume that a central bank in a country with a long-standing fixed exchange rate suddenly announced the following on Sunday evening:

1. Tomorrow morning, we will peg the exchange rate at a level 4 percent lower than today.
2. Over the next five years, we will gradually appreciate the exchange rate at 0.5 percent a year, and then refix the exchange rate at a new peg that is 1.5 percent lower than before this announcement. In other words, 2.5 percent of the initial 4.0 percent depreciation will be reversed over the next five years.

This monetary policy announcement will cause the exchange rate to immediately depreciate by 4.0 percent. And because it will be expected to appreciate at 0.5 percent a year over the next five years (assuming the policy is credible), the domestic interest rate will immediately decline by 0.5 percent, relative to interest rates in the foreign country.

Although this section is titled "What's Wrong with Interest Rates," we've started our analysis with a case where interest rates actually are a useful policy indicator and instrument. In this case, low interest rates really do represent easy money. Unfortunately, this case is more the exception than the rule.

Once you begin thinking about monetary policy in relation to the expected path of exchange rates, it immediately becomes clear that it is possible to generate any particular interest rate path with an easy-money policy. Easy money might be associated with lower interest rates, but it might equally be associated with higher nominal interest rates.

Indeed, the so-called orthodox case of low interest rates coinciding with easy money requires a rather bizarre assumption about the expected future path of the exchange rate. That doesn't make it wrong, but it suggests that there is no reason, a priori, to rule out more straightforward cases, such as a falling exchange rate that is expected to continue falling.

In the panel b of figure 4.1 (the NeoFisherian case), the central bank announces a sudden sharp decline in the exchange rate, as well as adoption of a crawling peg system that implies future exchange rate depreciation. Because of the interest parity condition, the expectation of further exchange rate depreciation implies higher nominal interest rates.

And not just higher rates in the long run (once inflation kicks in). Because of the interest parity condition, interest rates must *immediately* rise to a higher level.

Central banks do not typically make this sort of announcement for the future path of exchange rates, at least not explicitly. But if you translate central bank statements into the language of the foreign exchange market, then it is not unusual for monetary policy announcements to have this impact. Thus, a central bank might say something to the effect:

Due to the massive pressure of speculators, we are allowing the peso to depreciate by 15 percent. We are also raising our target interest rate by 500 basis points to avoid an even sharper depreciation.

The combined effect of those two announcements would create exactly the sort of expected exchange rate path shown in the panel b of figure 4.1, and this sort of exchange rate shock frequently occurs during financial crises in developing countries.³

Astute readers may recognize that this is the so-called NeoFisherian case. An easy-money policy leads to higher nominal interest rates, even in the short run. When NeoFisherian models were first discussed by people like Steve Williamson and John Cochrane,⁴ there was some grumbling about the claim that a low interest rate policy might be inflationary. Mainstream economists questioned the implicit assumption being made about causation when using the Fisher effect in this way. Some snickered, “Do umbrellas cause rain?”

Yes, there is a problem when NeoFisherians talk about the effect of higher interest rates. There is confusion of cause and effect. But that’s *equally true* of mainstream Keynesian talk about low “interest rate policies,” with the implicit assumption that low rates are easy money. Indeed, panels a and b nicely illustrate the problem with what I call “reasoning from a price change.” Merely looking at the change in the interest rate doesn’t tell us much about the change in the stance of monetary policy. An easy-money policy might be associated with lower interest rates, but it also might be associated with higher interest rates.

Some economists try to finesse the issue by claiming that the liquidity effect dominates in the short run, while the Fisher effect dominates in the long run. In that case, an easy-money policy can lead to lower nominal interest rates in the short run, but higher

3. Here’s how Wikipedia describes the Mexican peso devaluation of 1994: “The central bank devalued the peso on December 20, 1994, and foreign investors’ fear led to an even higher risk premium. To discourage the resulting capital flight, the bank raised interest rates.” Wikipedia, “Mexican Peso Crisis,” September 30, 2022, https://en.wikipedia.org/wiki/Mexican_peso_crisis.

4. Stephen D. Williamson, “Neo-Fisherism: A Radical Idea, or the Most Obvious Solution to the Low-Inflation Problem?,” *Regional Economist*, Federal Reserve Bank of St. Louis, July 5, 2016; John H. Cochrane, “Michelson-Morley, Fisher, and Occam: The Radical Implications of Stable Quiet Inflation at the Zero Bound,” in *NBER Macroeconomics Annual*, vol. 32 (Cambridge, MA: National Bureau of Economic Research, 2017).

nominal interest rates in the long run. As far as I can tell, that was roughly Milton Friedman's view of the situation:

Low interest rates are generally a sign that money has been tight, as in Japan; high interest rates, that money has been easy. . . . After the U.S. experience during the Great Depression, and after inflation and rising interest rates in the 1970s and disinflation and falling interest rates in the 1980s, I thought the fallacy of identifying tight money with high interest rates and easy money with low interest rates was dead. Apparently, old fallacies never die.⁵

Notice the past tense in the phrase "has been tight." Friedman saw low nominal interest rates as the long-run effect of tight money and high nominal rates as the long-run effect of easy money. His view is illustrated in panel c of figure 4.1 (hybrid case), where after the initial depreciation, the currency is expected to appreciate for a period of time, before resuming its depreciation. This path of the exchange rate would imply that the monetary stimulus led to lower nominal interest rates in the short run, but higher rates in the long run. Once again, we can generate this path of interest rates with a suitable announcement about the future path of exchange rates. Indeed, I can generate almost any path of interest rates with an equivalent exchange rate policy.

Countries such as Switzerland and Japan combine ultralow interest rates with ultralow inflation, which seems consistent with the NeoFisherian perspective. But these examples have not increased the support for NeoFisherian ideas, and indeed, most economists remain wedded to the Keynesian view that low rates represent an easy-money policy. Instead, the profession has largely reacted to these anomalous cases by embracing the idea that monetary policy is ineffective near the zero lower bound. As we will see, it is not true that monetary policy is ever ineffective. Rather, what is ineffective is a monetary regime focused on interest rate targeting. Other "foolproof" methods of monetary stimulus remain quite effective, albeit rarely used.

Mainstream economists might reply to this analysis in several possible ways. One common response is that although easy money can raise nominal interest rates in the long run via the Fisher effect, an easy-money policy reduces interest rates in the short run because of the liquidity effect. But we can see from the first two panels in figure 4.1 that this need not be the case; even in the short run, an easy-money policy can raise nominal interest rates.

A related argument is that although the NeoFisherian case might occasionally apply to developing countries with a history of high inflation and unstable exchange rates, in developed countries the Keynesian model explains the relationship between monetary policy and interest rates. Once again, this is not necessarily the case, as seen in January 2015 when the Swiss National Bank (SNB) suddenly revalued the franc and

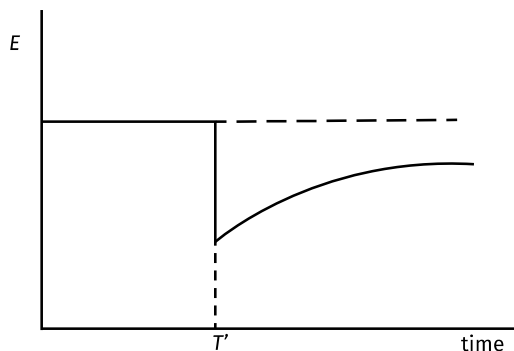
5. Milton Friedman, "Rx for Japan: Back to the Future," *Wall Street Journal*, December 17, 1997.

simultaneously sharply cut its nominal interest rate target. The lower nominal interest rates caused investors to expect even further appreciation in the Swiss franc, a clearly contractionary monetary policy.

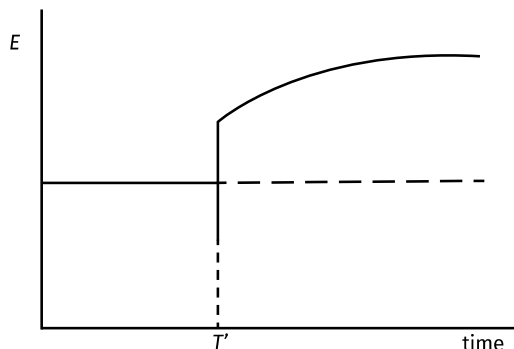
Figure 4.2 shows two examples of a “low interest rate policy.” As you can see by looking at the long-run change in the nominal exchange rate, the first policy shock is expansionary (currency depreciation), while the second is contractionary (currency appreciation). And yet because of the interest parity effect, *the path of nominal interest rates is the same* in both cases. This means that the entire concept of an “interest rate policy” is illusory. A given path of interest rates can be compatible with a wide variety of monetary policy stances.

Figure 4.2: Two Low Interest Rate Policies

A. Keynesian (United States: March 19, 2009)



B. NeoFisherian (Switzerland: January 15, 2015)



Note that in the graphs in figure 4.1, all the monetary policies were expansionary, whereas in some cases the interest rate rose and in other cases the interest rate declined. In these two graphs, the path of interest rates is identical, but the stance of policy is very different.

A more plausible counterargument is that the SNB policy shift had two components: a lifting of the franc-euro exchange rate peg and lower nominal interest rates. Lifting the

currency peg was highly contractionary, while the lower interest rates somewhat moderated the contractionary impact of the franc appreciation. But all monetary policy announcements are hybrid policies. There is almost always an announcement about the current setting of a monetary policy instrument, as well as some forward guidance about the future path of policy. These two parts of the announcement need not push policy in the same direction.

Some economists might argue that the preceding analysis is nothing new. Good economists have always known that nominal interest rates can be a misleading indicator of the stance of monetary policy, and that what really matters is the relationship between the policy rate and the (unobserved) natural rate of interest. But as we've already seen, the unobservable nature of the natural rate of interest means that we must fall back on other indicators of the stance of monetary policy, such as the money supply or the exchange rate, or better yet, the price level or NGDP growth.

As far as I know, there are almost no economists who agree with my view that the Fed triggered the Great Recession in late 2007 with a tight money policy. When I made this claim in my recent book, *The Money Illusion*, I found that even many economists who were sympathetic to my views on policy proposals such as NGDP targeting were unwilling to blame the Fed for the recession.⁶ The relatively few economists who do believe the Fed caused the recession make the opposite argument; that an extremely easy monetary policy in 2004–2006 led to a bubble, the bursting of which was the underlying cause of the Great Recession.

So why don't economists believe that a tight money policy triggered a recession in late 2007? After all, growth in the monetary base suddenly came to a complete halt in late 2007 and early 2008, so it's not like there weren't any so-called concrete steps for people to notice, even if they do not accept my *outcomes* approach to determining the stance of monetary policy, which focused on the fall in NGDP. Why was it so difficult to convince economists that sharply slowing growth in the monetary base, leading to a sharp slowdown in NGDP growth at roughly the same time, triggered the Great Recession?

I can only think of one answer to this question. Nominal interest rates fell from 5.25 percent to 2.0 percent during late 2007 and early 2008. If you see monetary policy as a series of Fed decisions about interest rates, it's hard to see how that pattern of rate cuts could cause a recession. Wasn't monetary policy being "eased"?⁷

6. Scott Sumner, *The Money Illusion: Market Monetarism, the Great Recession, and the Future of Monetary Policy* (Chicago: University of Chicago Press, 2021).

7. As an aside, I can easily understand why *noneconomists* would not have blamed the Fed; to most people, it looked like the housing crash caused the slump. But economists are supposed to see through the symptoms of falling NGDP and look for root causes.

The tendency of many people to equate interest rate changes with shifts in monetary policy causes real harm. It leads to a false impression that monetary policy cannot be the cause of macroeconomic instability, at times when Fed policy is causing the economy to fall into recession or to overheat. Because interest rates are an exceedingly poor indicator of the stance of monetary policy, the reduction in interest rates during 2007–2008 is not a good reason to deny that tight money caused the Great Recession. In the next section, we'll look at the money supply as a policy indicator. It is only slightly less bad.

What's Wrong with the Money Supply?

Monetarists have long criticized the central role that interest rates play in monetary analysis. Instead, they advocate using the money supply as an instrument and/or indicator of monetary policy. This approach does avoid some of the pitfalls associated with an interest rate approach, but not all. It turns out that the money supply is also an unreliable monetary policy indicator.

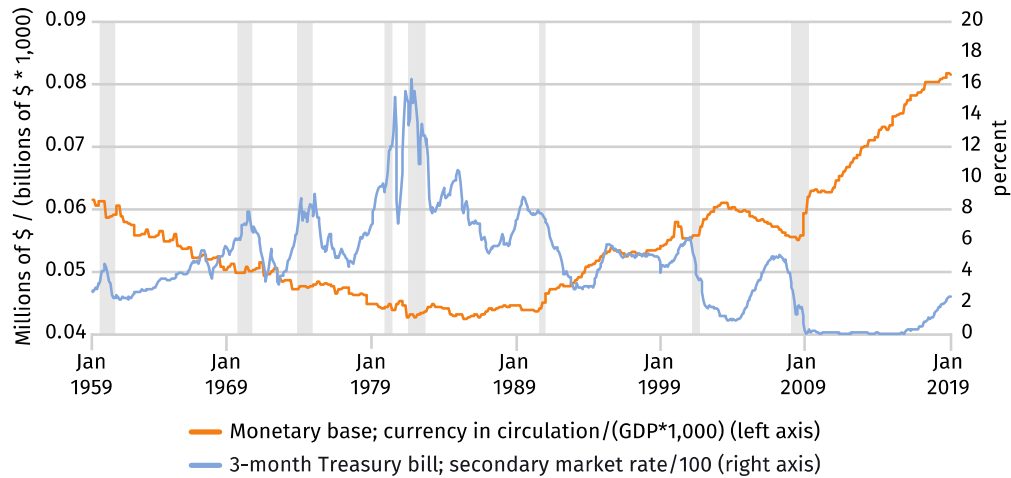
Recall that figure 4.1 showed five varieties of easy money. The first three panels looked at the path of exchange rates (with an implied path of interest rates). In contrast, the final two panels (panels d and e) showed changes in money supply and demand, with one example of easy money associated with a rising money supply, and a second example where monetary easing was associated with a contraction in the money supply. The first example is familiar to most people, while the second case requires an extensive explanation.

We've already seen that interest rates are an especially poor monetary policy indicator at either very low rates or very high rates, where the income and Fisher effects tend to dominate the liquidity effect. Very low nominal interest rates often occur when inflation is low, and very high rates often occur when inflation is high.

Unlike with interest rates, money supply growth is often a good policy indicator during periods of extremely high inflation. But during periods of very low inflation, money growth can be an extremely poor indicator of the stance of monetary policy. To understand why, we need to look at the factors determining changes in the demand for money.

Throughout most of the post–World War II period, the demand for base money as a share of GDP was inversely related to the nominal interest rate. This is mostly because until 2008, the opportunity cost of holding currency and bank reserves was equal to the nominal interest rate. People hold less base money when there is a high opportunity cost of doing so. Today, that claim only applies to currency, as bank reserves pay interest. Nonetheless, there continues to be a negative relationship between base money demand and interest rates (see figure 4.3).

Figure 4.3: US Interest Rates and Demand for Cash, 1959–2018

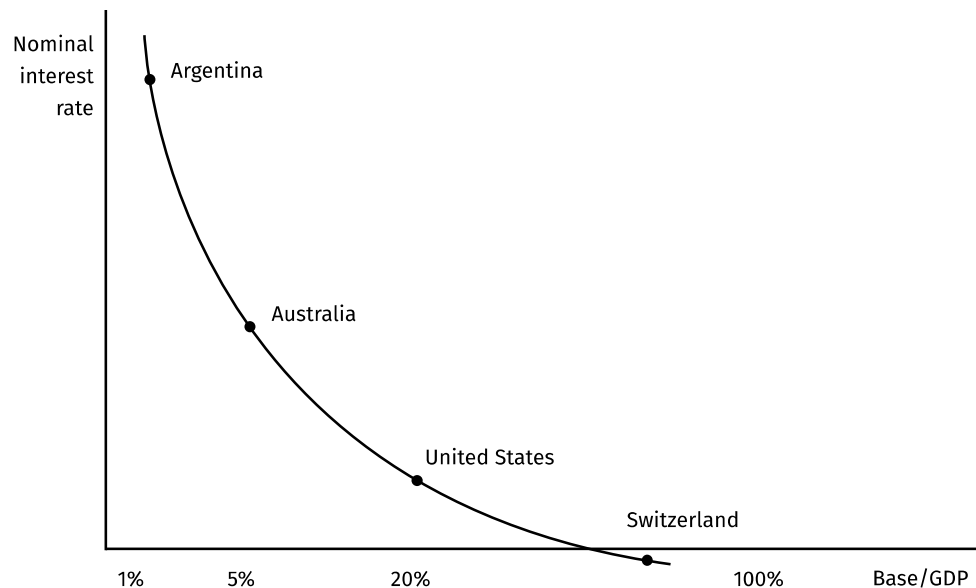


Source: FRED (Federal Reserve Economic Data), Federal Reserve Bank of St. Louis, <https://fred.stlouisfed.org/>.
Note: Gray bars indicate periods of recession as defined by the National Bureau of Economic Research (NBER).

As nominal interest rates approach zero, the demand for base money often increases sharply. Central banks typically accommodate that higher demand with large increases in the supply of base money. In countries with the very lowest inflation rates, such as Switzerland and Japan, even longer-term interest rates fall close to zero (or even go negative), and demand for base money can rise to well over 100 percent of GDP.

In contrast, in a typical developed economy with positive interest rates and no payment of interest on reserves, base demand remains below 10 percent of GDP. In countries with hyperinflation, base money demand is lower still. Figure 4.4 is a highly stylized depiction of how base money demand varied across countries in the early 2010s.

Figure 4.4: Trade-Off between Nominal Interest Rates (or Inflation) and Central Bank Balance Sheets



Because base money demand is very elastic when nominal rates are near zero, base money is often injected into the economy at a very high rate during periods of low or negative interest rates, a process called *quantitative easing*. During these periods, the normally positive correlation between base growth and inflation breaks down, and even reverses. Rapid money growth becomes associated with very low inflation rates.

Critics of monetarism often misunderstand the implications of figure 4.4. They point to large increases in the monetary base that are associated with low inflation, and ask, “How much more QE would be needed to hit the inflation target?” The correct answer is often *less than zero*. At the zero bound, a credible monetary policy that generates higher inflation expectations will lead to far *less* demand for base money.

If the Bank of Japan shifted from a regime of roughly 1 percent inflation (since 2013) to a regime targeting inflation at 10 percent, then demand for base money in Japan would fall from over 140 percent of GDP to less than 10 percent of GDP. It would be forced to shrink its monetary base to avoid overshooting the 10 percent inflation target. (This is what the final panel in figure 4.1 shows—the impact of a credible policy of reflation in Japan.)

This misconception has led many pundits to wrongly assume that monetary policy is not effective at the zero lower bound. In fact, the problem is not that central banks are unable to target inflation when rates fall to zero, rather the problem is that central banks have stumbled into the zero rate trap with Keynesian policies of interest rate targeting. Interest rates cease to be a reliable policy instrument when the nominal interest rate falls to zero. Keynesians use a flawed approach to monetary control, and when it breaks down

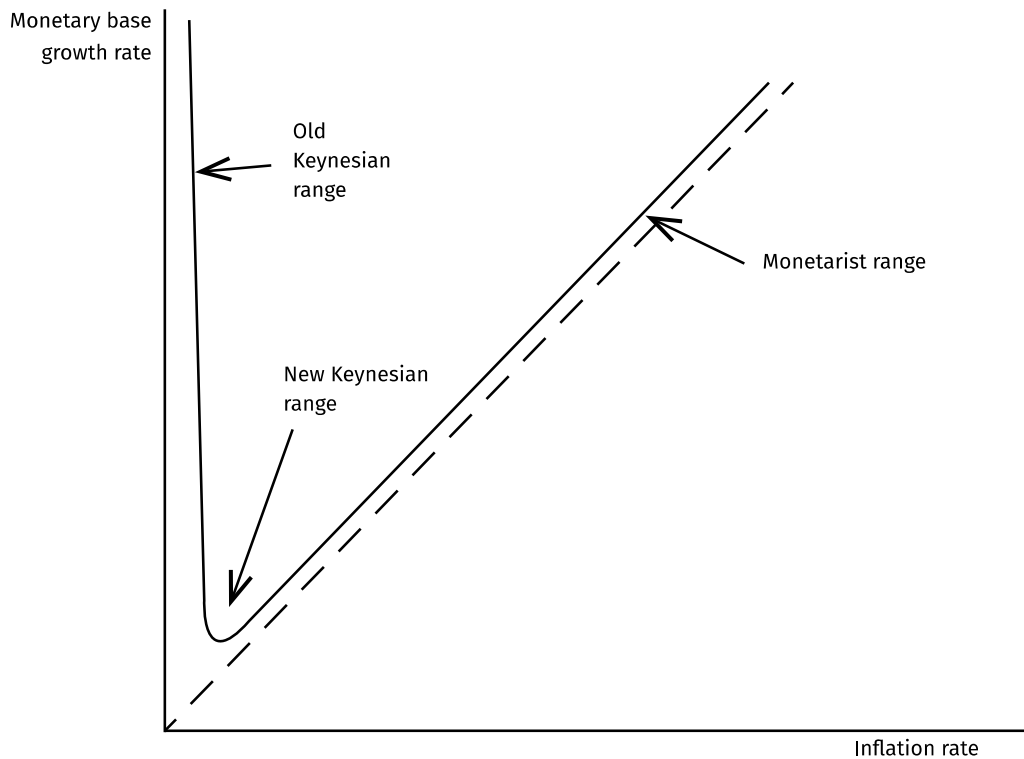
at the zero lower bound they often assume that the situation discredits all types of monetary control, even non-Keynesian approaches that were never tried.

Money, Inflation, and Ideology

The tendency of QE to occur during periods of very low inflation or nominal interest rates leads to a confusing pattern, where during some periods (say 1970) base growth is strongly and positively correlated with inflation, while in other periods (say 2010) base growth is negatively correlated with inflation, at least for developed economies.

Figure 4.5 is a highly stylized representation of how the popularity of various macroeconomic models relates to the correlation between the growth rate in the monetary base and inflation.

Figure 4.5: Monetary Ideologies and Monetary Base Growth/Inflation Correlations



The monetarist range shows the strongly positive correlation between base growth and inflation typically seen during very high inflation periods, such as the 1960s and 1970s. During these periods, quantity theoretic explanations for high inflation become increasingly popular. This is even true of individuals that might otherwise take a relatively nonmonetarist approach to policy. Thus, both Knut Wicksell and John Maynard Keynes switched from an interest rate-oriented approach to a more quantity theoretic

approach during the early 1920s, when a number of European economies were hit with hyperinflation.⁸

Keynesian models that equate “easy money” with low interest rates are not persuasive during periods of high inflation, when the Fisher effect dominates movements in interest rates. The postwar revival of the quantity theory, led by Milton Friedman, Anna Schwartz, Allan Meltzer, and Karl Brunner, among others, gained traction as ever-higher inflation rates seemed to discredit traditional Keynesian models of monetary policy. Friedman suggested, “Double-digit inflation and double-digit interest rates, not the elegance of theoretical reasoning or the overwhelming persuasiveness of serried masses of statistics massaged through modern computers, explain the rediscovery of money.”⁹

The opposite extreme occurs during periods of near-zero interest rates, such as the 1930s, the 1940s, and the 2010s, when traditional Keynesian models seem more persuasive. Near-zero interest rates led many observers to (wrongly) conclude that monetary policy is ineffective. And the fact that large increases in the monetary base are associated with low inflation tends to further discredit monetarist analysis.

An intermediate case occurs during periods of relative monetary stability, such as 1924–1929, or the so-called Great Moderation (1984–2007). When central banks succeed in holding inflation at close to 2 percent, the correlation between money and inflation may be weak. However, unlike during the zero-lower-bound periods, nominal interest rates are positive and monetary policy continues to be viewed as effective at stabilizing aggregate demand and inflation.

During these periods, New Keynesian policies such as the Taylor rule are favored by many central bankers. Keynesian interest rate targeting is used to stabilize inflation and reduce output instability. Unlike with traditional Keynesianism, however, New Keynesians view monetary policy as effective and indeed superior to fiscal stabilization policy.¹⁰ Conversely, unlike during monetarist periods, money supply growth rates do not play a major role in policy evaluation or implementation.

Obviously, this sort of time-varying popularity of models is not a desirable state of affairs for macroeconomics. We would like to have robust structural models that can apply to a wide range of macroeconomic conditions. Thus, we need to consider whether the reasons for the time-varying popularity of various models are actually sound. More specifically, is the rejection of monetarism during periods of low inflation actually justified? In my view, critics of monetarism dismiss the theory too easily. Although there are some problems

8. See Scott Sumner, *The Midas Paradox: Financial Markets, Government Policy Shocks, and the Great Depression* (Oakland, CA: Independent Institute, 2015).

9. Milton Friedman, “25 Years after the Rediscovery of Money: What Have We Learned? A Discussion,” *American Economic Review* 65, no. 2 (1975): 176.

10. DeLong pointed out that New Keynesian economics incorporated a number of monetarist insights. J. Bradford DeLong, “The Triumph of Monetarism?,” *Journal of Economic Perspectives* 14, no. 1 (2000): 83–94.

with traditional monetarist policy recommendations, the underlying framework still provides many useful insights for evaluating and guiding monetary policy.

After the death of Milton Friedman in 2006, Paul Krugman wrote an essay that was somewhat dismissive of Friedman and Schwartz's *Monetary History*.¹¹ Krugman pointed to the rapid growth in the US monetary base from 1930 to 1933 and asked whether in light of that fact it made sense to speak of the Fed's causing the Great Contraction with a tight money policy. Krugman did acknowledge that Friedman and Schwartz had focused their analysis on the broader aggregates (mostly M1 and M2), which did decline sharply during the early 1930s, but viewed those declines as errors of omission, not contractionary monetary policies. Indeed, Krugman suggested that it is not obvious that the Fed could have prevented the aggregates from declining.

Edward Nelson and Anna Schwartz were sharply critical of Krugman's essay, pointing to the fact that the Fed had been created specifically to prevent the sort of banking panic that occurred in the early 1930s, and also that Krugman had glossed over some specific actions taken by the Fed that made the contraction more severe.¹²

During the 2010s, we saw something of a repeat of this debate. Critics of monetarism pointed to the fact that rapid growth in the base did not lead to high inflation, as simple versions of the quantity theory might have predicted. They also pointed to some inflation warnings made by conservative economists in the early 2010s that did not pan out.

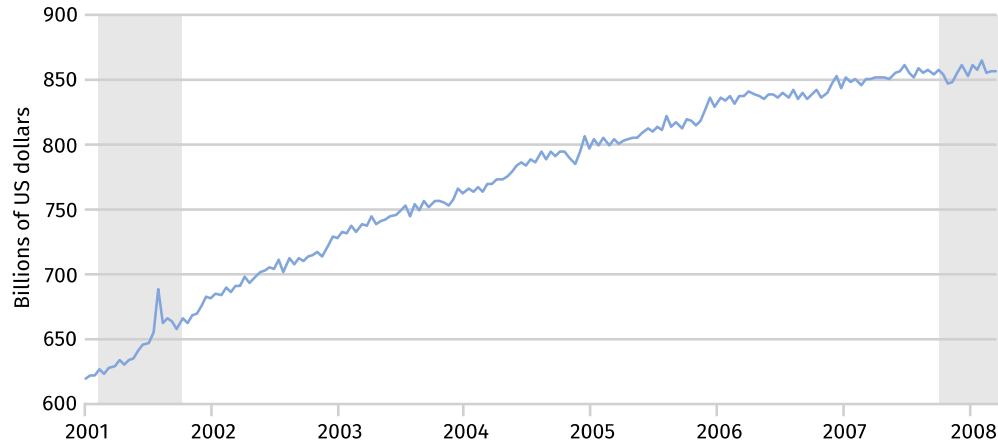
There are several problems with attempts to dismiss monetarism by pointing to the relationship between rapid increases in the monetary base (i.e., QE) and low inflation. First, at no time during recent decades have either monetarists or nonmonetarists pointed to the monetary base as the proper indicator of the stance of monetary policy. Monetarists typically focused on the broader monetary aggregates, while nonmonetarists looked at interest rates and other indicators. So it was inappropriate to equate large injections of base money in QE programs with a highly expansionary monetary policy.

Even worse, if the monetary base actually were the correct indicator of monetary policy, then this would imply that monetary policy became extremely tight in late 2007 and early 2008, just as the United States tipped into recession. Base growth in the United States (which is typically about 5 percent a year) came to a complete halt between July 2007 and May 2008 (figure 4.6). So if the monetary base actually were the right policy indicator, then the profession should have been warning in late 2007 or early 2008 that a lack of growth in the base was pushing the economy into recession.

11. Paul Krugman, "Who Was Milton Friedman?," *New York Review of Books*, February 15, 2007.

12. Edward Nelson and Anna J. Schwartz, "The Impact of Milton Friedman on Modern Monetary Economics: Setting the Record Straight on Paul Krugman's 'Who Was Milton Friedman?,'" *Journal of Monetary Economics* 55, no. 4 (2008): 835–56.

Figure 4.6: US Monetary Base, 2001–2008



Source: FRED, Federal Reserve Bank of St. Louis, <https://fred.stlouisfed.org/>.

Note: Gray bars indicate NBER-defined periods of recession.

In fact, few economists even commented on the fact that base growth had ceased in late 2007 and early 2008. Nominal interest rates were falling, and thus most of the profession seemed to assume that policy was “expansionary.” In retrospect, those making that assumption were wrong, but not because base growth is the right indicator, indeed *neither* base money growth *nor* interest rates (real or nominal) are a reliable indicator of the stance of monetary policy.

It is often assumed that the United States fell into recession in late 2007 because of a reduction in the velocity of base money. This is also false. Between the summer of 2007 and the spring of 2008, nominal GDP continued to grow slowly, even as the monetary base plateaued. Thus, in an accounting sense, the problem was the dramatic slowdown in base growth; base velocity was actually increasing.

In fairness, later in 2008, the velocity of circulation did fall sharply (due to near-zero interest rates). This pattern is actually pretty similar to the Great Depression, however, when the monetary base in the United States fell during the first year of the contraction and then rose sharply in response to the banking crisis, as the Fed (partially) accommodated a fall in base velocity during the banking panics.

There is another problem with focusing on growth in the monetary base. The original monetarist model was based on the assumption that the monetary base was “high-powered money.” That assumption was accurate until October 2008, when the Fed began paying interest on reserves. At that point, the nominal interest rate was no longer the opportunity cost of holding base money, and there was no reason to assume that the traditional “money multiplier” would continue to link movements in the base and the broader monetary aggregates.

Friedman and Schwartz argued that the doubling of reserve requirements in 1936 and 1937 had made policy much more contractionary, reducing the money multiplier and the

broader monetary aggregates.¹³ As with higher reserve requirements in 1936/37, the Fed's decision to pay interest on bank reserves in October 2008 tended to boost the demand for reserves and reduce the money multiplier. Not only is monetarist analysis not irrelevant in this new environment, monetarists were among the first to warn that monetary policy was becoming too contractionary. Tim Congdon, Robert Hetzel, David Beckworth, and I all warned that money was too tight during the Great Recession, whereas Keynesian criticism of Fed policy typically didn't become prominent until well into the recovery.

A third problem is that many central banks refused to commit to a whatever-it-takes approach to achieving a higher inflation rate. I argued that traditional monetarist analysis of money and inflation applied to changes in the money supply that were expected to be permanent, and that temporary monetary injections would not be inflationary.¹⁴ In 1998, Krugman reached the same conclusion using a formal model. An injection of base money that is not expected to be permanent will not lead to a significant rise in the price level.¹⁵

As we saw in chapter 3, in 2006 the Bank of Japan sharply reduced the monetary base, reversing large increases that had occurred earlier in the decade. Those previous injections of base money had relatively little impact on the Japanese price level, due to the public's belief that the Bank of Japan was committed to near-zero inflation and would remove excess cash balances if necessary to prevent any significant inflation. And that is exactly what they did in 2006.¹⁶ Although Krugman's 1998 paper is often viewed as a defense of the concept of a liquidity trap, the model actually shows that even at the zero lower bound a permanent injection of base money will be expansionary.

In figure 4.1, we saw five different types of expansionary monetary policies. The final two examples showed that an expansionary monetary policy might be associated with either a rise or a fall in the monetary base.

Figure 4.7 illustrates two cases of rapid growth in the money supply. In the first case, which illustrates the standard monetarist model, rapid money growth leads to higher prices. In the second case, a contractionary monetary policy produces deflation and near-zero interest rates. To prevent prices from falling even more rapidly, the central bank accommodates the large increase in real base money demand via a QE program. Tight money is associated with rapid money supply growth, as in Switzerland and Japan.

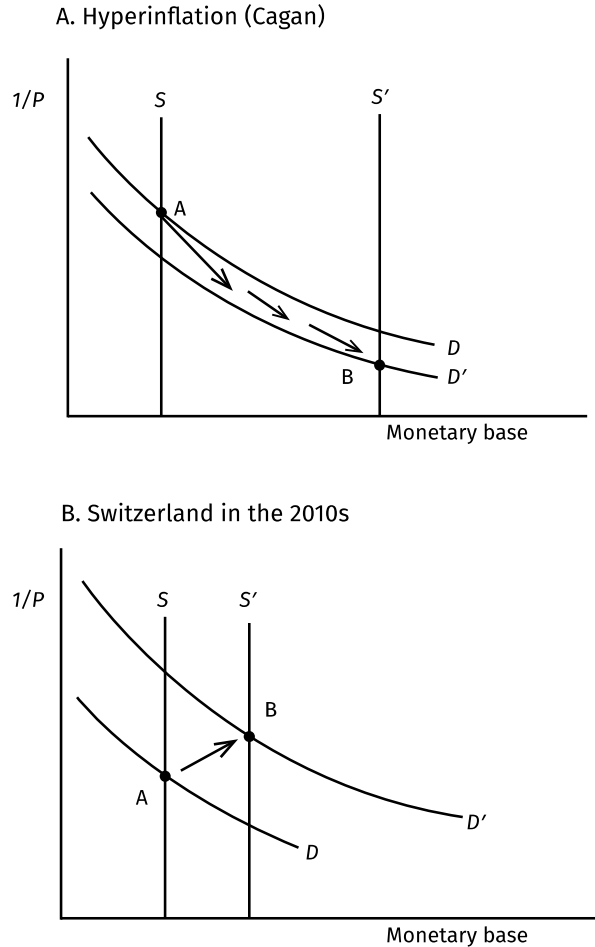
13. Milton Friedman and Anna J. Schwartz, *A Monetary History of the United States, 1867–1960* (1963; repr., Princeton, NJ: Princeton University Press, 1971).

14. Scott Sumner, "Colonial Currency and the Quantity Theory of Money: A Critique of Smith's Interpretation," *Journal of Economic History* 53, no. 1 (1993): 139–45.

15. Paul R. Krugman, "It's Baaack! Japan's Slump and the Return of the Liquidity Trap," *Brookings Papers on Economic Activity* 2 (1998): 137–87.

16. . See Paul Krugman, "It's Baaack, Twenty Years Later" (CUNY working paper, City University of New York, February 2018).

Figure 4.7: Two Types of Rapid Money Growth



For those who have difficulty reading graphs, let's go through this one step at a time. In panel a of figure 4.7, assume a very large increase in the monetary base, at a time when the public is not hoarding base money. In other words, at a time when interest rates are positive. By itself, this would create lots of inflation because of the “hot potato effect.” On the graph, the equilibrium moves down because the value of money ($1/P$) is inversely related to the price level. Thus, when prices rise rapidly during hyperinflation, the value of money ($1/P$) falls rapidly.

Philip Cagan's classic study showed that this is not the end of the story. During hyperinflation, the public's real demand for base money falls. Here, we are assuming that base money pays no interest (which was the case during previous episodes of hyperinflation). When the demand for money falls, that further reduces the value of money. Thus, the new equilibrium in the first graph is even lower than what would occur if the money supply curve were the only factor affecting the price level. During hyperinflation, the value of money falls primarily because of the large increase in the money supply, but also because of a decline in money demand.

Now, let's look at panel b, which illustrates the Swiss case during the 2010s. Here, we begin with a shift in money demand, which is rising because of a previous contractionary monetary policy that made Swiss francs an attractive currency to hold. By itself, the large increase in the Swiss demand for base money would have caused the value of the Swiss franc to rise sharply, to a new equilibrium point on the new demand curve, directly above point A.

The Swiss National Bank would like to avoid a period of severe deflation, which would push the Swiss economy into recession. Thus, it increases the monetary base enough so that the new equilibrium (point B) is only slightly higher than point A. Switzerland has only mild deflation—a small increase in the Swiss franc's purchasing power.

To summarize, here we have two examples of a large increase in the monetary base. The first is associated with a highly expansionary monetary policy, while the second is associated with a highly contractionary monetary policy in previous years. Pessimism about the efficacy of monetary policy at the zero lower bound is due to people conflating these two examples, assuming that any large increase in the base represents an expansionary monetary policy. The Swiss case during the 2010s is not an easy-money policy that failed, it is a tight-money policy that led to increased money demand, where the central bank partially accommodated that increased demand for base money with increased supply.

Why the Price of Money Approach Is Superior

It took me a long time to figure out why the price of money approach is superior to the interest rate or the quantity of money approaches. My initial view was that these were just three ways of looking at the same phenomenon, that a given money supply implied a given interest rate and a given exchange rate. In the previous sections, we saw why that assumption is clearly false. There is no reliable relationship between money growth and the stance of monetary policy, and the same is true of interest rates.

The conventional view is that if the central bank of Singapore sets an exchange rate, that setting implies a certain money supply and nominal interest rate for Singapore. With one policy tool you can only have one target. Thus, I initially assumed that if the Paul Volcker Fed targeted the money supply, then that money supply target would necessarily imply a certain interest rate and exchange rate. And if the Alan Greenspan Fed targeted the federal funds interest rate, then that rate setting implied a specific level of base money and a specific exchange rate.¹⁷

Now, I understand that this view is too simple. As we saw earlier, the exact same path of nominal interest rates can be associated with either easy money or tight money,

17. Today, the Fed can control the base independently through changes in interest on reserves. But this tool was not available to Alan Greenspan.

depending on what happens to the spot exchange rate. And we also saw that an extremely rapid growth in the monetary base might be associated with either very low inflation or very high inflation. Fortunately, this sort of indeterminacy is much less of a problem when central banks use a price of money approach.

To better see the advantage of using the price of money approach, consider a thought experiment where you are given a crystal ball that shows the path of the monetary instrument in Australia over the next three years. Consider some pretty extreme policy choices:

1. The monetary base increases by 300 percent.
2. Interest rates are held at zero for three years.
3. The exchange rate of the Australian dollar (in US dollar terms) is cut from 0.66 to 0.22.

By conventional standards, all three policy paths look expansionary. There's a big increase in base money, a low interest rate policy, and an extreme currency depreciation. But only in the third case can we have any confidence that the policy will be expansionary in *outcomes*. After all, the first two policy paths look qualitatively similar to the US experience during both the Great Depression and the Great Recession, or Japan during the 2000s.

The third policy path—an extreme depreciation of the Australian dollar—would not necessarily lead to high inflation, but that outcome would be highly likely to occur. One doesn't typically see the real exchange rate for a developed economy fall by two-thirds in just three years. In that case, the rapid nominal depreciation would lead to high inflation in Australia, assuming that the US price level did not decline during this period.

To summarize, at a superficial level all three policy paths look highly expansionary. But only in the case of severe currency depreciation can we be fairly confident that the policy would in fact lead to high inflation. FDR was able to immediately end deflation in the spring of 1933 by replacing policies that are sometimes effective (low interest rates and an expanded monetary base) with a policy instrument that is almost always highly effective in boosting inflation—sharp currency depreciation. And this is why Lars Svensson viewed currency depreciation as a *foolproof* way of escaping from a liquidity trap.¹⁸

One of the advantages of the price of money approach is that it allows us to better understand why monetary policy is so confusing. Our instincts are to think of policy stances in a unidimensional fashion—more or less money, higher or lower interest rates, and so forth. But we've already seen that policy is multidimensional. Any given policy

18. Svensson, "The Zero Bound in an Open Economy."

shock moves both the spot exchange rate and the expected future path of exchange rates. Only the latter change affects nominal interest rates.

Thus, both the Fed's QE announcement of March 2009 and the SNB's franc appreciation of January 2015 were associated with a fall in nominal interest rates. In that sense, the policies were quite similar. Both led to an expected future appreciation in their currencies. But the US policy was associated with an immediate sharp depreciation in the value of the dollar, whereas the Swiss policy shock was associated with an immediate sharp appreciation in the franc. Thus, the US policy ended up being expansionary, while the Swiss policy change was contractionary.

So far, I've discussed the price of money approach using one specific price of money—the nominal foreign exchange rate. Unfortunately, this particular price of money is not sufficient for our purposes, for a number of reasons. Imagine that in the distant future, the entire world came together and adopted a single currency, such as the euro. In that case, the central bank could not use foreign exchange rates as a policy instrument and indicator, *because exchange rates would literally not exist*.

Even today, exchange rate targeting is not a general solution to the problem of monetary policy. If the Bank of Japan decides that its inflation objective can only be achieved if the yen depreciates by 1 percent a year against the US dollar, and the Fed decided that its inflation objectives could only be achieved if the dollar depreciates by 1 percent a year against the yen, then at least one party must end up being disappointed. This is a recipe for international discord, and explains why today it is mostly small economies such as Singapore, Hong Kong, and Denmark that have monetary policies that rely on exchange rate control.

And finally, real exchange rates show surprisingly large changes over time, making the nominal exchange rate a somewhat imperfect indicator of the stance of monetary policy, at least if you care about macroeconomic outcomes, such as stable inflation or NGDP growth.

None of this means the price of money approach is wrong—I believe it is the most effective means of conducting monetary policy, but we need a more reliable indicator than nominal exchange rates. In the next chapter, we'll search for the optimal indicator of the price of money, and then look at what that indicator tells us about the stance of monetary policy and the optimal policy regime.

Chapter 5: From the Gold Standard to NGDP Futures Targeting

Even in a world with no exchange rates, it is possible to have a monetary policy that relies on the price of money approach. The simplest example is a commodity money regime, where a commodity such as gold or silver represents the medium of account. In this chapter, we'll move step by step from a laissez-faire gold standard to a nominal gross domestic product (NGDP) futures targeting regime. One goal is to show that the two regimes are not as different as you might first suppose. See if you can spot a sharp break in one of the nine following steps:

1. *Pure gold standard.* The dollar is defined as one gram of gold; otherwise, the government is not involved in the monetary system. Private banks are free to produce gold-backed banknotes.
2. *Gold exchange standard.* The government produces paper currency and promises to redeem each paper dollar for one gram of gold, on demand.
3. *Gold price targeting.* The government adjusts monetary policy in such a way as to keep the free-market price of gold at \$1 per gram. But the government does not directly buy and sell gold at that price; rather, it targets gold prices by engaging in open market operations with other assets, such Treasury securities.
4. *Symmetallism.* Monetary policy targets the price of a basket of metals containing one gram of gold plus 20 grams of silver at a price of \$1. Notice that I said "plus." If I'd said "or," the system would have been bimetallism. Symmetallism is less well-known than bimetallism but is a more important concept. It's a key step toward inflation targeting.
5. *Commodity price targeting.* The government adjusts monetary policy in such a way as to stabilize the spot price of a basket of 37 actively traded commodities.
6. *Commodity futures price targeting.* The government adjusts monetary policy in such a way as to stabilize the price of a basket of 37 actively traded commodity price *futures*.
7. *Consumer price index (CPI) futures targeting.* The government adjusts monetary policy in such a way as to stabilize the price of one-year forward CPI contracts at 100.

8. *Inflation futures targeting.* The government adjusts monetary policy in such a way as to ensure that the price of one-year forward CPI contracts rises at 2 percent a year.
9. *NGDP futures targeting.* The government adjusts monetary policy in such a way as to ensure that the price of one-year forward NGDP contracts rises at 4 percent a year.

So how should we think of this nine-part transition from a simple laissez-faire gold standard to a hypothetical NGDP futures targeting regime? It may be helpful to break the transition down into three subgroups:

- *Gold.* The first three steps all involve various forms of a gold standard. In all three cases, the price level is the inverse of the purchasing power of gold. The three policies differ in how much influence the government has over the demand for gold, and hence its ability to affect the price level.
- *Composite commodity.* Steps 4, 5, and 6 involve commodity money regimes where the medium of account is a composite of more than one good. But in each case, the commodities are relatively homogeneous goods with flexible prices that adjust in real time to keep the market in equilibrium. Even as we move from one or two goods to many goods, the basic principles of commodity money continue to apply.
- *Macroeconomic aggregate.* Step 7 brings us to a monetary regime where the underlying aggregate being targeted is measured infrequently, with a significant time lag. We don't know the current price level until the CPI is announced later the next month. Thus, we move from directly targeting the spot price of a set of well-defined commodities to targeting a futures contract for all goods in the consumer price index. Importantly, the price of this futures contract is flexible and is known in real time, even though the actual CPI is sticky and measured with a long time lag.

Once we've decided to target a CPI futures price, there's no particular reason why the target path should involve a 0 percent rate of change. That might be the optimal inflation rate, but it's also possible that some other figure might be optimal, either more or less than zero. In step 8, I've assumed that the target growth rate for the CPI is 2 percent a year.

Once we've decided to target a futures contract linked to an economic aggregate, there's no particular reason why the CPI is the appropriate aggregate. It might be another price index, or it might be an aggregate such as nominal GDP. In step 9, we have a monetary regime that targets NGDP futures prices along a growth path of 4 percent a year.

The nine categories can also be broken down in a different fashion, into two broad categories:

- *Physical goods.* Each of the first five monetary regimes involves stabilizing the price of one or more physical goods.

- *Financial assets.* The last four monetary regimes involve controlling the price of a financial asset—a futures contract.

Although there are very significant differences among these nine policies, in each case we are clearly using the *price of money approach* to monetary policy. On the other hand, the Federal Reserve's current inflation targeting regime does *not* use a price of money approach for the policy instrument. Instead, the Fed adjusts policy instruments such as interest rates (interest on reserves [IOR]) or the quantity of base money (quantitative easing [QE] or quantitative tightening) with the goal of nudging inflation toward its 2 percent target.

What Does It Mean to Use the Price of Money Approach?

In recent decades, an increasing number of economists have begun to see the advantages of targeting NGDP. Unfortunately, there is still almost no support for moving toward a price of money approach to monetary policy. To better understand the distinction, consider the following often heard claim:

We should stop targeting interest rates and instead have central banks target NGDP.

At first glance, that sounds like a plausible policy recommendation. But on closer inspection, it is unclear exactly what is being advocated. How would the central bank achieve its NGDP target? As far as I know, most of the economists that favor NGDP targeting also favor interest rate targeting. They recommend that the central bank adjust interest rates as needed to produce stable NGDP growth.

I recall John Taylor once asking for clarification from people who proposed replacing the Taylor rule with NGDP targeting. The Taylor rule is a formula to guide policymakers in adjusting interest rates with an eye toward achieving 2 percent inflation and full employment. Taylor wondered what sort of interest rate rule would achieve stable NGDP growth—a quite reasonable request if you assume that policymakers plan to use interest rates as the policy instrument.

Here's another way to make my point. Asking whether policymakers should use interest rate targeting or NGDP targeting is analogous to asking a motorist whether he plans to use a steering wheel or a map to achieve his destination. Why not both?

Moving to NGDP targeting does not, by itself, represent the adoption of the price of money approach to policy. On the other hand, moving to NGDP *futures* targeting does represent the abandonment of conventional monetary policy and the adoption of the price of money approach. But at exactly what point does monetary policy cross over from interest rates (the rental cost of money) to the price of money approach? Here again, it may be helpful to break the transition down into small steps. Again, see whether you can find a sharp qualitative break:

1. *Discretionary Federal Open Market Committee (FOMC) with no accountability.* Assume the 12-member FOMC votes on a policy instrument

setting, such as the target federal funds rate. The rate is set at the median vote.

2. *Discretionary FOMC with accountability.* Assume the 12-member FOMC votes on a policy instrument setting, such as the target federal funds rate. One year later, the Fed ascertains whether the previous policy had been too expansionary or too contractionary, using a predetermined formula related to the Fed's announced policy goals. For simplicity, assume the goal is 4 percent NGDP growth.
3. *Discretionary FOMC with accountability and incentives.* This is the same as step 2, except FOMC members receive financial bonuses or penalties one year later depending on their vote on the policy instrument setting. Votes for a more dovish policy than what was actually adopted would be viewed as a forecast of below-target NGDP growth, and vice versa. If NGDP comes in below target, the doves are rewarded, and the hawks are penalized. If NGDP comes in above target, the hawks are rewarded, and the doves are penalized.
4. *Expanded FOMC with accountability and incentives.* The FOMC is expanded from 12 members to 8 billion members. Anyone can vote, with the proviso that the bonus-penalty system applies to all who choose to vote.
5. *Expanded FOMC with one dollar per one vote.* Members can choose to vote as often as they like, with the proviso that the bonus-penalty system applies to each vote.

Before going any further, let's think about what sort of system has evolved. You could think of step 5 as being as if the government operated a NGDP futures market and adjusted the federal funds rate until the equilibrium price of NGDP futures was equal to the policy goal (such as 4 percent NGDP growth).

But that's not quite right, as in a sense the NGDP futures market *is the central bank*. It is the futures market (not central bank officials) that sets the interest rate. It's not so much that the market is forecasting 4 percent NGDP growth; rather, the market is forecasting the instrument setting (say, IOR or the federal funds target) that is expected to produce 4 percent NGDP growth. The central bank has lost all discretion. Under NGDP futures targeting, the interest rate adjusts passively, just as under interest rate targeting the money supply adjusts passively.

Alternatively, the central bank could retain some discretion by offering to buy and sell unlimited NGDP futures contracts at a price implying 4 percent NGDP growth. In that case, it would presumably set the federal funds target at a position where the market was roughly equally balanced between short and long positions (and hence the central bank faced relatively little risk). That's analogous to a central bank that buys and sells unlimited gold at \$35 an ounce but retains a bit of discretion over interest rates.

Why might it prefer to maintain some discretion? Perhaps it worries about NGDP futures market manipulation. That's actually unlikely to be a problem,¹ but retaining some discretion would allow the central bank to avoid the very minor risk of a single large trader significantly moving the federal funds rate. Alternatively, policymakers might fear that markets are irrational—subject to bubbles—and thus wish to retain at least some discretion.

Under previous *price of money* regimes, such as the gold standard and Bretton Woods, central banks often retained a small amount of discretion. Under the gold standard, the price of gold was often allowed to fluctuate within a narrow band, called *gold points*. Similarly, under Bretton Woods, the exchange rate was allowed to move as much as 1 percent or 2 percent above or below the official exchange rate.

Under NGDP futures targeting, the central bank could gain additional discretion by allowing NGDP futures prices to fluctuate within a band of say 3 percent to 5 percent. Thus, the central bank could offer to take a short position on any contracts offered by bullish speculators at a price implying 5 percent NGDP growth, and the central bank could offer to take a long position on any contracts offered by bearish speculators at a price implying 3 percent NGDP growth. In that case, the central bank would profit as long as actual NGDP growth ended up within the 3 percent to 5 percent band.

A small NGDP growth rate band might be appropriate if the central bank felt the need to occasionally allow some variation in NGDP growth, but was worried about incurring large losses in the NGDP futures market. On the other hand, if the band were too wide (say 0 percent to 8 percent), then the regime would be almost indistinguishable from pure discretion. From this perspective, the distinction between rules and discretion is a matter of degree. A narrow band (say 3.9 percent to 4.1 percent) would represent a relatively strict policy rule, while a 2 percent to 6 percent band would be highly discretionary.

For all of these reasons, the distinction between the quantity of money, interest rate, and price of money approaches to policy is not either- or; rather, it is a matter of degree. Indeed, the Fed currently uses all three approaches, with QE, IOR, and Treasury Inflation-Protected Securities (TIPS) spreads all playing a role in policy making. Nonetheless, there are very important distinctions between these three approaches. Policy becomes more reflective of the price of money approach when either of following hold true:

1. *Monetary policy uses a nominal price as a policy instrument in a discretionary regime.* Singapore uses the exchange rate as a policy instrument, and for a brief time President Franklin Roosevelt used the dollar price of gold. In both cases, adjustments in the instrument price were aimed at achieving macroeconomic stability.

1. See Scott Sumner, "Nominal GDP Futures Targeting," *Journal of Financial Stability* 17, no. C (2015): 65–75.

2. *Monetary policymakers do “whatever it takes” to stabilize a nominal goal variable.* Two obvious examples are the gold exchange standard of the 1920s and Hong Kong’s fixed exchange rate regimes. In those cases, the stable exchange rate was not a means to an end; rather it was the ultimate goal of policy.

Both approaches have obvious drawbacks. Under a discretionary regime, it’s not clear what sort of instrument setting is likely to produce stable macroeconomic conditions. In contrast, it is not difficult for a central bank to stabilize short-term interest rates, the price of gold, or foreign exchange rates. Unfortunately, success at that limited objective does not necessarily produce stable macroeconomic conditions.

The obvious compromise is to find (or create) an asset price that is closely linked to the goal of policy. Thus, instead of targeting interest rates or exchange rates at a level that policymakers hope will produce 2 percent inflation, they might simply target CPI futures at a price consistent with a market expectation of 2 percent inflation. If 4 percent NGDP growth produces a superior outcome for the economy, then they might create and target NGDP futures prices.

The case for NGDP futures targeting traditionally relies on two components. First, that a stable path of NGDP is likely to produce good macroeconomic conditions. There are actually many different versions of this argument.² That’s the “NGDP” part of NGDP futures targeting. The “futures” part of NGDP futures targeting focuses on the question of how best to stabilize NGDP. These arguments tend to be based on the efficient market hypothesis, that is, the wisdom of crowds.

Here, I don’t plan to repeat those arguments, which I’ve covered elsewhere. Instead, I’d like to point to another less well-known advantage of NGDP futures targeting. It employs a *price of money* approach to policy, and hence is far more powerful than alternative approaches to monetary policy, such as interest rate targeting or money supply targeting, especially at the zero lower bound. It really is a *foolproof method* of affecting nominal aggregates.

In the next section, we’ll see that under the price of money approach to policy there is no zero lower bound to worry about, no problem of monetary policy ineffectiveness, and hence no need for fiscal stabilization policy. Given that fiscal policy has often been employed in an inept fashion, and given that political gridlock in America makes future reliance on fiscal stabilization policy quite chancy, this is a major advantage of the price approach to monetary policy.

2. Important work has been done by Bennett McCallum, George Selgin, David Beckworth, and Michael Woodford, among others.

The Price of Money Approach and the Zero Lower Bound

As we saw in chapter 3, Lars Svensson argued that currency depreciation was a foolproof way of getting out of a liquidity trap. And this was not a new claim. George Warren and Irving Fisher pushed FDR to adopt a policy of depreciating the dollar against gold as a way of boosting prices when interest rates were stuck at zero. But does the price of money approach actually solve the zero-lower-bound problem? And if so, *why*?

We need to break this question down into two parts. Is the price of money approach politically feasible? And does it work in a technical sense? We'll start with the latter question, for which a positive answer is essential before going any further. Once I've demonstrated the technical feasibility, we can consider what sort of price approach is politically feasible.

In chapter 3, I argued that Paul Krugman had a deeper understanding of these issues than most other economists. In the end, I'll disagree with Krugman's view on monetary policy effectiveness at the zero lower bound, but I see his critique as being the most persuasive—the one that most urgently needs addressing.

Krugman (2010) didn't waste time considering whether currency depreciation would work as a technique for boosting aggregate demand and inflation. The answer is obviously yes, at least if the depreciation is pushed far enough. That's the implication of almost any plausible macroeconomic model. Again, imagine if the yen were depreciated to 1,000 to the dollar. Japan would quickly move into hyperinflation.

Instead, Krugman challenged the assumption that the exchange rate was a policy *instrument*, rather than an *outcome* of policy. For instance, he denied the claim that the Swiss National Bank (SNB) could easily depreciate the Swiss franc as a way of boosting the inflation rate.

Krugman's claim is a bit odd, as in the field of international finance the traditional view has been that a country might have trouble preventing currency depreciation, especially if it ran out of international reserves in its attempt to prop up a currency. In contrast, central banks accumulate international reserves when they try to depreciate a currency, and hence can never “run out of ammunition.”

Thus, the Bank of Japan (BOJ) could offer to sell unlimited yen at a price of 1,000 yen to the dollar, which would then become the market price.³ In theory, Japan might buy up the entire world with near-worthless paper yen. If that sort of operation seems too good to be true, it is because it would likely lead to hyperinflation almost immediately. That's a bad outcome, but it's also “success” in the sense that it shows that the BOJ can indeed boost inflation if it wishes to, with no obvious upper limit.

3. The yen is currently about 135 to the dollar; hence, this would represent an extreme depreciation.

So why did Krugman question the ability of the SNB to depreciate the franc? Let's review the 2010 quote discussed in chapter 3:

Oh, and about the exchange rate: there's this persistent delusion that central banks can easily prevent their currencies from appreciating. As a corrective, look at Switzerland, where the central bank has intervened on a truly massive scale in an attempt to keep the franc from rising against the euro—and failed.⁴

I suspect that the key word here is *easily*. To see why I draw that conclusion, consider this argument made by Ben Bernanke in 1999:

The important question, of course, is whether a determined Bank of Japan would be able to depreciate the yen. I am not aware of any previous historical episode, including the periods of very low interest rates of the 1930s, in which a central bank has been unable to devalue its currency. Be that as it may, there are those who claim that the BOJ is impotent to affect the exchange rate, arguing along the following lines: Since (it is claimed) domestic monetary expansion has been made impossible by the liquidity trap, BOJ intervention in foreign exchange markets would amount, for all practical purposes, to a sterilized intervention. Empirical studies have often found that sterilized interventions cannot create sustained appreciations or depreciations. Therefore the BOJ cannot affect the value of the yen, except perhaps modestly and temporarily.

To rebut this view, one can apply a *reductio ad absurdum* argument, based on my earlier observation that money issuance must affect prices, else printing money will create infinite purchasing power. Suppose the Bank of Japan prints yen and uses them to acquire foreign assets. If the yen did not depreciate as a result, and if there were no reciprocal demand for Japanese goods or assets (which would drive up domestic prices), what in principle would prevent the BOJ from acquiring infinite quantities of foreign assets, leaving foreigners nothing to hold but idle yen balances? Obviously this will not happen in equilibrium.⁵

Please don't misinterpret what Bernanke is trying to say here. He is not recommending that the BOJ buy up an infinite quantity of assets. Reading between the lines, Bernanke almost certainly believes an attempt to do so would create hyperinflation in Japan. The final sentence in the long quotation is the key to understanding Bernanke's argument. Because Bernanke's thought experiment results in an implausible equilibrium outcome (the world giving Japan all of its assets for worthless paper), we can assume that it would not happen. This means that a credible commitment to depreciate the yen would clearly "succeed" long before the BOJ had bought up all of the world's assets. (I use scare quotes,

4. Krugman, "Japanese Monetary Policy (Wonkish)," *Paul Krugman (blog), New York Times*, July 30, 2010.

5. Ben S. Bernanke, "Japanese Monetary Policy: A Case of Self-Induced Paralysis?" (working paper, Princeton University, Princeton, NJ, December 1999).

because here success means pushing inflation higher—there is no guarantee it would not rise excessively relative to the target.)

On close examination, it's not clear that Krugman and Bernanke disagree with each other, and I suspect their views are closer to each other than to my views on this issue. It seems to me that Krugman's "easily" remark is a claim that the SNB would have to buy a very large quantity of assets to achieve success, beyond the already very large amount purchased at the time Krugman wrote the blog post. That view is not inconsistent with Bernanke's claim. Furthermore, later in Krugman's 2010 blog post he suggests that the impotence of monetary policy at the zero lower bound is partly due to a conservative mindset:

Some central bankers are just itching to exit from unconventional monetary policy. . . . In the face of deflation, central bankers are remarkably creative at finding reasons to tighten. That doesn't mean that they actually prefer deflation.⁶

That's also my view. But I'd like to suggest an interpretation of this view that differs from Krugman's pessimistic take. I will attempt to show that in the medium and long run, the SNB could achieve its target by buying *far fewer* assets than it bought in its failed attempt to achieve its target. In other words, I will argue that monetary economics is one of the few areas of life where the effort necessary to succeed is *much less* than the effort required to fail. To make this argument, I will rely on both empirical evidence and theory. Let's start with the evidence, and then consider what sort of model would explain this evidence.

Until very recently, it has been quite unusual to find a central bank explicitly trying to push inflation higher. It is also pretty rare for a government to use the price of money approach to control inflation. And it is extremely unusual to see both at the same time. Therefore, I'll consider evidence from two of the policy experiments with which I am familiar: Switzerland and Denmark in the 2010s and the United States in 1933.

Switzerland and Denmark in the 2010s

A year after Krugman's blog post on Switzerland, the SNB succeeded in sharply depreciating the franc and then (in September 2011) pegging its value at a fixed rate of 1.2 francs per euro (meaning the value of 1 franc was roughly 0.83 euros). Thus, a determined central bank can push back against market forces and hold down the value of its currency, at least on some occasions.

In January 2015, the Swiss made the decision to allow the franc to appreciate strongly, ending a highly successful three-and-a-half-year peg to the euro. The Danish krone was

6. Krugman, "Japanese Monetary Policy."

also pegged to the euro, and came under intense pressure from speculators. The *Financial Times* had this to say at the time:

It's been a long time since so many developed central banks were tested by free market forces. And free market forces aren't finished yet. Hot on the heels of the SNB giving up on its euro ceiling policy, the market is zoning in on the Danish central bank and its ability to maintain its euro-peg. As Dan already pointed out, the Danes have had to cut rates three times in in the last two weeks: January 19, January 22 and January 29. If that looks and feels desperate, perhaps that's because it is?⁷

After discussing speculators buying the krone, the *Financial Times* suggested:

All that, say the analysts, increasingly puts the Danes in the position of the Swiss National Bank: having to gobble up euro-assets they may not want or care for.⁸

Many pundits argued that the Swiss National Bank was having to buy so many assets because of its weak franc policy, and that allowing the franc to appreciate would reduce this problem, allowing it to buy fewer assets. Many suspected that the Danish central bank would eventually be forced to follow suit.

At the time, I argued that this was exactly backward. A strong franc policy merely whetted the appetite of speculators, and the Swiss franc is popular partly because speculators correctly anticipate that it will gradually appreciate over the long run. If you don't like having to "gobble up" so many euro assets, the right policy is to maintain the peg, not allow the franc to appreciate.

Three days after the SNB's decision to break the franc-euro peg, Tyler Cowen had this to say:

And if the Danes cut their peg, I am loathe to call this [Swiss franc appreciation] a "mistake" (even though it likely will hurt their economy), rather it would be an inevitability.⁹

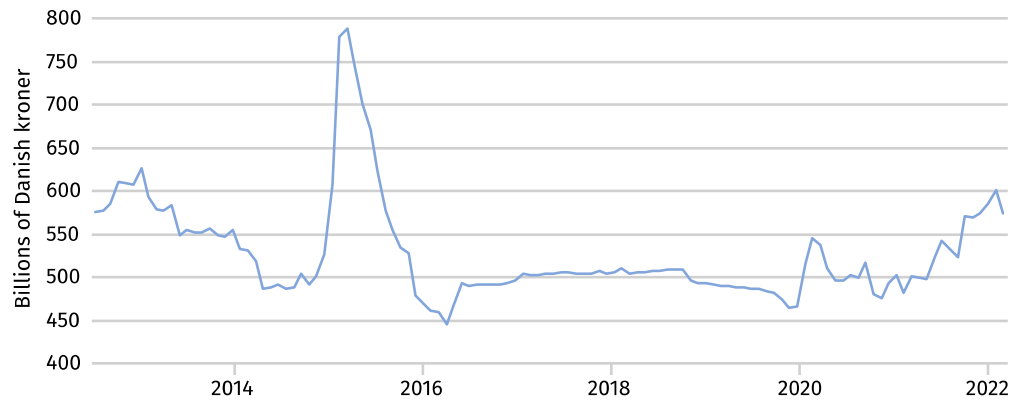
Notice that Cowen does not make an unconditional prediction here. He seems to be genuinely uncertain as to whether the SNB's abandonment of the peg will force the Danes to follow suit. After more than eight years, we now have a pretty definitive answer to Tyler's test. It wasn't inevitable. The Danes did not allow the krone to appreciate. As a result, after a brief surge in early 2015 their central bank balance sheet returned to normal (see figure 5.1).

7. "Is the DKK the New CHF?," *Financial Times*, January 30, 2015.

8. "Is the DKK the new CHF?"

9. Tyler Cowen, "The Danish Domino," *Marginal Revolution* (blog), January 19, 2015.

Figure 5.1: Denmark Central Bank Balance Sheet, 2012–2022



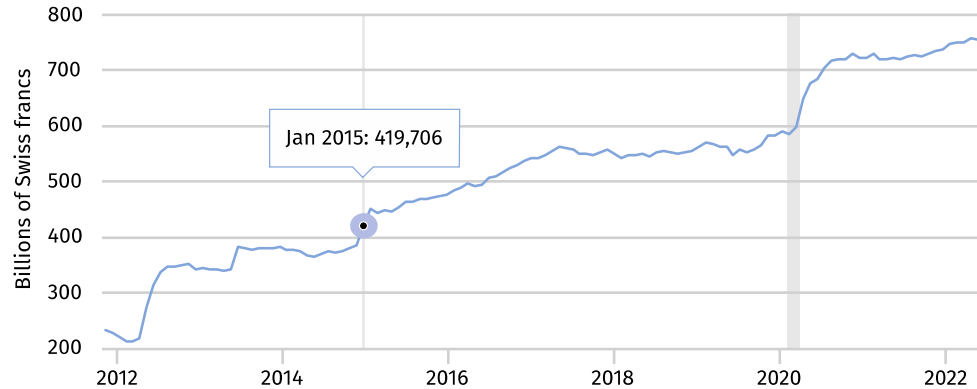
Source: Danmarks Nationalbank.

I would go even further. Even if the Danes had chosen to revalue the krone, that revaluation would not have been inevitable, at least in the ordinary sense of the term *inevitable*.¹⁰ After all, financial markets clearly thought that a revaluation was possible, but not inevitable.

Switzerland didn't do nearly as well as Denmark. Its monetary base soared immediately before the revaluation in mid-January, as markets almost certainly anticipated that the SNB was about to allow the franc to appreciate, and then continued to grow over time. Countries with the lowest inflation rates (e.g., Switzerland and Japan) tend to have by far the largest central bank balance sheets. There is greater demand to hold base money of currencies that are not losing purchasing power over time.

10. Here I'm using the term *inevitable* in its everyday sense, not the philosophical sense of a deterministic universe with no free will.

Figure 5.2: Swiss Monetary Base Aggregate, 2012–2022



Source: FRED (Federal Reserve Economic Data), Federal Reserve Bank of St. Louis, <https://fred.stlouisfed.org/>.

Note: Gray bar indicates period of recession as defined by the National Bureau of Economic Research (NBER).

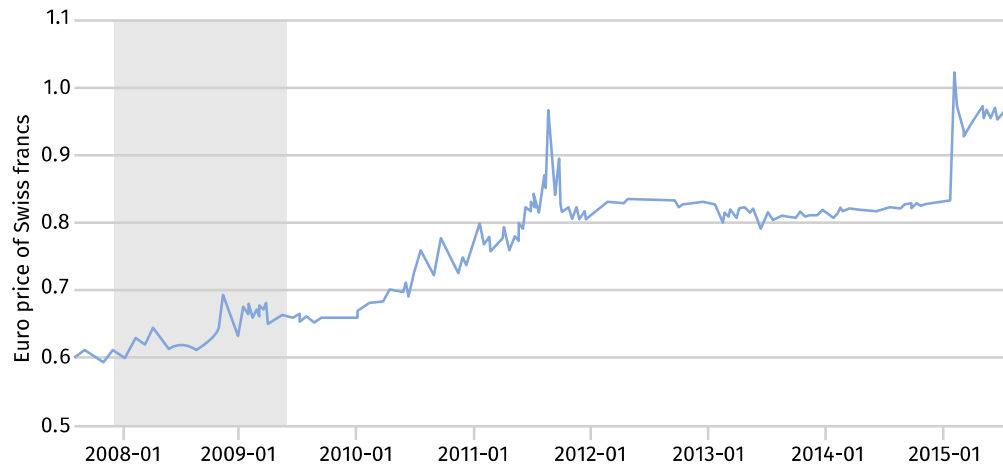
The Swiss monetary base was relatively flat during the 27 months from the end of the euro crisis in September 2012 to December 2014 (see figure 5.2). Once markets got wind of a possible currency revaluation, demand for Swiss francs soared. The media discussion often suggested that by ending the currency peg, the SNB could avoid being forced to buy lots of unwanted euro assets. *Just the opposite is true.* This is what mainstream economists get wrong—and why they are unduly pessimistic about monetary stimulus at the zero lower bound.

Once the franc was no longer pegged to the euro, investors began to assume it would resume its long-run trend of currency appreciation against the euro (and all other currencies as well). This increases the demand for Swiss francs. If the SNB does not meet that demand, the Swiss economy will fall into a period of deflation and depression.

The actual reason for the Swiss revaluation was not to avoid buying foreign assets; it was concern that the euro was becoming too weak. If the concern was a bloated balance sheet, then the SNB should have stuck with the currency peg.

I understand why Paul Krugman and other economists see the picture quite differently. During a period such as 2010–2011, when the franc is soaring in value and the SNB is buying lots of assets, it looks like those purchases are unable to “hold back the tide” of speculation. But in my view, this is to confuse cause and effect. The massive speculation is occurring because speculators predict (correctly) that the SNB will not do whatever it takes to prevent the franc from appreciating. Look at the enormous appreciation in the franc during 2010 and 2011, before the peg was established in September 2011 (figure 5.3).

Figure 5.3: Price of Swiss Franc, in Euros, 2008–2015



Source: FRED, Federal Reserve Bank of St. Louis, <https://fred.stlouisfed.org/>.

Note: Gray bars indicate NBER-defined periods of recession.

Stabilization of the franc did not immediately end the need for the SNB to buy assets, as it was in the midst of a severe eurozone crisis, and Switzerland was clearly a safe haven for worried euro holders in Mediterranean countries. But once the eurozone crisis ended in September 2012, the Swiss monetary base leveled off until January 2015 (see figure 5.3).

The Economist had this to say after the peg was removed:

The big question now is how much the removal of the cap will hurt the Swiss economy. The stockmarket fell because Swiss companies will now find it more difficult to sell their wares to European customers (high-rolling Europeans are already complaining about the price of this year's skiing holidays). UBS, a bank, downgraded its forecast for Swiss growth in 2015 from 1.8% to 0.5%. Switzerland will probably remain in deflation. But the SNB should not be lambasted for removing the cap. Rather, it should be criticised for adopting it in the first place. When central banks try to manipulate exchange rates, it almost always ends in tears.¹¹

All the effects of removal were bad, and yet they should not be “lambasted”? Why not? If it was likely to have a bad impact on both inflation and output, then what was the benefit of this decision? Why not stick with the currency peg? If you go back and read the entire article in *The Economist*, you will fail to find any justification for its unwillingness to criticize the SNB's action.

In January 2015, Paul Krugman offered a slightly different view:

11. “Why the Swiss Unpegged the Franc,” *The Economist*, January 18, 2015.

And for three years it worked. But on Thursday the Swiss suddenly gave up. We don't know exactly why; nobody I know believes the official explanation, that it's a response to a weakening euro. But it seems likely that a fresh wave of safe-haven money was making the effort to keep the franc down too expensive.

If you ask me, the Swiss just made a big mistake. But frankly—francly?—the fate of Switzerland isn't the important issue. What's important, instead, is the demonstration of just how hard it is to fight the deflationary forces that are now afflicting much of the world—not just Europe and Japan, but quite possibly China too. And while America has had a pretty good run the past few quarters, it would be foolish to assume that we're immune.¹²

Unlike *The Economist*, Krugman suggests that the SNB made a big mistake. That's also my view. But I've always been a bit confused about Krugman's views on monetary policy ineffectiveness, which seem to waver between the view that central banks *can't* escape a liquidity trap and the view that they *won't* escape a liquidity trap. That ambiguity shows up in the preceding quotation. Krugman's reference to a "big mistake" implies agency. How is that compatible with monetary policy ineffectiveness? Was the SNB unable to inflate? Or unwilling?

As I argued earlier, it appears that Krugman's pessimism centers on the perception that (at least near the zero lower bound) the "whatever it takes" would be too much for conservative central bankers to contemplate, even though he shares my view that they have often been too timid. Krugman suggests that the SNB was reluctant to buy so many foreign assets, whereas I believe that (at least in 2015) they worried about a weak euro. Where I differ from Krugman is that I believe the effort required to succeed is less than the effort required to fail.

I'd like to see much more research on this question, as in my view it gets to the heart of what's wrong with monetary policy in many countries. If I'm wrong about the SNB, if it really was forced to revalue the franc, then a central argument in this book is wrong. But this isn't the only evidence for my view.

FDR's Gold-Buying Program of 1933

For reasons I do not fully understand, among monetary policy experts the price of money approach seems to be viewed as vaguely disreputable. In chapter 2, I discussed how FDR's dollar depreciation policy was highly effective, after previous attempts to achieve stimulus through rate cuts and QE had largely failed. The initial decision to devalue the dollar is now widely seen as having been wise; however, economic historians have been

12. Paul Krugman, "Francs, Fear and Folly," *New York Times*, January 15, 2015.

almost universally critical of FDR's use of the buying price of gold as a policy instrument during the fall of 1933.

In my 2015 book on the role of gold in the Great Depression, I devote an entire chapter to FDR's gold-buying program.¹³ Although the policy was far from ideal, it clearly had a positive effect on aggregate demand. There does not seem to be any valid justification for John Maynard Keynes's remark in a December 31, 1933, letter to the *New York Times* that this policy was akin to "the gold standard on the booze."¹⁴ In my Depression book, I show that almost all of the specific criticism of the gold-buying program reflected a basic misunderstanding about the nature of the policy.

FDR's dollar depreciation policy was clearly better than the alternative, and certainly worked in a limited fashion. So why is it almost universally panned? I see several points of confusion. First, although called a gold-buying program, the purchases of gold were not essential to the policy; indeed, they worked at cross-purposes to what FDR hoped to achieve. The purchase of gold tends to put upward pressure on the purchasing power of gold, which is, *ceteris paribus*, deflationary.

Perhaps for this reason, FDR did not purchase enough gold to make the government's official purchase price equal to the free-market price of gold in global markets. This was also seen as a flaw in the policy, although it turned out to be a relatively minor problem.

Criticism also focuses on the seemingly random nature of the increases in the gold purchase price. On one occasion, FDR told his advisers to boost the day's gold buying price by 21 cents an ounce. When asked where he got that figure, FDR smiled and said it was three times seven, and seven is a lucky number. Is there any doubt why sober financial and monetary policy experts of the interwar period would agree with Keynes's criticism:

This game of blind man's buff with exchange speculators serves no purpose and is extremely undignified.¹⁵

Unfortunately for FDR, the gold-buying program of the fall of 1933 took place during a period when output was depressed by Roosevelt's National Industrial Recovery Act, which almost overnight artificially raised hourly wages by roughly 20 percent in late July 1933. This made the program look less effective than it actually was.

In addition, most economists seemed confused by the price of money approach to monetary policy. Although Keynes called it an example of "a crude economic doctrine

13. Scott Sumner, *The Midas Paradox: Financial Markets, Government Policy Shocks, and the Great Depression* (Oakland, CA: Independent Institute, 2015).

14. John Maynard Keynes, "From Keynes to Roosevelt: Our Recovery Plan Assayed," *New York Times*, December 30, 1933.

15. Keynes, "From Keynes to Roosevelt."

known as the quantity theory of money,” it was actually a radically different and innovative approach to monetary policy, which rejected the quantity theory of money.

Before 1933, the dollar price of gold had been fixed for 54 years. Economists had some awareness of theories that manipulating the money supply or fiscal policy could promote recovery, but the idea of adjusting the price of gold to stabilize the macroeconomy seemed akin to magic.

The combination of a weird and hard-to-understand approach to macroeconomic stabilization, combined with severe supply-side headwinds, led to a situation where the gold-buying program ended up with a somewhat disreputable image.

And yet, the policy was effective. As FDR raised the price of gold, the expected value at which the dollar would eventually be repegged to gold also increased. In the end, the dollar price of gold was raised from \$20.67 an ounce in March 1933 to \$35.00 an ounce in February 1934, where it stayed for another 34 years.

The aforementioned *Economist* magazine editorial critical of the SNB’s franc-euro exchange rate peg said:

When central banks try to manipulate exchange rates, it almost always ends in tears.¹⁶

That was certainly not the case with FDR’s dollar depreciation policy. It is not true of the monetary regime in Singapore. It is true, however, that fixed exchange rate regimes have often had one of two types of flaws:

1. The exchange rate may be set at a level where the supply and demand for foreign exchange is not in equilibrium. In that case, governments often rely on various exchange controls that distort the economy. This problem occurs most frequently in developing nations.
2. Even in cases where the foreign exchange market is in equilibrium, the official exchange rate might be set at a level that is inconsistent with macroeconomic equilibrium. Argentina during the late 1990s and early 2000s is a classic example.

Neither of these criticisms are applicable to FDR’s gold-buying policy, nor to Singapore’s use of exchange rates as a monetary policy instrument, nor to Switzerland’s euro peg of 2011–2015.

To be sure, there are good reasons to move beyond exchange rates as a policy instrument, but before doing so we need to dispel some myths about the price of money approach. These policies really do “work” in a technical sense; they allow central banks to have almost unlimited control over nominal aggregates, even at the zero bound. Once we establish the underlying rationale for the price of money approach, we can move on to

16. “Why the Swiss Unpegged the Franc.”

more effective strategies for employing the price of money approach to macroeconomic stabilization.

The Policy Pessimism Fallacy

The policy pessimism argument is often stated roughly as follows:

Central banks have already done so much in terms of X , and achieved so little in terms of Y . Therefore, an even more expansionary monetary policy is likely to accomplish little.

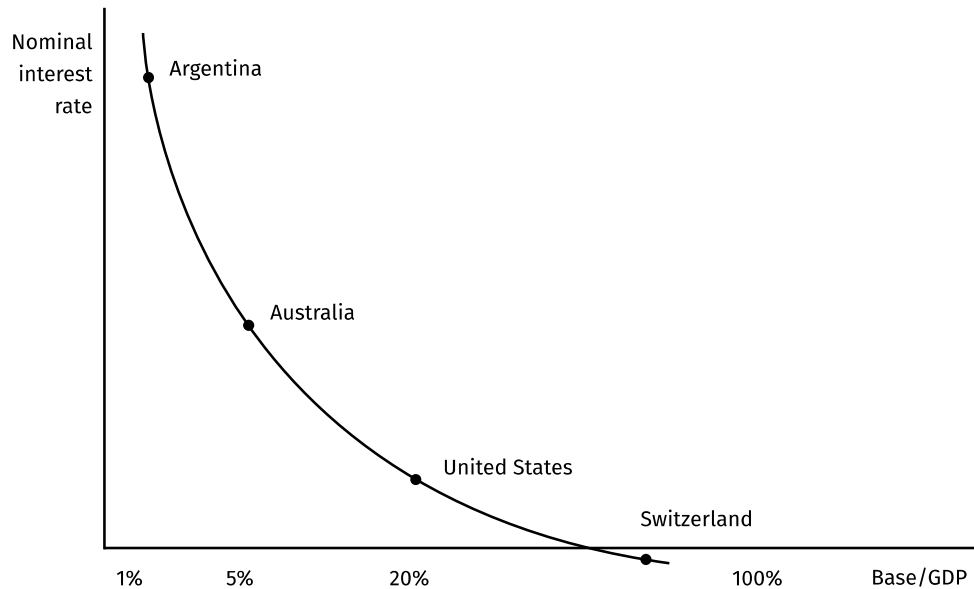
The variable X might represent a long period of near-zero interest rates, or a massive open market purchase that increased the monetary base five- or tenfold. The variable Y might represent inflation, or NGDP growth. Whatever specific form the pessimism takes, it always reflects a basic confusion over the relationship between policy instruments, indicators, and goals. What looks like a policy instrument setting indicating easy money, is actually an *outcome* of a previous tight money policy.

Let's review some previously examined cases that refute this conventional view of policy ineffectiveness:

1. The SNB had to buy assets at a much more rapid rate (to avoid severe deflation) during the period after it decided to abandon the euro peg in January 2015. If the SNB wishes to avoid having a bloated balance sheet, then policymakers need to stop the Swiss franc's relentless upward trend against almost all other currencies.
2. The Danish central bank decided to stick with the euro peg, and ended up having to purchase far fewer assets than the SNB. It turns out that allowing upward currency appreciation is not an "easy way out" for central banks worried about having to accumulate large quantities of foreign assets. Currency appreciation merely whets the appetite of speculators, who then begin to anticipate a further increase in the currency's value.
3. In the 11 months after March 1933, the United States achieved dramatic growth in nominal aggregates, such as the wholesale price index and NGDP, despite no growth in the monetary base. In the previous two and a half years, the base had grown dramatically even as prices and nominal output declined. Nominal growth also occurred during a period where short-term interest rates were near zero, and thus, according to Keynesian dogma, the central bank was "out of ammunition."

You might wonder if I've merely cherry-picked some examples to fit my hypothesis. I don't think so, as these examples are completely consistent with the predictions of previous empirical studies of the demand for money. Recall figure 4.4 in chapter 4 (repeated here as figure 5.4), showing that the higher the interest (and inflation) rate, the lower the demand for money as a share of GDP.

Figure 5.4: Trade-Off between Nominal Interest Rates (or Inflation) and Central Bank Balance Sheets



The sort of enormous balance sheets that we see in places like Switzerland and Japan occur precisely because their central banks are not willing to do *whatever it takes* to achieve higher trend rates of inflation (or NGDP growth).

This argument is so counterintuitive that I have trouble finding an appropriate analogy. In most parts of life, a greater perceived effort yields better results. Are there any other exceptions?¹⁷

Economists often look at countries with the most deflationary monetary policies, such as Switzerland and Japan, and reach one of two conclusions:

- Monetary policy is ineffective.
- They need to do even more QE.

Neither of these claims is true. A truly expansionary policy would result in higher nominal interest rates, and a dramatically lower demand for base money as a share of GDP (especially if one assumes no interest on reserves). The adoption of something like

17. Perhaps the drug war is an exception. If the demand for drugs is inelastic, then spending more money on the drug war makes drug smuggling more profitable, not less. It actually increases the size of the illegal drug industry (in revenue). Talk to average people about the drug war, and they'll tell you that all the crime associated with drug dealing shows that legalizing drugs would lead to more crime. In fact, the end of alcohol prohibition in 1933 led to a dramatic fall in violent crime.

Lars Svensson’s “foolproof” method for escaping from a liquidity trap would raise nominal interest rates and dramatically reduce the demand for base money.¹⁸

The United States is not about to use exchange rates as a policy instrument. Indeed, even Japan is highly unlikely to adopt Svensson’s proposal. So then, what is the alternative? How can the *price of money* approach be used to provide monetary stimulus at the zero bound in a large economy like the United States? Is there a politically feasible option?

Unlike exchange rate depreciation, America’s trading partners would not object to the Fed adopting a *whatever-it-takes* approach to targeting NGDP futures prices. But even that option is not politically feasible in America circa 2022. So what’s left?

In my view, we don’t need a radical change in our monetary institutions. The Fed has the tools to stabilize NGDP growth using the price of money approach. What’s needed is a change in the way policymakers approach the problem. Let’s start from where we are today:

1. The Fed has a dual mandate to address inflation and employment. It puts equal weight on each side of the mandate. As a practical matter, that means the Fed puts roughly equal weight on inflation and real GDP growth.
2. NGDP targeting puts equal weight on inflation and real growth. Thus, stable NGDP growth at a modest rate (say 4 percent a year) is roughly consistent with the Fed’s current policy goals.
3. Fed officials say they rely on both internal models and market forecasts when setting policy.

Now, let’s think about what sort of NGDP *forecast targeting* regime would be roughly consistent with these three policy assumptions. For computational simplicity, I’ll assume that the Fed puts equal weight on market forecasts and internal model-based forecasts. Nothing essential changes if the Fed were to put more weight on one type of forecast than the other.

To use the price of money approach, the central bank needs to create a real-time estimate of expected NGDP growth that changes as market conditions change. This forecast might be a simple average of the (flexible) market forecast and the (slow-moving) model-based forecast of NGDP.

The market forecast changes continually as market conditions change. In contrast, the model-based forecast is updated much less frequently—only when a new data point becomes available for a macroeconomic time series, such as retail sales, the CPI, GDP, industrial production, trade, payroll employment, and so forth. Just as the sum of a

18. Lars E. O. Svensson, “Escaping from a Liquidity Trap and Deflation: The Foolproof Way and Others” (NBER Working Paper No. 10195, National Bureau of Economic Research, Cambridge, MA, December 2003).

rational number like 3.478 and an integer such as 6 is a rational number (9.478), the composite forecast that averages the market forecast and the model-based forecast will offer a real-time estimate of NGDP growth that changes minute by minute with market conditions.

In principle, targeting that sort of composite forecast is no different from targeting any other price-like variable, such as the price of gold or the foreign exchange rate. If the NGDP growth target is 4 percent, then monetary policy should be adjusted until the composite forecast calls for 4 percent NGDP growth. If the model-based forecast currently predicts 4.3 percent growth, then monetary policy should be adjusted until the market predicts 3.7 percent NGDP growth (assuming equal weights on the two forecasts).

There are several ways of deriving an NGDP market forecast. Ideally, the government would directly set up an NGDP futures market and offer to trade those contracts to ensure adequate liquidity. NGDP-indexed bonds would provide similar information. Alternatively, the Fed could estimate the market forecast for NGDP growth by constructing a model that contains a market inflation forecast, such as the TIPS spread, combined with a variety of market indicators of expected real GDP growth.

However the NGDP forecast ends up being derived, it is essential that the Fed view that forecast as a *price*. When conducting policy, the Fed's forecast of NGDP growth should be stabilized in exactly the same way that the Bank of England or the Bank of France stabilized their exchange rate under the Bretton Woods system. No longer would central banks make a series of *gestures*, and then "wait and see" how things work out. Policy should be continually set at a position where the point estimate of expected NGDP growth is exactly on target. And the central bank should do *whatever it takes* to ensure that expected NGDP growth is on target.

The policy instrument should have the characteristics of a market price, frequently moving up and down by small amounts. The Open Market Trading Desk in New York could be instructed to inject reserves as necessary to keep the composite market forecast on target, given the model-based forecast.

If the Fed insists on continuing to use interest rates as a policy instrument, then FOMC members could vote each day by email on their preferred federal funds target to the closest basis point. After all, limiting changes to multiples of quarter-point movements is inefficient. The federal funds target for that day could be set at the median vote. The federal funds target might rise three basis points one day, and decline two basis points the next. It would look much more like a flexible market price, and much less like an infrequently adjusted administered price, partly because *it would be much more of a market price*. Markets would essentially be directing the Fed.

This all may sound quite radical, but nothing I'm suggesting here differs from current Fed practice in an *important* way. Innovations such as moving to daily FOMC meetings, setting rates at the median vote, and allowing changes as small as one basis point could easily be done if the will were there. They would not violate the Fed's congressional mandate. NGDP targeting is also consistent with the dual mandate. The Fed already takes

both market forecasts and model-based forecasts into account when making decisions. It doesn't violate Congress's mandate if the Fed commits to do whatever it takes to achieve its policy target.

There is only one scenario where the Fed would not be able to do NGDP targeting without assistance from fiscal policy. If the Fed set its target NGDP growth rate so low that longer-term nominal interest rates fell to extremely low levels (as in Switzerland and Japan), then the Fed might not be able to find enough eligible assets to purchase to achieve its goal. In that case, it could set a higher NGDP growth rate target, or ask Congress for permission to buy a wider range of assets, or even ask for assistance from fiscal policy.¹⁹

In the United States, we are far from a position where the Fed would have to worry about running out of ammunition. Even at a 4 percent NGDP growth rate with level targeting, the demand for base money (assuming no IOR) would be low enough that the Fed could supply those funds without buying anything other than Treasury securities. Again, don't look at the demand for base money under a flawed policy regime such as the United States during the early 2010s, and assume that even faster NGDP growth would have required more QE. Faster NGDP would have allowed the Fed to get by with *much less* QE.

Where Do We Go from Here?

My previous book *The Money Illusion* received some fairly favorable reviews, but as far as I know almost no one accepts my central argument—that the Great Recession was caused by tight money.²⁰ The purpose of this book is to address some of these reservations. Why do I look at things so differently from other economists? Why are my views so counterintuitive?

I've argued that the Fed made three fundamental mistakes in 2008:

1. It failed to *target the market forecast* of its policy goal for aggregate demand growth.
2. It failed to implement a *level targeting* regime, promising to make up for near-term shortfalls or overshoots in spending.
3. It failed to adopt a *whatever-it-takes* approach to adjusting the various policy instruments.

19. And there are still other options—which I do not favor—such as negative IOR or restrictions on the use of currency.

20. Scott Sumner, *The Money Illusion: Market Monetarism, the Great Recession, and the Future of Monetary Policy* (Chicago: University of Chicago Press, 2021).

The Money Illusion provides extensive documentation for these charges, so I won't go over this ground again. Instead, I'd like to look forward. How can we prevent a repeat of these mistakes?

In my view, switching to the level targeting of NGDP futures prices, along a 4 percent growth path, would address all of the mistakes that led to the Great Recession (or the inflation overshoot of 2021/22).

That sort of regime would obviously represent a *target the forecast* approach, as well as a *level targeting* approach. But what about “whatever it takes”? How does NGDP futures targeting resolve that issue?

Recall the previous discussion of Lars Svensson's “foolproof” proposal for Japanese inflation, or Paul Krugman's reservations about the SNB's attempt to depreciate the Swiss franc. In both cases, the real issue is not whether something like that would work; rather, the question is whether it is even possible to move the policy instrument (the exchange rate in this case) to the desired level.

Under a fiat money regime, there is no technical limit to how much money can be produced. There may be political limits, but ultimately the politics of any regime are likely to revolve around one central question: is it successful? The public isn't going to care about the fact that a *whatever-it-takes* promise to control the policy instrument might *theoretically* require very large purchases, if the *actual* outcome is a much smaller central bank balance sheet because people don't wish to hold very much zero interest base money in an economy with briskly growing NGDP.

If I'm right, then central bankers in deflationary countries like Japan and Switzerland are like prison inmates who sat behind bars for years, never realizing that the door to their cell was unlocked the entire time.

The Instrument Is the Indicator Is the Goal

I have an absurdly ambitious goal for this book. The goal is not to promote NGDP targeting—lots of economists have already come around to that view. The goal is to get people to view monetary economics in a radically different way: *the instrument is the indicator is the goal*.

We are used to thinking about monetary policy as a multistage process. Thus, back before 2008, the Fed moved the monetary base with the goal of moving the short-term interest rate with the goal of moving the aggregate level of spending (and ultimately prices and employment). Other central banks were adjusting interest on reserves, rather than the size of the monetary base. Singapore's central bank adjusted the target exchange rate as necessary to achieve its macroeconomic goals.

I am suggesting that NGDP futures prices are the right policy instrument. I am also suggesting that stable growth in NGDP futures prices is the right policy goal. And I

am suggesting that the market forecast of NGDP growth is the right indicator of whether policy is too easy or too tight.

In this sort of NGDP futures targeting regime, there are no more mysterious “demand shocks”—all shocks are real shocks. No more misdiagnosis of the stance of monetary policy. No more worry about the so-called inherent instability of capitalism. No fear that bank failures would spill over into inadequate aggregate demand. No reason to claim that bailouts of failing firms would boost GDP. No reason for people to expect changes in taxes and transfers to affect aggregate demand. No worries about the paradox of thrift or the paradox of toil. No reason to teach Keynesian economics. Our macroeconomic textbooks could be written by real business cycle theorists.

Now, you know why I characterize the book’s goals as being “absurdly ambitious.” The goal is nothing less than the end of macroeconomics as we know it.

And that’s why my approach to publishing this book is unconventional. I wanted a living book that could continue to evolve as I received critical feedback. A book where I could address criticism either by backing off on my claims or by sharpening my arguments.

And that is what I plan to spend my final years doing.

Postscript on the Great Recession

In *The Money Illusion*, I argued that the Great Recession was caused by a tight money policy that drove NGDP growth from its roughly 5 percent previous trend line to negative 3 percent in 2008/09. Even readers who were sympathetic to many of my arguments (e.g., NGDP targeting) balked at such a counterintuitive claim.

Over time, I gradually realized that I was not going to make any headway unless I got my critics to see things in a different way. To convince people that the Great Recession was caused by a negative monetary shock, I had to get them to change the way they judge the stance of monetary policy—to stop focusing on the money supply and interest rates, and instead focus on changes in market forecasts of NGDP growth. Instead of seeing the sharp fall in NGDP as the side effect of nonmonetary shocks to the economy, it is essential that we start viewing market NGDP expectations as *monetary policy itself*.

I also needed to convince people that there was an alternative policy path that would have prevented a sharp fall in NGDP, even given the serious problems in real estate and banking. Part of this comes from the price approach to monetary policy, where there is no zero lower bound. Part of this comes from level targeting, which has stabilizing properties that make demand “shocks” smaller than with growth rate targeting. And part of this comes from the recognition that so-called extraordinary measures such as zero or negative interest rates and QE are not in fact highly expansionary monetary policies; rather, they are the long-run effect of previous tight money policies that drove NGDP growth sharply lower.

Monetary policy drives nominal aggregates. And because nominal wages are sticky, changes in nominal aggregates drive the business cycle. And because most debt is also nominal, changes in nominal aggregates drive financial cycles as well.

If someone is willing to accept this new way of thinking about monetary policy, then formerly counterintuitive claims like “tight money caused the Great Recession” suddenly begin to look much more plausible, consistent with basic economic theory.

Part II

Problems with Alternative Approaches to Monetary Policy

Chapter 6: A Critique of Interest Rate–Oriented Monetary Economics

Interest rates have played a central role in monetary policy analysis. The short-term nominal interest rate is often viewed as the appropriate instrument of monetary policy, and interest rates are also viewed as an indicator of changes in the stance of money policy. In this chapter, I show that too much weight is placed on movements in interest rates as a policy indicator and that confusion on this point has contributed to previous monetary policy failures. More speculatively, one needs to rethink whether interest rates are even the appropriate policy instrument for central banks.

Keynesian economists often describe a reduction in interest rates as an *expansionary* monetary policy. This orthodoxy has recently been challenged by an alternative group termed *NeoFisherians*¹ who argue that lower interest rates may actually be disinflationary, or contractionary. A dispute over such a basic question is rather embarrassing for the field of macroeconomics, particularly because central bankers use interest rates as an important policy instrument. The monetary policy steering mechanism is unreliable.

In this chapter, I argue that both groups are engaged in the fallacy of *reasoning from a price change*, that is, drawing causal inferences from the change in a price without first knowing what caused the price to change. Interest rate movements are not monetary policy; they are one of many effects of monetary policy. Speaking of a central bank cutting interest rates by 25 basis points is pointless, unless one indicates whether the rate cut was achieved with an expansionary or a contractionary policy. This critique of mainstream monetary economics has important implications for understanding real-

Originally published as “A Critique of Interest Rate–Oriented Monetary Economics” (Mercatus Working Paper, Mercatus Center at George Mason University, Arlington, VA, November 2020).

1. Stephen Williamson and John Cochrane have both argued that NeoFisherism is a model worthy of serious consideration, while Mariana García-Schmidt and Michael Woodford offer a defense of the Keynesian view. Stephen Williamson, “Neo-Fisherism: A Radical Idea, or the Most Obvious Solution to the Low-Inflation Problem?,” *Regional Economist*, Federal Reserve Bank of St. Louis, July 5, 2016; John H. Cochrane, “Michelson-Morley, Fisher, and Occam: The Radical Implications of Stable Quiet Inflation at the Zero Bound,” in *NBER Macroeconomics Annual*, vol. 32 (Cambridge, MA: National Bureau of Economic Research, 2017); Mariana García-Schmidt and Michael Woodford, “Are Low Interest Rates Deflationary? A Paradox of Perfect-Foresight Analysis” (NBER Working Paper No. 21614, National Bureau of Economic Research, Cambridge, MA, October 2015).

world monetary policy errors and points the way toward a more reliable set of monetary policy tools.

This chapter employs an eclectic set of arguments because these issues are obscured when one uses traditional (mathematical) models. Keynesians and NeoFisherians can look at the same highly technical dynamic stochastic general equilibrium model and reach different conclusions as to what the model indicates about monetary policy. In general, fiat money models have a sort of indeterminacy, more accurately described as *solution multiplicity*,² because the effect of a current policy action depends mostly on how that action is expected to affect the future path of policy.

Thus, no one knows the effect of a cut in the target interest rate without first knowing the implication of that policy change for the expected future path of various policy instruments. A reduction in interest rates might be contractionary if it reflects the Fisher effect—the tendency of lower inflation to lead to lower nominal interest rates. This is the focus of NeoFisherian models. In contrast, lower interest rates might be inflationary if they reflect the liquidity effect of an increase in the money supply. This is the focus of Keynesian models.

Unfortunately, both Keynesians and NeoFisherians rely on models in which interest rates are treated as monetary policy, rather than as one of many variables affected by changes in the stance of monetary policy. This conceptual error makes it difficult to resolve the Keynesian-NeoFisherian dispute, which needs to be reframed in a way that does not equate interest rates with monetary policy.³ I show that reframing the debate with a policy regime employing exchange rates as a policy instrument allows one to clarify the disagreement between the two schools of thought.

As shown in this chapter, the question is not whether lower interest rates constitute an expansionary or a contractionary monetary policy. Instead, one needs to figure out *when* expansionary monetary policies are associated with lower nominal interest rates and *when* contractionary monetary policies are associated with lower nominal interest rates.

I begin by discussing monetary policy terminology, which is often ambiguous. Then, I explain how monetary economics has been plagued by the problem of *reasoning from a price change*—wrongly drawing inferences about quantities from the change in a market price. This includes changes in market interest rates, which do not represent the stance of monetary policy. Then, I consider alternative measures of the stance of policy, including the money supply and exchange rates. The contrasting predictions of Keynesian and NeoFisherian models are illustrated with a simple model of exchange rates and interest

2. See Bennett T. McCallum, “Multiple-Solution Indeterminacies in Monetary Policy Analysis” (NBER Working Paper No. 9837, National Bureau of Economic Research, Cambridge, MA, July 2003).

3. Hummel provides an excellent discussion of why equating interest rates and monetary policy is a mistake. See Jeffrey Rogers Hummel, “Central Bank Control over Interest Rates: The Myth and the Reality” (Mercatus Working Paper, Mercatus Center at George Mason University, Arlington, VA, August 2017).

parity. This analysis is further developed by drawing a distinction between level shifts and growth rate shifts in monetary policy. Finally, I show some examples of the ways a focus on interest rates led to monetary policy failures in the past, as well as the implications of this analysis for monetary policy reform. One conclusion is that central banks should switch from targeting interest rates to targeting forecasts of the policy goal variable.

Note on Terminology

I use a number of terms that are defined in multiple ways, such as monetary policy, policy instrument, Keynesian, NeoFisherian, expansionary, contractionary, and more generally the stance of monetary policy. Unfortunately, universally accepted definitions do not exist for any of these terms. However, a lack of precise definitions does not prevent the terms from playing an important role in the policy debate. Finding any high-level discussion of Federal Reserve policy that does not employ terms such as expansionary and contractionary policy (or perhaps accommodative and restrictive policy) is almost impossible. The following definitions fit the way I use the terms in this paper:

- *Monetary policy* is the set of actions taken by a central bank that affect the supply and demand for base money. A monetary policy *regime* is a set of policy decisions (which might be systematic) that influence broader macroeconomic variables. Open market operations (OMOs) and changes in the interest rate on bank reserves (IOR) are examples of policy tools that affect the supply and demand for base money. In contrast, changes in market interest rates such as the federal funds rate are generally the effect of explicit central bank actions, such as OMOs and IOR changes.
- A *more expansionary* monetary policy is a policy that tends to increase nominal aggregates such as inflation and nominal GDP. The term *expansionary* is less clear when used in an absolute sense, but one plausible definition is a policy stance that results in above-target nominal growth or inflation. The exact opposite applies to *contractionary* policy. Note that many economists use other definitions for expansionary and contractionary policy, such as changes in interest rates or in the money supply.
- The *stance of monetary policy* is the extent to which policy is expansionary or contractionary. Thus, under a 2 percent inflation targeting regime, a monetary policy stance that leads to 4 percent or 8 percent inflation is relatively expansionary, and the 8 percent inflation policy is more highly expansionary than a policy that leads to 4 percent inflation. A zero inflation rate would be relatively contractionary under that regime.
- The *Keynesian view* is that a high interest rate policy is contractionary, while the *NeoFisherian view* is that a high interest rate policy is expansionary. Obviously, these definitions overlook important nuances,

such as effects over the short run versus the long run, which are considered later in this chapter, but the current debate over NeoFisherian models indicates that two very different views are actually in play, where no general agreement exists.

- A *policy instrument* is a variable over which the central bank has tight control in the short run, and the bank uses it to adjust the stance of monetary policy. Short-term interest rates, the monetary base, exchange rates, and the price of gold have all been used as monetary policy instruments at various times in history.
- The (nominal) *natural rate of interest* is the market interest rate that allows the central bank to achieve its target (such as 2 percent inflation). The natural rate of interest is more often defined in real terms, but I find the nominal definition to be more useful.

Reasoning from a Price Change

One of the most common errors in economic analysis is to *reason from a price change*, which means to draw inferences about changes in quantity on the basis of a change in a price. For instance, one will occasionally see the media suggest that the supply-and-demand model predicts that people would be expected to consume less oil when the price of oil rises. In fact, the supply-and-demand model has no implications for the correlation between changes in price and changes in quantity; it depends entirely on whether the price change was driven by a demand shift or a supply shift. Thus, in the mid-2000s, a rise in oil demand led to an increase in both oil consumption and oil production. In contrast, a fall in oil supply during 1974 led to a decrease in oil consumption that coincided with a period of rising oil prices.

Nor does holding other things constant help when considering a price change. If there is no shift in supply and demand, then any price change leads to disequilibrium, and the effect on output cannot be predicted without understanding the (nonprice) rationing mechanism.

Although reasoning from a price change is a serious error, it is also an easy mistake to make—I have fallen into the trap myself. So have prominent economists such as Nobel laureate Robert Shiller:

Real interest rates have turned negative in many countries, as inflation remains quiescent and economies overseas struggle.

Yet, these negative rates haven't done much to inspire investment, and Nobel laureate economist Robert Shiller is perplexed as to why.

"If I can borrow at a negative interest rate, I ought to be able to do something with that," he tells U.K. magazine *MoneyWeek*. "The government should be borrowing, it would seem, heavily and investing in anything that yields a positive return."

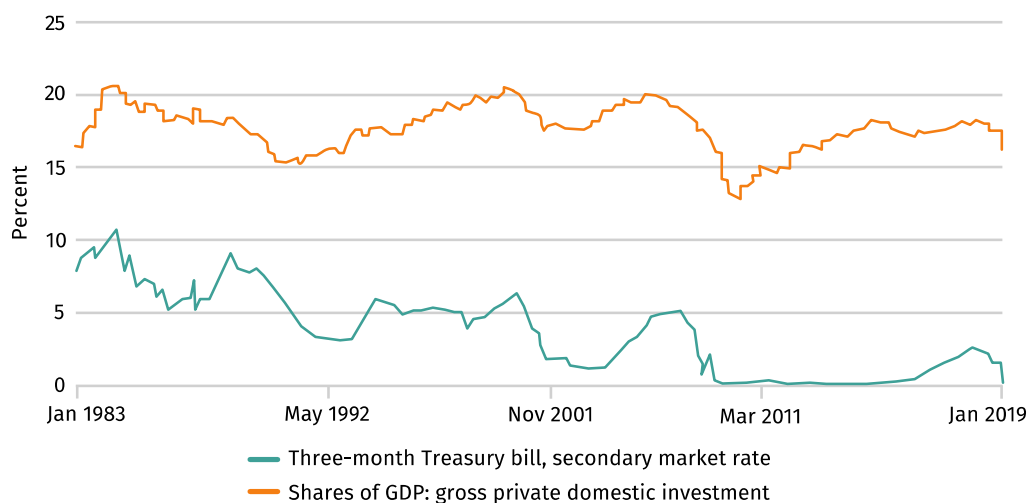
But, “that isn’t happening anywhere,” Shiller notes. “No country has that. . . . Even the corporate sector, you might think, would be investing at a very high pitch. They’re not, so something is amiss.”

And what is that?

“I don’t have a complete story of why it is. It’s a puzzle of our time,” he maintains.⁴

In fact, there is no mystery. Relatively low levels of investment are usually associated with low interest rates, because interest rates and investment are both highly procyclical. This relationship occurs because the investment schedule is much more volatile than the saving schedule. Thus, although a rightward shift in the saving schedule could lead to both lower interest rates and higher investment, a leftward shift of the investment schedule more often produces a fall in interest rates. If saving schedule shifts were dominant, then more investment would tend to occur during periods of low interest rates, such as the early 1930s and 2009. In fact, both interest rates and investment as a share of GDP are strongly procyclical, declining sharply during recessions (figure 6.1).

Figure 6.1: Investment Share of GDP and Treasury Bill Yield



Source: Federal Reserve Economic Data (FRED), *Shares of Gross Domestic Product: Gross Private Domestic Investment* and *3-Month Treasury Bill: Secondary Market Rate* (datasets), Federal Reserve Bank of St. Louis, <https://fred.stlouisfed.org/>.

There are cases where what appears to be reasoning from a price change is justified owing to a tacit assumption that the cause of the price change is obvious. Consider a discussion of a price increase following the implementation of a substantial new cigarette tax. If all parties in the discussion understand that a tax increase caused the price

4. Dan Weil, “Shiller: Why Negative Rates Aren’t Sparking More Investment Is ‘Puzzle of Our Time,’” *Newsmax Finance*, February 12, 2015.

increase, then a claim that a much higher cigarette price will likely reduce consumption does not pose a problem. Everyone presumably understands that higher prices are occurring because the tax on cigarettes shifts the supply curve to the left.

The central argument in this chapter is that contemporary monetary theory and practice are marred by an unfortunate tendency to reason from a price change, to conflate changes in interest rates with changes in the stance of monetary policy. In fact, there is no necessary correlation between changes in interest rates and changes in the stance of monetary policy. In other words, market interest rates are *not* monetary policy; they are one of many variables affected by monetary policy.

I suspect that when economists discuss the effect of interest rates on the broader economy, they often tacitly assume that the change in rates is caused by the central bank, perhaps an adjustment in the IOR, and that this change allows one to avoid the fallacy of reasoning from a price change. Unfortunately, it does not. A change in interest rates is not equivalent to a change in the stance of monetary policy for two important reasons. First, changes in the Fed's target interest rate are often linked to broader monetary policy announcements, which also affect the natural rate of interest. For instance, an expansionary monetary policy might raise inflation expectations via the Fisher effect and hence increase the (nominal) natural rate of interest.

Second, the central bank's policy rate often moves in the same direction as the natural rate of interest, but by a smaller amount. Interest rates are partly endogenous, and the central bank responds to exogenous changes in the natural rate of interest. This pattern is true even for interest rates that are under the direct control of the central bank, such as the discount rate and the interest rate on reserves. When the natural rate of interest fell sharply during the 2007/08 banking crisis, the Fed responded by reducing its policy target more slowly, effectively tightening policy.

Although Saudi Arabia can be confident that a decision to sharply boost its oil output will have a depressing effect on oil prices, the Fed cannot be confident that a decision to boost the money supply will have a depressing effect on interest rates. So what makes money different from oil? Start with the fact that (unlike oil) money is one side of almost all transactions. Thus, any oil supply shock is also a demand for money shock. When Saudi Arabia sells more oil, it also buys more money. With respect to oil, however, and indeed for all goods other than money, a change in the market fundamentals does not directly alter the stock of base money (currency and bank reserves), which is determined by the central bank.

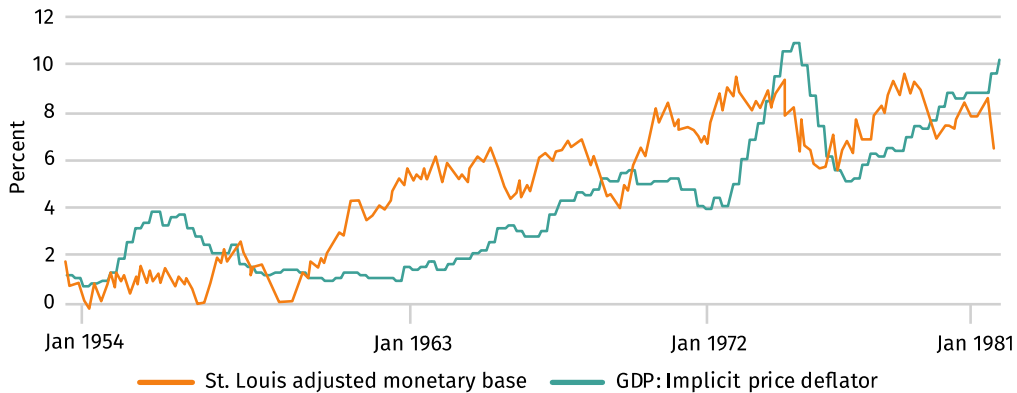
One typically assumes that when an oil supply shock changes the nominal price of oil, it has too little effect on the value of money (i.e., aggregate price level) for the nominal price of oil to move in the opposite direction from its real price. Thus, an increase in Saudi oil production is highly unlikely to cause the value of money to fall by so much that the nominal (dollar) price of Saudi oil would rise even as the real price (i.e., relative to other goods) declined. When looking at specific product prices, one justifiably focuses on the good or service in question, not the money flowing in the other direction. In a sense, this focus is what distinguishes microeconomic price theory from macro theory.

Money is different. One might think that a massive Fed purchase of Treasury securities should raise the price of Treasury bonds. Isn't that just basic supply and demand? Actually no, because open market purchases also have the effect of increasing the supply of money, which can easily raise inflation expectations and thereby boost nominal interest rates. In addition, of course, higher nominal interest rates are associated with falling bond prices.

This effect is not just a theoretical curiosity; indeed, in the longer term the Fisher effect is close to the norm. Figure 6.2 shows that during the 1960s and 1970s, the Fed began increasing the stock of money at a much more rapid rate, pushing inflation higher.

Figure 6.3 shows that this acceleration in the rate that Treasury securities were being purchased with newly created money led to increased inflation expectations, higher nominal interest rates, and one of the worst bond markets in American history.⁵

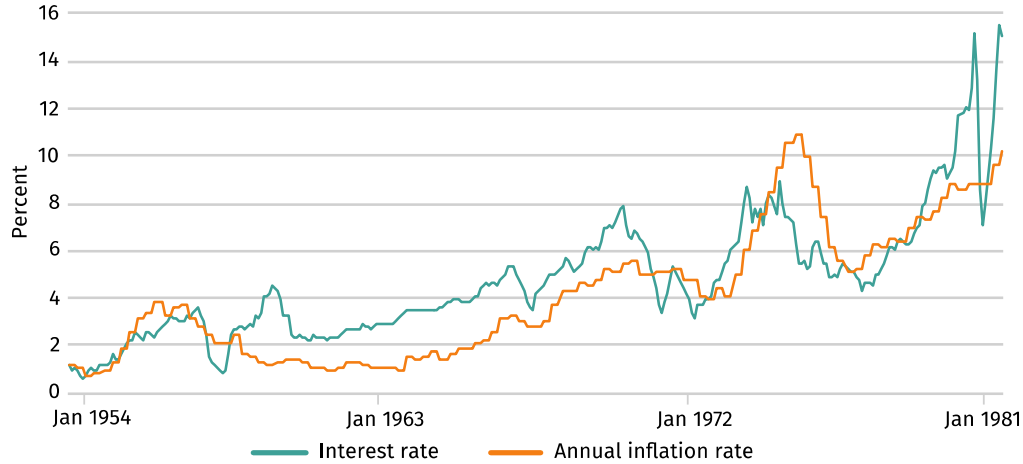
Figure 6.2: Monetary Base Growth and Inflation



Source: FRED, *St. Louis Adjusted Monetary Base (Discontinued)* and *Gross Domestic Product: Implicit Price Deflator* (datasets), Federal Reserve Bank of St. Louis, <https://fred.stlouisfed.org/>.

5. This episode should make us very suspicious of claims that Fed asset purchases *subsidize* the holders of the assets being sold to the Fed. The Treasury debt holders of the 1970s would have greatly preferred to do without that alleged Fed subsidy.

Figure 6.3: Three-Month T-Bill Yields and Inflation



Source: FRED, *3-Month Treasury Bill: Secondary Market Rate* and *Gross Domestic Product: Implicit Price Deflator* (datasets), Federal Reserve Bank of St. Louis, <https://fred.stlouisfed.org/>.

Some economists will concede the importance of the Fisher effect in the long run, but they continue to insist that it is meaningful to consider a thought experiment whereby the Fed adjusts interest rates, other things equal. However, unless the term *interest rate* refers to a Fed-administered rate (such as the discount rate or the interest rate on bank reserves), there is no basis for assuming other things equal when the Fed does something to move *market* interest rates. The Fed cannot magically change market interest rates, other things equal; it must take affirmative actions.

This complication is not merely a theoretical curiosity. In the real world, the most important effect of Fed policy results not from the current setting of a single policy instrument; the dominant factor is communication about the future path of all the various policy instruments. A vector autoregression (VAR) study that looks at the effect of changes in interest rates—other things equal—will not be able to provide useful guidance to monetary policymakers, because it will ultimately gloss over the more important aspects of monetary policy announcements. This is one aspect of the famous *identification problem*. Indeed, later in this chapter, one will see that the Fed can raise interest rates with either an expansionary or a contractionary monetary policy. The effects on the economy are quite different in the two cases.

There is also a less obvious problem with reasoning from an interest rate change; the short-term interest rate has both exogenous and endogenous features. Short-term interest rates are exogenous in the sense that on any given day the Fed can set rates at various levels. In contrast, when short-term interest rates are the only policy instrument, then the interest rate is endogenous in the sense that only one interest rate setting is consistent with exactly 2 percent inflation. Thus, under a successful inflation-targeting regime, the interest rate (as well as the money supply) is endogenous. More broadly, for *any* monetary policy target, including the price of gold, the foreign exchange rate, the

inflation rate, or nominal GDP, generally only one interest rate path is consistent with policy success.

The following analogy might help. Consider a bus going from Denver, Colorado, to Salt Lake City, Utah. What determines the path of the bus as it winds its way over the Rocky Mountains? From one perspective, the bus's path is determined by the driver, who adjusts the position of the steering wheel. From another perspective, the bus's path is determined by the highway itself, combined with the assumption that the driver does not wish to allow the bus to fall into a ditch. Returning to monetary policy, one might say that the short-term interest rate is determined by the vote of the Federal Open Market Committee (FOMC), or that it is determined by the fundamentals of the economy, *combined with the FOMC's preference that the inflation rate not stray very far from 2 percent.*

One is so used to thinking of central banks determining the interest rate that one can easily forget that until 1913, the Fed did not exist and the level of interest rates reflected economic fundamentals. Consider the following thought experiment. Before 1913, imagine the economy being affected by shocks A, B, and C. In each case, interest rates rose or fell as a result. Now imagine the same three shocks hitting an economy with a central bank. Assume the central bank moves its target interest rate in response to shocks A, B, and C in exactly the same way as interest rates moved in the previous (pre-1913) case. In the latter case, would it make more sense to describe those interest rate changes as being caused by the central bank or by shocks A, B, and C? The language of causality struggles with these subtleties.

In my view, debating whether the Fed controls interest rates is just as meaningless a question as disputing whether the path of the bus is determined by the layout of the road or by the steering decisions of the driver. Whether a variable is viewed as exogenous or endogenous is simply a matter of *convenience*, not some sort of deep scientific question that can be resolved once and for all. For some purposes (e.g., day-to-day decision-making), thinking of the central bank as setting the interest rate makes sense. For other problems (e.g., the long-run path of interest rates under inflation targeting), thinking of macroeconomic fundamentals determining the interest rate makes sense. In that case, even a Fed-administered rate such as IOR cannot be viewed as a policy indicator; it too is largely endogenous in the medium to long run.

Unfortunately, the problem of interest rates has one additional layer of complexity, which cannot be compared by analogy with the bus journey. After all, when the bus driver turns the steering wheel, the road itself does not move. In contrast, monetary policy actions by the central bank actually change the fundamentals of the economy. As shown, an expansionary monetary policy can increase inflation, real income, or both, which then may lead to a situation in which an entirely different (and higher) interest rate is required to restore macroeconomic equilibrium. According to the language of Keynesian economics, a change in the policy interest rate can lead to a change in the natural interest rate.

Unfortunately, there is no single accepted definition of the natural interest rate, and indeed there is not even a single generally accepted term (both *equilibrium* and *neutral*

are sometimes substituted for *natural*). When Knut Wicksell first popularized the concept in 1936, he had in mind a policy setting for the short-term interest rate that led to stable prices.⁶ Overall price stability is an arbitrary policy goal, however, and one could just as easily define a “natural rate of interest” as one that led to 2 percent inflation or one that led to 4 percent nominal GDP growth. The important point is that a change in monetary policy leads to movements in prices and output, which in turn change the natural rate of interest. Milton Friedman and Anna Schwartz showed that a tight money policy by the Fed during the early 1930s led to falling prices and output.⁷ This economic slump contributed to a major decline in the natural rate of interest. Money got tighter even as the Fed’s policy rate gradually declined (albeit too slowly).

So far, I have been revisiting perspectives that have already received extensive coverage in the literature. Thus, the following is by Milton Friedman in 1997:

Low interest rates are generally a sign that money has been tight, as in Japan; high interest rates, that money has been easy. . . .

After the U.S. experience during the Great Depression, and after inflation and rising interest rates in the 1970s and disinflation and falling interest rates in the 1980s, I thought the fallacy of identifying tight money with high interest rates and easy money with low interest rates was dead. Apparently, old fallacies never die.⁸

Friedman is saying that low rates are generally a sign that a previous tight money policy (which he would have defined as a reduction in the money growth rate) reduced the (nominal) natural rate of interest and that the central bank eventually accepts the inevitable and reduces the policy rate. However, notice that Friedman warns that this point is less well understood than he had assumed. In retrospect, his 1997 comments exposed a weak spot in mainstream economics. The failure to address that flaw over the next two decades eventually led to a split between Keynesians and NeoFisherians. Nevertheless, the NeoFisherians are not just saying that low rates mean money *has been* tight; they are saying that persistently reducing interest rates makes money tighter.

Friedman, the Keynesians, and the NeoFisherians have not provided a satisfactory account of the relationship between the stance of monetary policy and the nominal interest rate. Although Friedman’s views are closest to my own, his “has been” phrasing is inadequate. Traditional monetarism lacks a satisfactory account of the relationship between interest rates and monetary policy in a world of efficient markets and rational

6. Knut Wicksell. *Interest and Prices: A Study of the Causes Regulating the Value of Money* (London: Macmillan and Company, 1936).

7. Milton Friedman and Anna J. Schwartz, *A Monetary History of the United States, 1867–1960* (1963; repr., Princeton, NJ: Princeton University Press, 1971).

8. Milton Friedman, “Rx for Japan: Back to the Future,” *Wall Street Journal*, December 17, 1997.

expectations. In the remainder of this chapter, I suggest an alternative framework for thinking about the relationship between money and interest rates.

Alternative Approaches to Monetary Policy

The Keynesian-NeoFisherian dispute is difficult to resolve using modern macroeconomic models that assume the interest rate is the instrument of monetary policy. This section examines alternative approaches to monetary policy using the money supply and exchange rates and then uses a simple exchange rate model to reframe the debate in a much clearer and more useful fashion. Just to be clear, these are thought experiments. I am not advocating that the Fed actually target the money supply or the nominal exchange rate. Nor am I relying on any controversial assumptions regarding the stability of money demand, velocity, or real exchange rates. Instead, I use a much weaker set of assumptions, that boosting the money supply or depreciating the currency is inflationary, *ceteris paribus*.

Perhaps the most famous alternative to the Keynesian approach is monetarism, where the *quantity of money* (defined in various ways) is used as either the instrument or the short-run target of monetary policy. In most such proposals, the monetary base is used as the policy instrument, because it is directly controlled by the central bank. Broader money aggregates such as M1 or M2 are short-run targets.⁹ Contrast this with the pre-2008 regime, where open market operations adding and subtracting base money were the policy instrument used to target the federal funds rate.

Another heterodox approach relies on changes in the *price of money*. Indeed, some of the earliest examples of monetary policy involved the debasement of coinage. Thus, a monarch might change the definition of the unit of account from one pound of silver to one-half pound of silver, effectively doubling the price of silver in terms of money. President Franklin D. Roosevelt adopted an analogous policy during 1933/34, when he gradually raised the dollar price of gold before adjusting the official definition of the dollar from 1/20.67 ounce of gold to 1/35.00 ounce of gold. The central bank of Singapore uses adjustments in the foreign exchange value of the Singapore dollar as its monetary instrument.¹⁰

Thus, one has at least three broad categories for thinking about the stance of monetary policy: changes in the quantity of money (M1, M2, etc.), changes in the price of money (exchange rates, etc.), and changes in the rental cost of base money (interest rates). The Keynesian-NeoFisherian dispute is much easier to understand if one chooses any monetary policy approach *other than interest rates*. I begin with the quantity of money

9. M1 includes cash held by the public and checking account balances. M2 includes M1 plus various types of savings account balances and money market mutual funds.

10. One advantage of this approach is that there is no zero-bound problem.

approach, but later I argue that the price of money approach is the framing that most clearly distinguishes the two perspectives.

The level and growth rate of the money supply

John Cochrane has been a leader in developing NeoFisherian ideas, and in 2016 Nick Rowe wrote a blog post responding to Cochrane.¹¹ Rowe considered a thought experiment involving an increase in the rate of interest paid on money (R_m), which might be viewed as the interest rate paid on bank reserves:

If the central bank announces that R_m increases by 1 percent, and at the same time announces that money growth increases by 1 percent, then we get NeoFisherian results. The inflation rate increases by 1 percent, but the opportunity cost of holding money is unchanged (the increased R_m and increased inflation cancel out), so there is no initial jump up or down in the price level.

But if the central bank announces that R_m increases by 1 percent, and at the same time announces that money growth will not change, then we get an initial drop in the price level, because the opportunity cost of holding money has fallen so the demand for money has increased, but there is no subsequent change in the inflation rate.

If we assumed prices are sticky rather than perfectly flexible, that initial drop in the price level would take a few years of deflation to work itself out.

It's not enough to ask what happens if the central bank changes the deposit rate of interest. We must also ask what the central bank does with the money supply. And the New Keynesians (Neo-Wicksellians) are to blame by deleting that second question, by deleting money from their model.

And by the way, my model is bog-standard IS-LM [investment/savings–liquidity preference/money supply], except that the central bank pays interest on money, and you can make the IS curve New Keynesian if you like, and add flexible prices or an expectations-augmented Phillips Curve.¹²

This helps one understand an empirical fact that might otherwise be confusing. Today, people often talk about changes in the Fed's interest rate on excess reserves (IOER) as being equivalent to a change in market interest rates. When the Fed cut the IOER close to zero in 2020, market rates fell by a roughly similar amount. And yet in 1981, short-term market interest rates were about 15 percent while the IOER was zero. So the IOER is clearly not *necessarily* equivalent to the market interest rate.

11. Nick Rowe, "John Cochrane on Neo-Fisherianism, Again," *Worthwhile Canadian Initiative* (blog), December 14, 2016.

12. Rowe, "John Cochrane on Neo-Fisherianism, Again."

Proponents of using interest rates as a policy indicator face a dilemma. If they put market interest rates into a VAR study, then they engage in the fallacy of reasoning from a price change. Market interest rates never change, *other things equal*. If they put IOER into a VAR study, then they are treating *the interest rate* as being 0 percent from 1980 to 2007. One might argue that IOER equals the market rate when the banking system is saturated with large quantities of reserves, but that approach leads to a deeper question: why are those vast excess reserves not inflationary, as in places such as Zimbabwe or Venezuela? Peter Ireland writes the following:

In the long run, the additional degree of freedom provided by the ability to pay interest on reserves is best described as one that gives the Federal Reserve the ability to target the real quantity of reserves separately from the federal funds rate. Even when it pays interest on reserves, the Fed must continue to use open market operations to adjust the nominal quantity of reserves proportionally, following any policy action intended to bring about a long-run change in the aggregate price level.¹³

Thus, although IOER can push the ratio of base money to GDP up from 5 percent to 50 percent or 100 percent, money remains neutral in the long run. As long as the real demand for reserves is determinate, a permanent exogenous doubling of the monetary base will still lead to a doubling of the price level and nominal GDP in the long run.¹⁴ Because this point is frequently misunderstood, consider the following from Ireland:

Thus, while the Fed's newly-obtained ability to pay interest on reserves does allow it to tighten monetary policy by raising its federal funds rate target in the short run without any immediate open market operation, the long-run effects of this monetary policy tightening turn out to be the same with interest on reserves in figure 2 as they were in figure 1 without. From a monetarist perspective, the open market operation that leads to a contraction in the dollar volume of reserves supplied is still necessary for bringing about a permanent reduction in the price level.¹⁵

For a zero rate of IOER to produce low market interest rates and a low rate of inflation, something else is needed. One possibility is that in 2020, a zero rate of IOER coincides with investors having confidence that the Fed will keep money growth at a level consistent with low interest rates and low inflation, whereas that was not true in 1981

13. Peter N. Ireland, "The Macroeconomic Effects of Interest on Reserves," *Macroeconomic Dynamics* 18, no. 6 (2014): 1309.

14. Ireland shows that it is not difficult to make reserve demand determinate: "Further, in both this model and Hornstein's, these extra mechanisms for ensuring determinacy could be eliminated if the monetary authority lowered the rate of interest it pays on reserves ever so slightly below the market rate; here, an arbitrarily small but still positive interest rate spread would work, through (37), in exactly the same way as the arbitrarily small but positive labor requirement measured by the parameter φ_v , to keep the demand for real reserves finite and well defined." Ireland, "Macroeconomic Effects of Interest on Reserves," 1295.

15. Peter N. Ireland, "A Monetarist View of Policy Renormalization" (position paper, Boston College, Boston, and Shadow Open Market Committee, New York, September 2017), 10.

when investors expected rapid money growth to lead to persistently high rates of inflation and high equilibrium market interest rates.

This point is easily missed because zero interest rates create a much larger demand for base money as a share of GDP. Thus, at the zero bound, a large one-time increase in the monetary base, dubbed *quantitative easing* (QE), often coincides with a reduction in the longer-run expected rate of money growth. So low interest rates and low inflation expectations do not appear to be anchored with expectations of low rates of money growth. People see the previous fast growth in the money supply, not the falling expectations for future money growth. Monetarism looks irrelevant.

Nick Rowe is correct that the New Keynesian–NeoFisherian dispute can be more easily understood by bringing the money supply into the analysis.¹⁶ This framing allows one to distinguish between the effect of one-time changes in the money supply (or demand) on interest rates and the effect of permanent changes in the growth rate of the money supply.

At the same time, several factors suggest an even better way of resolving the Keynesian–NeoFisherian dispute—using exchange rates as an indicator or instrument of monetary policy. First, unlike with the money supply, exchange rate targeting has occurred in many times and places.¹⁷ Second, one sees forward markets in exchange rates but no forward markets in the money supply. Third, the interest parity condition is more reliable than the Fisher effect. Finally, the recent importance of the zero lower bound makes it exceedingly difficult to see quantity theoretic relationships (i.e., money and price correlations), even when money still does affect prices, *ceteris paribus*. In contrast, the zero-lower-bound condition has little relevance for the purchasing power parity (PPP) relationship, which links changes in exchange rates and international inflation differentials.

For a more specific example of this final point, no one doubts that a tenfold increase in the yen price of dollars (say, from 105 yen to the dollar to 1,050 yen to the dollar) would be highly inflationary for Japan. However, some economists would be skeptical of a claim that a tenfold increase in the Japanese monetary base would be highly inflationary.¹⁸ At the zero bound, real exchange rates are more stable than real money demand.

16. Rowe, “John Cochrane on Neo-Fisherianism, Again.”

17. Singapore’s central bank uses the exchange rate as its monetary instrument.

18. To be clear, I am not arguing that a tenfold increase in the Japanese base, *from the current level of roughly 100 percent of GDP*, would not be inflationary. Rather, one has seen that sort of increase in the past—at the zero bound—without much inflation in Japan.

Exchange rates and interest rates

Interest rate differentials between two countries with open capital markets are closely related to differences in the expected rate of change in the exchange rate. If two open economies have a fixed exchange rate, such as Germany and Denmark, then one would expect nominal interest rates on risk-free bonds to be almost identical. In contrast, if the British pound is expected to depreciate at 2 percent a year against the euro, then risk-free interest rates should be roughly 2 percent higher in the United Kingdom than in Germany. This *interest parity condition* does not hold perfectly, because various frictions in the real world prevent costless financial arbitrage. However, it does hold much more precisely than PPP, indeed well enough to illustrate both sides of the Keynesian-NeoFisherian debate.

The Keynesian view of monetary policy and interest rates can be shown most effectively using the example of Dornbusch overshooting. Rudiger Dornbusch combined four off-the-shelf macroeconomic concepts to illustrate the link between monetary shocks, interest rates, and exchange rates:¹⁹

The quantity theory of money

PPP

The liquidity effect

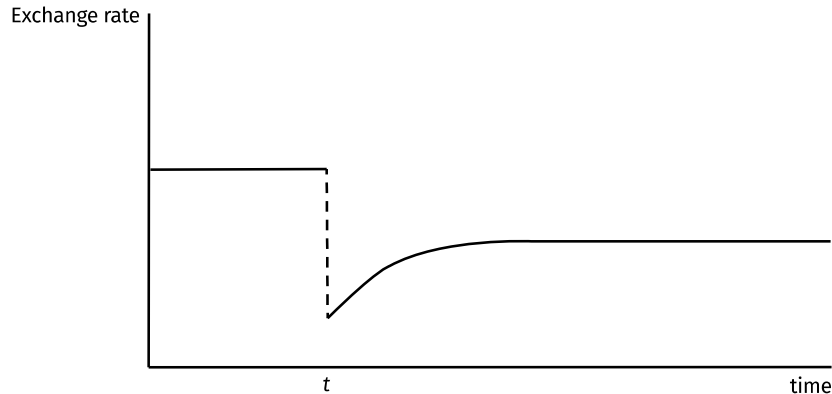
The interest parity condition

The basic idea can be illustrated with a simple thought experiment involving a permanent and exogenous 10 percent increase in the money supply in a single country. According to the quantity theory (a), this increase would be expected to boost the domestic price level by 10 percent in the long run. According to PPP (b), an exogenous 10 percent price level increase would be expected to depreciate the exchange rate by 10 percent in the long run. According to the liquidity effect (c), the monetary injection would be expected to lower nominal interest rates in the short run, but not the long run. Because the monetary injection has lowered nominal interest rates relative to the (unchanged) foreign interest rate, interest parity (d) suggests the exchange rate would be expected to appreciate going forward.

Figure 6.4 shows that if one combines these four assumptions, then the monetary shock must cause the exchange rate to immediately depreciate by more than 10 percent, overshooting its long-run equilibrium. After the initial depreciation, the exchange rate will be expected to gradually appreciate (because of interest parity), finishing 10 percent lower than before the exogenous monetary injection.

19. Rudiger Dornbusch, "Expectations and Exchange Rate Dynamics," *Journal of Political Economy* 84, no. 6 (1976): 1161–76.

Figure 6.4: Keynesian View of Monetary Stimulus and Exchange Rates



As noted earlier, this thought experiment illustrates the traditional Keynesian view that monetary stimulus reduces nominal interest rates. A NeoFisherian might rightly object that it does not prove the Keynesian case because the liquidity effect is simply assumed, not shown to be true.

To understand the real value of this thought experiment, one needs to reframe the monetary shock from a money supply injection to a change in the expected path of exchange rates. Thus, suppose that at $t = 0$, there is no announcement of an injection of new money into the economy. Instead, the central bank announces that it will immediately depreciate the currency by 18 percent and then gradually appreciate the currency by 1 percent a year for eight years. In the long run, the currency will depreciate by 10 percent relative to the initial equilibrium, just as in the Dornbusch overshooting thought experiment. What can one say about the effect of this monetary policy shock?

Now, one can jettison the quantity theory of money and the liquidity effect. All one needs is the interest parity condition and PPP. According to PPP, this monetary shock is inflationary, in the sense that it is expected to boost the price level by 10 percent in the long run. And according to the interest parity condition, this monetary shock will reduce the nominal interest rate by 1 percent for a period of eight years.²⁰

Of course, a NeoFisherian might reject either PPP or the interest parity condition, but that would be an odd move. Both conditions are classical ideas, akin to the Fisher effect for interest rates. For instance, PPP becomes increasingly dominant as the inflation differential between two countries increases, because a larger inflation differential makes changes in the real exchange rate relatively less important. Similarly, the Fisher effect

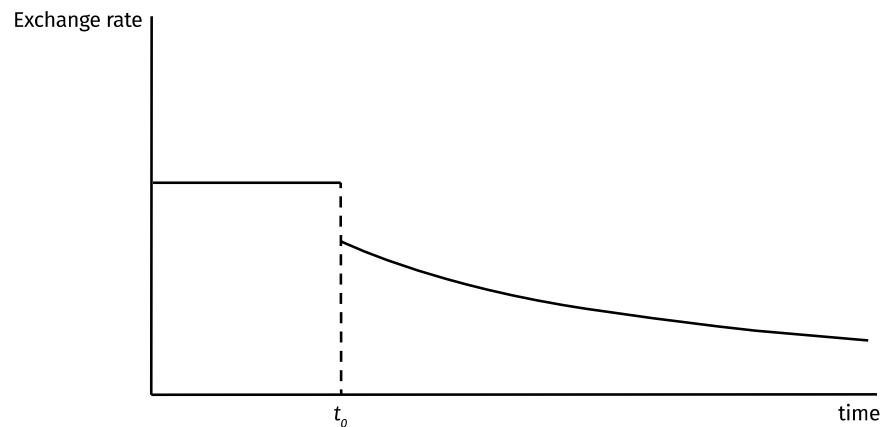
20. It is less clear that this policy shock would be inflationary in the short run. The overall price level might instantly rise by 18 percent and then gradually lose 8 percent of that increase over eight years. But I believe it would be inflationary even in the short run, because of sticky prices.

becomes increasingly important at higher inflation rates, because changes in the real interest rate become relatively less important.

A more plausible NeoFisherian rebuttal would be that this thought experiment is a theoretical curiosity, but that in the real world, higher inflation is generally associated with higher nominal interest rates. Central banks do not generally announce the sort of target path for exchange rates that is seen in figure 6.4. For now, simply recognize that some feasible monetary shocks simultaneously raise the expected future price level and lower the domestic nominal interest rate.

Figure 6.5 shows that a NeoFisherian outcome can be illustrated by assuming a monetary shock that causes the exchange rate to depreciate at a point in time and also be expected to depreciate even further over time.

Figure 6.5: NeoFisherian View of Monetary Stimulus and Exchange Rates



With the expected depreciation of the exchange rate, the price level will be expected to rise over time (owing to PPP). Because of the expected future depreciation of the currency, the nominal interest rate will also rise (owing to interest parity). A Keynesian might argue that although this situation is possible, in most cases it is merely a theoretical curiosity—with real-world applications only in extreme cases, such as Latin American-style hyperinflation. After all, this shows a monetary shock that causes both higher interest rates and a weaker currency.

Nonetheless, at least one prominent Keynesian economist took this hypothetical case very seriously, albeit at a point in time when the NeoFisherian model had not yet been created. Lars Svensson discusses one implication of his “foolproof” method for Japan to escape from the zero-lower-bound trap:

- (1) It is technically feasible for the central bank to devalue the currency and peg the exchange rate at a level corresponding to an initial real depreciation of the domestic currency relative to the steady state.
- (2) If the central bank demonstrates that it both can and wants to hold the peg, the peg will be credible. That is, the private sector will

expect the peg to hold in the future. (3) When the peg is credible, the central bank has to raise the short nominal interest rate above the zero bound to a level corresponding to uncovered interest rate parity. Thus, the economy is formally out of the liquidity trap. In spite of the rise of the nominal interest rate, the long real rate falls, as we shall see.²¹

Here, Svensson is merely calling for Japan to depreciate and then peg the yen, not depreciate and then further depreciate the yen. However, this approach amounts to the same general idea because Japanese interest rates have been lower than American interest rates for most of the past few decades, indicating expectations of further yen appreciation. Thus, merely pegging the yen to the dollar would immediately raise Japanese interest rates and eventually bring Japanese inflation closer to US rates; outright yen depreciation is not necessary to achieve exit from the liquidity trap.

Svensson uses the phrase “in spite of” in the final sentence, which is an indication of his Keynesian perspective.²² He is reassuring his readers that the policy is inflationary in spite of the higher nominal interest rates. By implication, this pattern is not normal.

In contrast, NeoFisherians would say the higher nominal rates are exactly what one would expect from an inflationary monetary shock. They might note that Svensson specifically cited this as a “foolproof” reflation tool. Svensson has shown that *highly effective* monetary policies (expansionary or contractionary) are likely to be NeoFisherian in nature. This is an important point to which I return later in the section titled “Problems with Using Interest Rates as a Policy Indicator.”

Empirical evidence

The correlation between interest rates and the stance of monetary policy is ambiguous. One can draw up a path for the exchange rate where lower nominal interest rates are associated with either an inflationary or a disinflationary monetary policy. But which pattern is more likely?

The traditional answer focuses on the distinction between short- and long-run effects. Thus, an expansionary monetary policy may depress interest rates in the short run (liquidity effect) and then raise them higher in the long run (income and Fisher effects). This is the traditional monetarist view.

As the previous hypothetical examples demonstrate, however, that distinction is not enough. Even in the short run, an expansionary monetary policy may depress or increase interest rates, depending on the expected path for the exchange rate. Although a comprehensive empirical investigation of this issue is beyond the scope of this chapter, a

21. Lars E. O. Svensson, “The Zero Bound in an Open Economy: A Foolproof Way of Escaping from a Liquidity Trap,” *Monetary and Economic Studies* 19, no. S1 (2001): 297.

22. Svensson, “The Zero Bound in an Open Economy,” 297.

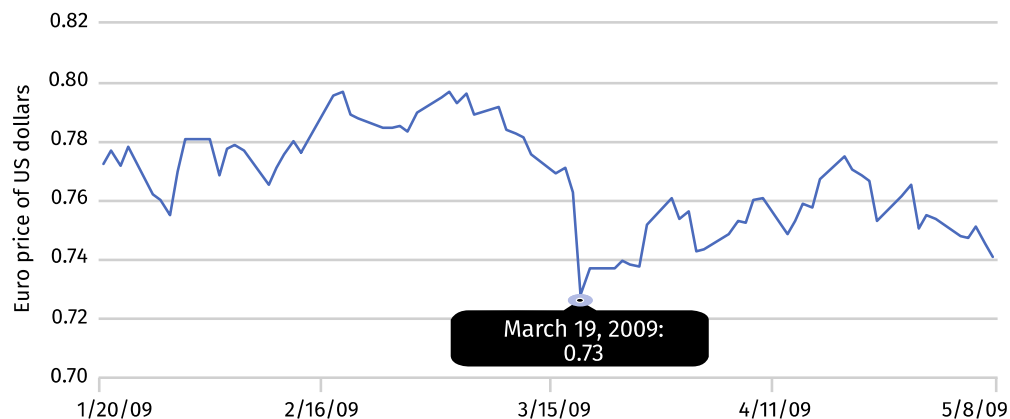
recent study by Martín Uribe suggests that the NeoFisherian result is not uncommon, even in the short run:

The paper then estimates a standard new-Keynesian model driven by permanent and stationary but persistent inflation-target shocks as well as a battery of other conventional monetary and real disturbances. It finds that 50 percent of the variance of inflation changes is accounted for by monetary shocks that induce positive short-run comovement in the interest rate and inflation.²³

Thus, it may be useful to provide real-world examples of both Keynesian and NeoFisherian policy shocks to illustrate the two cases.

On March 18, 2009, the Fed announced its first major QE program, promising to purchase \$1.15 trillion in Treasury securities and mortgage-backed securities. This announcement was followed by a sharp increase in the price of Treasury bonds and a decline in bond yields.²⁴ Figure 6.6 shows that following the announcement, the dollar fell more than 4.5 percent against the euro,²⁵ an unusually large daily move.

Figure 6.6: Euro Price of US Dollars



Source: FRED, U.S. / Euro Foreign Exchange Rate (dataset), Federal Reserve Bank of St. Louis, <https://fred.stlouisfed.org/>.

Other asset prices such as US equities and gold increased sharply.²⁶ Overall, these initial reactions look almost exactly like those one would expect from the Dornbusch overshooting model. The announcement of a large increase in the money supply boosted

23. Martín Uribe, “The Neo-Fisher Effect: Econometric Evidence from Empirical and Optimizing Models” (Columbia University and National Bureau of Economic Research working paper, February 20, 2020), 1.

24. One-year Treasury bill yields fell by roughly 11 basis points right after the policy was announced.

25. This decrease occurred from noon EST on March 18, 2009, to noon EST on the following day.

26. Edmund Andrews, “Fed Plans to Inject Another \$1 Trillion to Aid the Economy,” *New York Times*, March 18, 2009.

inflation expectations and reduced nominal interest rates. The spot exchange rate of the dollar fell more sharply than the forward exchange rate. Thus, the dollar's forward premium actually increased as interest rates fell.

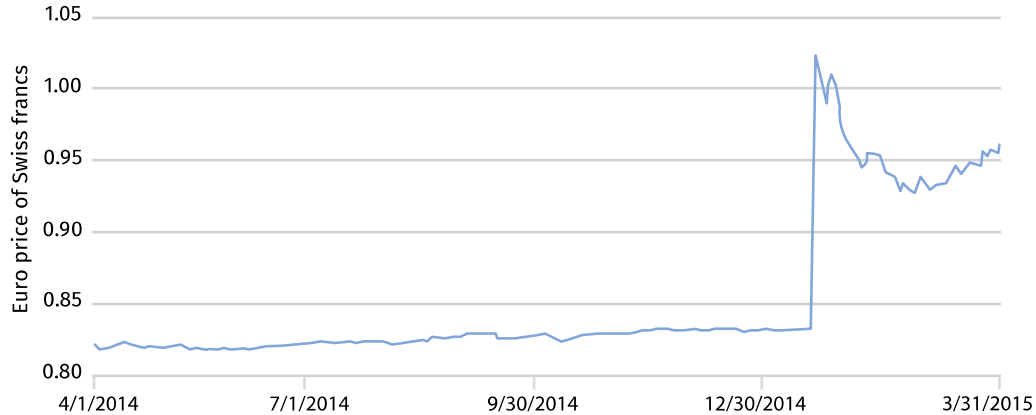
A very different sort of monetary shock occurred in Switzerland in 2015, although as with the US QE program, it had the effect of depressing nominal interest rates. Figure 6.7 shows that before January 2015, the Swiss franc had been pegged to the euro at a fairly stable exchange rate. On January 15, 2015, the Swiss National Bank (SNB) surprised markets with a dramatic revaluation of the franc, which spiked more than 20 percent higher before settling in with a roughly 15 percent appreciation against the euro.²⁷

The SNB was under the mistaken impression that this revaluation would reduce speculative pressure on the Swiss franc. Instead, the appetite for francs increased even more, because the franc was perceived as a currency that was likely to gradually appreciate over time.

On the day of the revaluation, the SNB also cut its short-term policy rate to -0.75 percent, and yields on Swiss bonds also fell sharply. The forward exchange rate for Swiss francs appreciated even more than the spot rate, which is an implication of the interest parity condition during a period of falling Swiss interest rates. Swiss equity prices fell sharply, as did the price of gold measured in Swiss francs. Thus, all the major asset markets were suggesting that investors saw the policy move as disinflationary, *despite* the sharp fall in nominal interest rates.

27. Contrary to widespread opinion, the Swiss franc appreciation was not inevitable. At the time, the Danish krone was also under speculative pressure. But Denmark refused to break the euro peg, and the speculation then subsided. Also note that figure 6.7 shows the dollar and franc exchange rate. The euro and franc exchange rate would have been flat before January 2015.

Figure 6.7: Euro Price of Swiss Francs



Source: FRED, *Switzerland / U.S. Foreign Exchange Rate* and *U.S./Euro Foreign Exchange Rate* (datasets), Federal Reserve Bank of St. Louis, <https://fred.stlouisfed.org/>.

The Swiss policy shock was essentially identical to Svensson’s (2001) proposed “foolproof” method for escaping from a liquidity trap, *except in the opposite direction*.²⁸ In Svensson’s model, Japan could escape the zero bound by sharply depreciating its currency and then stabilizing it or, better yet, promising further depreciation. As shown earlier, this sort of expansionary monetary policy would actually raise Japanese interest rates. The Swiss sharply appreciated their currency and implicitly signaled further appreciation ahead by simultaneously depressing interest rates even further below the level in the United States. One might call this a foolproof method for *staying in a liquidity trap*.

The Fed’s QE1 announcement was an inflationary low interest rate policy (Keynesian), whereas the Swiss franc appreciation was a disinflationary low interest rate policy (NeoFisherian). So what determines which result holds in any given case? Ultimately, there is no easy answer to this question. One possibility is that the immediate response to monetary shocks tends to be Keynesian when the nominal interest rate is the primary policy instrument (i.e., signal) and NeoFisherian when interest rate changes are subservient to exchange rate changes (or some other policy signal).²⁹

Consider an emerging-market central bank that is forced to break an exchange rate peg and then very sharply devalue its currency. That action is clearly inflationary, and it is often accompanied by a sharp increase in the central bank’s target interest rate—signaling even more depreciation ahead. That would be a NeoFisherian policy mix and

28. Svensson, “The Zero Bound in an Open Economy.”

29. Sumner shows that policy seemed to become NeoFisherian during a brief period in November 1933, when President Roosevelt began using higher gold prices as an instrument of monetary policy. Scott B. Sumner, *The Midas Paradox: Financial Markets, Government Policy Shocks, and the Great Depression* (Oakland, CA: Independent Institute, 2015).

one where the change in the interest rate would take a backseat to the change in the exchange rate.

At this point, some economists might be inclined to fall back on a *ceteris paribus* argument, claiming that lower interest rates continue to be expansionary, other things equal. That would be a mistake, just as it makes no sense to claim that lower oil prices cause higher consumption (or lower production), other things equal. Recall that the change in equilibrium quantity depends on what causes the lower oil prices. Similarly, low interest rates caused by a tight money policy are disinflationary, whereas low interest rates caused by an easy-money policy are inflationary. Market interest rates *never change for no reason at all*; there is always a causal factor or combination of factors, and one must consider how those factors affect inflation expectations.³⁰

Level Shifts versus Growth Rate Changes

To gain a deeper understanding of the difference between Keynesian and NeoFisherian policy shocks, one needs to consider monetary policy in two dimensions—level shifts and growth rate changes. In the previous section, that distinction applied to exchange rates. A central bank can change the spot exchange rate and also change the expected future path of exchange rates. More important, those changes may or may not be in the same direction.

Economists are used to thinking about monetary policy shocks in unidimensional terms—more or less expansionary. However, if policy has two dimensions—level shifts and growth rate changes—then policy shocks can be expansionary in one dimension and contractionary in another. Thus, in the Dornbusch overshooting model, an increase in the money supply causes an immediate depreciation in the spot exchange rate (expansionary) and an expected appreciation in the future exchange rate (contractionary). This distinction is especially important in modern macroeconomic models where aggregate demand is much more powerfully affected by changes in the expected future path of the policy instrument than by changes in the current setting of the policy instrument.³¹

In 1998, Paul Krugman developed a model of the zero lower bound that emphasized the role of policy expectations.³² Krugman pointed out that traditional models of liquidity traps ignored the role of expectations. Even at the zero bound, a large increase in the

30. Unlike market interest rates, IOER can be viewed as an exogenous policy instrument. However, IOER need not equal the market interest rates, as seen before 2008.

31. See Gauti B. Eggertsson and Michael Woodford, “The Zero Bound on Interest Rates and Optimal Monetary Policy,” *Brookings Papers on Economic Activity* 1 (2003): 139–211.

32. Paul R. Krugman, “It’s Baaack: Japan’s Slump and the Return of the Liquidity Trap,” *Brookings Papers on Economic Activity* 2 (1998): 137–87.

money supply should be inflationary, because it would push prices higher once nominal interest rates were no longer holding fast at zero. The expectation of higher future inflation should depress the current level of real interest rates (if one assumes nominal rates are holding fast at zero). Thus, monetary injections should continue to be expansionary even at the zero bound, indeed even when base money is (temporarily) a perfect substitute for Treasury bills. Additionally, even if nominal interest rates were to immediately rise for NeoFisherian reasons, the monetary injection would continue to be expansionary owing to the boost that higher nominal interest rates would give to base money velocity.

Krugman argued that the real problem is not a liquidity trap, but rather what might be called an *expectations trap*. Central bank injections of new money will not be inflationary if they are not expected to be permanent, but conservative central bankers will be reluctant to allow inflation once the economy has exited the liquidity trap. Because the removal of excess cash balances can prevent higher inflation once rates are positive, the public will expect the monetary injections to be only temporary. Central banks can break out of this expectations trap only if they can credibly promise to be irresponsible, that is, promise to allow higher inflation after exiting the zero bound for interest rates.³³

Central banks can also *sterilize* monetary injections with the payment of interest on bank reserves, and this approach has the same effect as making monetary injections temporary. Thus, for a conservative central bank, the injection of zero interest *high-powered money* at the zero bound is often ineffective since it is expected to be temporary. The money will later be withdrawn, or it will begin to earn interest and thus no longer represent high-powered money. Only *permanent* injections of zero interest high-powered money (currency or zero interest bank reserves) are reliably inflationary.

In summary, a monetary shock in Krugman's expectations trap model has two dimensions: a change in the current money supply and a change in the expected future money supply. Policy is reliably inflationary only when both dimensions of policy are expansionary.

Interest rates are especially poorly suited to measure the stance of monetary policy because they pick up only one of the two dimensions of policy changes. The monetary stimulus shown in the Fed's 2009 QE program (figure 6.6) and the monetary contraction in the 2015 Swiss policy shock (figure 6.7) had the same qualitative effect on nominal interest rates, which fell immediately in both cases. That effect occurred because both the monetary stimulus and the monetary contraction led to expectations of future currency appreciation. However, one policy was effectively expansionary while the other was contractionary, a difference immediately apparent when one looks at exchange rate data.

33. Krugman later seemed to regret using the phrase "promise to be irresponsible," because central bankers are not known for being attracted to irresponsible policies. Furthermore, the sort of *level targeting* regime that can overcome an expectations trap might actually be regarded as quite responsible when viewed from a social welfare perspective.

The problem is that although changes in interest rates indicate something about changes in the expected rate of appreciation in a currency, they do not indicate anything about level shifts—changes in the level of the spot and forward exchange rates.

Much of modern macroeconomics formed in a world where the distinction between level and growth rate shifts was difficult to perceive. John Maynard Keynes was famously dismissive of the Fisher effect, viewing it as a theoretical curiosity outside a few extreme cases of hyperinflation. Until 1968, however, growth rate shifts were greatly restricted by the long-run link between currencies and gold. By the 1970s, in contrast, economists had begun to distinguish between level and growth rate shifts. In 1975, Friedman noted the following:

As I see it, we have advanced beyond Hume in two respects only; first, we now have a more secure grasp of the quantitative magnitudes involved; second, we have gone one derivative beyond Hume.³⁴

For instance, the nominal price of gold in the United States was \$20.67 an ounce between 1879 and 1933, and then \$35.00 an ounce between 1934 and 1968. During periods when the price of gold was fixed, there were frequent changes in the level of prices owing to factors such as one-time shifts in gold supply and demand. However, in 1987, Robert Barsky showed that expected inflation rates were usually close to zero before World War I, because the long-run price level was relatively flat under a commodity price peg *and* actual price level changes were approximately a random walk.³⁵

Interestingly, a period of gradual dollar depreciation occurred between 1933 and 1934. For most of this 10-month period, markets viewed gold price changes as a one-time adjustment in levels, not a change in the expected growth rate of gold prices. An exception occurred during November 1933, however, when President Roosevelt began intentionally raising gold prices by a small amount almost every day. For a brief period, bond yields actually rose on expansionary monetary policy news (higher gold prices). This brief NeoFisherian period was viewed as highly unusual by bond traders who had spent their entire life working in a financial system anchored by a gold price pegged at \$20.67 an ounce. Of course, the Fisher effect came back with a vengeance beginning in the late 1960s, as the last links with gold were dismantled.³⁶

NeoFisherian outcomes are most apparent when one looks at changes in long-run growth rates of the exchange rate or the money supply. The link of interest rates with exchange

34. Milton Friedman, "25 Years after the Rediscovery of Money: What Have We Learned? A Discussion," *American Economic Review* 65, no. 2 (1975): 177.

35. Robert B. Barsky, "The Fisher Hypothesis and the Forecastability and Persistence of Inflation," *Journal of Monetary Economics* 19, no. 1 (1987): 3–24.

36. The end of the gold standard is often wrongly dated as August 1971, when the dollar was officially devalued. However, the peg had been unofficially abandoned in March 1968, when the free-market price of gold was allowed to rise above \$35 an ounce.

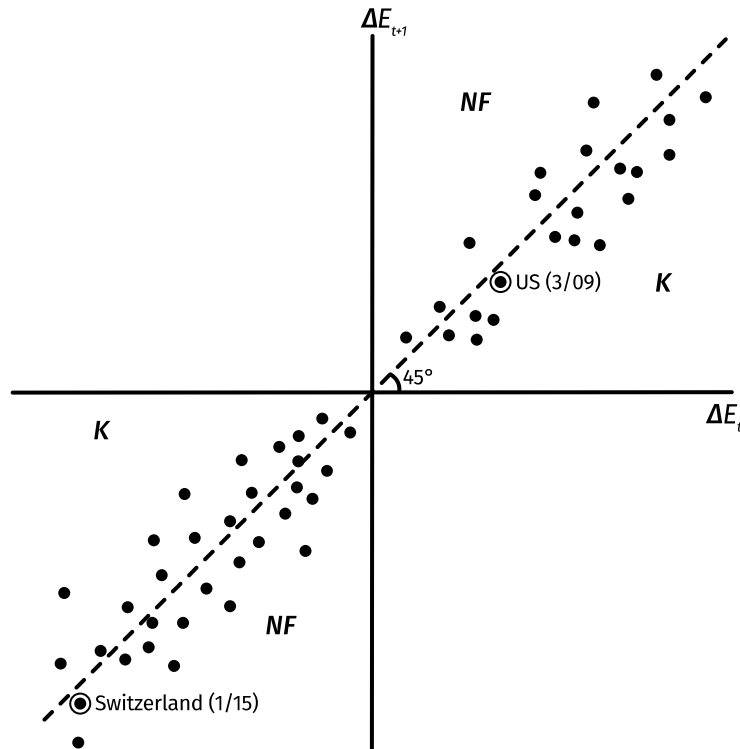
rates is tighter, because the interest parity condition holds relatively well. The link between interest rates and the money growth rate is much weaker, because it relies on two relatively loose relationships—the quantity theory and the Fisher effect. Nonetheless, given a sufficiently large and persistent increase in the expected long-run growth rate of the money supply, nominal interest rates will rise together with money growth, as occurred in the 1960s and 1970s. Therefore, a Keynesian result (low interest rates being inflationary) requires a scenario where the level shift dominates the growth rate shift, as in Dornbusch overshooting, which involves a one-time change in the money supply but no long-run growth rate shift.

It is easier to dispense with interest rates when describing the changes in the stance of monetary policy and to replace them with a vector of both level shifts and growth rate shifts. Thus, the January 2015 Swiss monetary shock could be described as a 15 percent increase in the level of the franc and a simultaneous 0.25 percent increase in the expected growth rate of the franc (reflecting a roughly 25-basis-point decline in Swiss interest rates). The March 2009 Fed QE program could be described as a 4.50 percent *decrease* in the level of the US dollar and an 11-basis-point increase in the expected growth rate of the dollar, because the one-year bond yield fell by 11 basis points.

This multivariate approach to policy shocks can illustrate monetary policy shifts much more effectively than a simple discussion about a 25-basis-point reduction in a central bank's target interest rate. Alternatively, monetarists could describe monetary policy shocks in terms of both a shift in the current money supply and a shift in the expected future path of the money supply.

Perhaps the best way to see how interest rates can be a misleading policy indicator is to look at the effect of monetary shocks on spot and forward exchange rates, which implicitly picks up the change in the expected forward premium (roughly the expected change in the exchange rate). Figure 6.8 illustrates various possible monetary shocks. E_t represents the spot price of foreign currency. Note: *This is the opposite of the definition used earlier in the book.* Thus, if E_t increases, then the domestic currency depreciates, and if E_t decreases, then the domestic currency appreciates. In figure 6.8, the vertical axis shows the change in the one-year forward exchange rate (E_{t+1}), while the horizontal axis shows the change in the spot exchange rate (E_t). Each point represents the response of foreign exchange markets to a monetary policy announcement.

Figure 6.8: Relationship between Changes in Spot and Forward Exchange Rates



Note: K indicates Keynesian. NF indicates NeoFisherian.

The scattered points in the upper right quadrant represent (hypothetical) expansionary monetary shocks, which cause the currency to depreciate in both the spot and the forward markets, that is, E increases. Figure 6.8 provides a specific example showing the market reaction to the US announcement of QE1 on March 18, 2009. The points in the lower left quadrant represent (hypothetical) contractionary monetary shocks, and the Swiss decision to let the franc appreciate in January 2015 represents a specific example.

If the spot rate moves by more than the forward rate, as in the March 2009 US example, then nominal interest rates will fall with expansionary policy and rise with contractionary policy. If the spot rate moves by less than the forward rate, as in the January 2015 Swiss example, then nominal interest rates will rise with expansionary policy and fall with contractionary policy.

The 45-degree line allows one to see whether the spot or the forward exchange rate responds more strongly to the monetary shock. Is it important whether points lie slightly above or slightly below the 45-degree line? It is difficult to see why. However, that slight distinction determines whether the policy shock ultimately is Keynesian (K), with lower interest rates accompanying easier money, or NeoFisherian (NF), with lower interest rates accompanying tighter money.

Notice that the effect of policy on exchange rates (and presumably inflation) does not primarily depend on whether interest rates rise or fall; it depends on whether spot and

forward exchange rates rise or fall. When one thinks about the effect of policy on inflation, it does not matter much whether one is slightly above or below the dotted line; it matters whether one is in the upper right quadrant or the lower left quadrant.

Problems with Using Interest Rates as a Policy Indicator

Misconceptions about the relationship between interest rates and monetary policy have had negative consequences for monetary policy. In this section, I first examine a few important historical examples showing the consequences of misdiagnosing the stance of monetary policy. Then, I consider the implications of this analysis for policy going forward, particularly at the zero lower bound on nominal interest rates.

Historical policy failures

Friedman and Schwartz's *Monetary History* might be the most influential treatise on economic history ever published.³⁷ Their core argument is that the stance of monetary policy is often misidentified. Although the Fed cut interest rates sharply between 1929 and 1932, monetary policy actually became much tighter, and this contributed to a period of sharp deflation.

Because monetary policy was widely seen as being expansionary during the early 1930s, not many people blamed the Fed policy for the deep depression. Thus, there is a sense that widespread misjudgments of the stance of monetary policy may have contributed to the policy failure that caused the Great Deflation of 1929–1933.

This critique has since been accepted by many nonmonetarists, including Ben Bernanke and Frederic Mishkin,³⁸ although they did not accept Friedman and Schwartz's specific claim that movements in the broader monetary aggregates were the best way to identify the stance of monetary policy. Unfortunately, no alternative policy indicator has been widely accepted by the economics profession. Given that lack of consensus, many economists fall back on using interest rate changes as a proxy for monetary policy changes, especially during periods when inflation expectations are fairly low.

In the 1960s and 1970s, the Fed gradually raised its target interest rate, eventually reaching double-digit levels. Once again, monetarists like Friedman suggested that interest rate increases were not a reliable policy tool or indicator and that the Fed needed to slow growth in the money supply. During 1979–1982, money supply targeting did help

37. Friedman and Schwartz, *Monetary History*.

38. See Ben S. Bernanke, (remarks, Federal Reserve Bank of Dallas Conference on the Legacy of Milton and Rose Friedman's *Free to Choose*, Dallas, October 24, 2003); and Frederic S. Mishkin, *The Economics of Money, Banking and Financial Markets*, 8th ed. (Boston: Prentice Hall, 2007).

slow inflation, but instability in the velocity of circulation eventually led to dissatisfaction with money supply targeting.

In 1999, Bernanke argued that the Bank of Japan had made essentially the same mistake that the Fed made in the early 1930s, when it assumed that low interest rates implied easy money. Bernanke argued that the Bank of Japan needed to show “Rooseveltian resolve,” a reference to President Roosevelt’s bold decision to devalue the dollar in 1933.³⁹ Once again, a major monetary policy error resulted (in part) from excessive focus on nominal interest rates as an indicator of the stance of monetary policy. Elsewhere, Bernanke pointed out that even real interest rates are not a reliable monetary policy indicator.⁴⁰

Kevin Erdmann and I argue that the recession of 2008/09 was worsened by a series of Fed policy errors, partly reflecting a mistaken assumption that falling interest rates during 2007/08 had eased monetary policy.⁴¹ In fact, policy was effectively becoming tighter all through 2007, 2008, and early 2009. Vasco Cúrdia shows that during this period, the natural interest rate was declining even more rapidly than the policy rate. This is known because both inflation and nominal GDP growth were below the Fed’s implicit policy goal in 2009.⁴² Below-target inflation occurs when policy interest rates are set above the natural rate.

Frederic Mishkin is the author of the foremost monetary economics textbook, which warns students that low interest rates do not represent easy money.⁴³ Mishkin also served on the Federal Reserve Board until August 2008. In his final FOMC meeting, Mishkin warned his fellow committee members not to rely on the assumption that low interest rates represent easy money:

First of all, let me talk about the issue of focusing too much on the federal funds rate as indicating the stance of monetary policy. This is something that’s very dear to my heart. I have a chapter in my textbook that deals with this whole issue and talks about the very deep mistakes that have been made in monetary policy because of exactly that focus on the short-term interest rate as indicating the stance of monetary policy. In particular, when you think about the stance of monetary policy, you should look at all asset prices, which means look at all interest rates. All asset prices have a very important effect on aggregate demand. Also you should look at credit market conditions because some

39. Ben S. Bernanke, “Japanese Monetary Policy: A Case of Self-Induced Paralysis?” (working paper, Princeton University, Princeton, NJ, December 1999), 25.

40. Bernanke, remarks, Federal Reserve Bank of Dallas Conference.

41. Scott B. Sumner and Kevin Erdmann, “Housing Policy, Monetary Policy, and the Great Recession” (Mercatus Research Paper, Mercatus Center at George Mason University, Arlington, VA, August 2020).

42. Vasco Cúrdia, “Why So Slow? A Gradual Return for Interest Rates,” Federal Reserve Bank of San Francisco *Economic Letter*, 2015-32, October 12, 2015.

43. Mishkin, *Economics of Money, Banking and Financial Markets*.

things are actually not reflected in market prices but are still very important. If you don't do that, you can make horrendous mistakes. The Great Depression is a classic example of when they made two mistakes in looking at the policy interest rate. One is that they didn't understand the difference between real and nominal interest rates. That mistake I'm not worried about here. People fully understand that. But it is an example when nominal rates went down, but only on default-free Treasury securities; in fact, they skyrocketed on other ones. The stance of monetary policy was incredibly tight during the Great Depression, and we had a disaster. The Japanese made the same mistake, and I just very much hope that this Committee does not make this mistake because I have to tell you that the situation is scary to me.⁴⁴

Mishkin's warning proved prescient. The very next month, Lehman Brothers failed. In an FOMC meeting two days after Lehman failed, the committee decided not to cut interest rates, which were then targeted at 2 percent. In his 2015 memoir, Ben Bernanke acknowledged that the Fed had erred in not easing policy after Lehman failed.⁴⁵

Even today, however, many economists continue to believe the Fed did all it could to prevent a steep fall in aggregate demand during 2008/09, even though it clearly did not even do all it could *in conventional monetary policy* (i.e., cutting rates). Of course, there are almost no technical limits to unconventional policies such as printing money to buy financial assets. The Fed policy was far too tight during 2008.

Perhaps the relatively low level of interest rates lulled economists into assuming that monetary policy was expansionary, exactly the same error that many economists made during the early 1930s. In fairness, however, the Fed did not do as poorly as the European Central Bank, which did not cut rates to zero until 2013, and as a result, the eurozone suffered a far more severe recession.

One recurring pattern is that the policy rate often changes more slowly than the (nominal) natural interest rate. When nominal interest rates rise, as in the 1960s and 1970s, the natural interest rate often rises even more rapidly. This rapid rise can be inferred from the fact that inflation rates rose sharply during the Great Inflation (1966–1981) to levels far above those preferred by policymakers. This circumstance means that periods of rising interest rates are often (not always) associated with inflationary monetary policies. Money looks tight to those who focus on interest rates as a policy indicator, but policy is actually expansionary. Conversely, periods when the policy rate is falling—such as the early 1930s and 2008 in the United States or the 1990s in Japan—are often associated with disinflationary monetary policy because the policy rate tends to fall more slowly than the natural rate of interest.

44. Frederic Mishkin, "Meeting of the Federal Open Market Committee," Board of Governors, Federal Reserve System, Washington, DC, August 5, 2008, 121–22.

45. Ben S. Bernanke, *The Courage to Act: A Memoir of a Crisis and Its Aftermath* (New York: W. W. Norton, 2015).

Another recurring pattern is that central banks seem to struggle more with policy when inflation and interest rates are either unusually low or unusually high. In one sense, that is almost a tautology, because unusually low or high inflation rates are generally viewed as policy errors. Nonetheless, the literature shows there is an increased sense that policy is impotent during these periods. During periods of high inflation, such as the late 1960s and 1970s, there was pessimism as to whether tight money could solve the problem.

This pessimism is even more pronounced during periods of deflation, when monetary policy is often viewed as ineffective. Because the focus on interest rates frequently leads to a misdiagnosis of the stance of policy, many pundits wrongly assume that central banks are lacking effective tools at zero interest rates. That mistaken assumption is much less likely to occur when a central bank is targeting the exchange rate, for which there is no zero lower bound.

Unfortunately, exchange rates are probably not a feasible policy instrument for a major economy such as the United States. So what does this analysis of the Keynesian-NeoFisherian dispute indicate about the most effective policy tools for a central bank like the Fed, European Central Bank, or Bank of Japan?

Policy implications

The most important policy implication of the Keynesian-NeoFisherian debate occurs at the zero lower bound for interest rates. During normal times, that is, when interest rates are well above zero, central banks seem to have little trouble keeping inflation near the 2 percent target. Unfortunately, zero-lower-bound episodes are becoming increasingly frequent, and financial futures markets suggest that low interest rates may become the new normal. How should central banks conduct monetary policy in an environment of low interest rates?

There are a number of policy options that are beyond the scope of this chapter, including the use of negative interest rates and the raising of the inflation target from 2 percent to 4 percent. Both of these options are viewed as highly controversial within the Fed. Instead, the Fed intends to double down on interest rate targeting, supplemented with QE programs that are aimed at depressing longer-term bond yields.

In some Keynesian models, one of the most promising policies at the zero lower bound is *forward guidance*. Thus, the Fed could promise to keep interest rates near zero for a specified period or until a specific macroeconomic objective is achieved. This approach recognizes that what matters most is not the current stance of monetary policy but rather the expected path of policy over time.

Unfortunately, just as the current interest rate is an ambiguous indicator of the stance of monetary policy, forward guidance as to the future path of interest rates can be interpreted in multiple ways. Would a promise to hold the federal funds rate at zero for 20 years be interpreted by markets as highly expansionary or as a promise to adopt a Japanese-style monetary regime of near-zero nominal GDP growth? As discussed earlier,

very low rates are consistent with both expansionary and contractionary policy. So how might the central bank signal *expansionary intent*?

In Svensson's 2001 proposal for a foolproof escape from a liquidity trap, the zero-lower-bound constraint was overcome by targeting exchange rates, and there is good reason to believe that exchange rate targeting can be a powerful tool.⁴⁶ When President Roosevelt raised the price of gold from \$20.67 an ounce to \$35.00 an ounce in 1934, the expected future price level likely rose significantly as a result, because the real value of gold in the long run is linked to the marginal cost of production,⁴⁷ and thus a higher nominal gold price implies a somewhat higher price level in the long run.⁴⁸

Before the devaluation of the dollar, the Fed had cut interest rates close to zero and also engaged in QE (during the spring of 1932). These policies did not lead to a robust recovery. In contrast, the dollar devaluation of 1933/34 led to substantial inflation, despite 25 percent unemployment, and rapid growth in industrial production. This result supports the view that exchange rate-oriented policies are more stimulative than policies of lower interest rates, at least in a deflationary slump.

Unfortunately, President Roosevelt's policy would not work today. An increase in gold prices would no longer be viewed as a credible indicator of monetary stimulus, because no one would expect the Fed to maintain the new and higher price for decades (as they did after 1934). In addition, exchange rate manipulation by a country as large as the United States would not be acceptable to its trading partners (and vice versa).

To achieve the same effect as the 1933/34 dollar devaluation, a modern central bank would have to go beyond targeting a single price and instead target the overall price level. Thus, in 2012, Michael Woodford suggested that forward guidance for interest rates should be linked to a target path for the price level, or better yet for the level of nominal GDP (which better reflects the Fed's dual mandate).⁴⁹ When the price level falls below the target path, expectations of faster future inflation have the effect of lowering the real interest rate on longer-term bonds. This effect pins down the long-run average rate of inflation and thus allows market participants to discriminate between a

46. Svensson, "The Zero Bound in an Open Economy."

47. See Robert J. Barro, "Money and the Price Level under the Gold Standard," *Economic Journal* 89, no. 353 (1979): 13–33.

48. See Gauti B. Eggertsson, "Great Expectations and the End of the Depression," *American Economic Review* 98, no. 4 (2008): 1476–516. The link between gold prices and goods prices was weakened by the prohibition on Americans owning gold, but not eliminated. An international gold market remained, so \$35 actually was the free-market price of gold for many decades after 1934.

49. Michael Woodford, "Methods of Policy Accommodation at the Interest-Rate Lower Bound" (working paper, Columbia University, 2012). Beckworth shows how nominal GDP level targeting is a way to overcome the problem that temporary currency injections are ineffective. See David Beckworth, "Permanent versus Temporary Monetary Base Injections: Implications for Past and Future Fed Policy," *Journal of Macroeconomics* 54, part A (2017): 110–26.

contractionary (NeoFisherian) low interest rate policy and an expansionary (Keynesian) low interest rate policy. The Fed's recent decision to adopt *average inflation targeting* is a modest, albeit inadequate, step in this direction.

In a sense, the current focus on interest rates as an instrument and indicator of policy reflects a *missing market*. With regard to a simple price-level target for an actively traded commodity, such as a gold exchange standard, interest rate targeting is redundant. There is no difference between doing enough open market purchases and sales to keep gold prices at \$35 an ounce and doing enough open market purchases and sales to keep interest rates at a level that will push gold prices to \$35 an ounce. Interest rates become a sort of fifth wheel when the central bank can directly target gold prices, or indeed any flexible asset price. The problem, of course, is that keeping gold at \$35 an ounce does not necessarily achieve the broader goals of the Fed's dual mandate. In addition, the Fed cannot directly peg the overall consumer price index (CPI), which includes prices that are both sticky and measured with a significant lag.

In principle, open market operations could be used to peg a CPI *futures* contract price in much the same way as gold prices were pegged before 1968. There would be no need to worry about the ambiguity of a target interest rate path. However, if such a CPI futures market does not exist or is not liquid enough to be viewed as an unbiased estimate of the future price level, then central banks may fall back on a policy that involves interest rate targeting guided by complex and sometimes unreliable macroeconomic models.

Nonetheless, the insights derived by considering a price-level futures market are useful for thinking about monetary policy at the zero lower bound. In 2003, Svensson argued that central banks should engage in "forecast targeting," which means setting policy at a position where the central bank forecast of the goal variable (consumer prices or nominal GDP growth) is equal to the target growth rate.⁵⁰ Richard Clarida, the former Fed vice chair, suggested that when forecasting inflation, he puts weight on both the forecasts of economists and the implied inflation forecasts in asset markets:

Market- and survey-based estimates of expected inflation are correlated, but, again, when there is a divergence between the two, I place at least as much weight on the survey evidence as on the market-derived estimates.⁵¹

If one combines Svensson's general approach with Clarida's specific forecasting technique, then one can see how monetary policy might move beyond interest rate targeting. Consider a composite inflation forecast that includes both nonmarket and market components. The Fed could update this inflation forecast every time asset prices changed (in other words, many times each day). Even though the nonmarket forecast of

50. Lars E. O. Svensson, "What Is Wrong with Taylor Rules? Using Judgment in Monetary Policy through Targeting Rules," *Journal of Economic Literature* 41, no. 2 (2003): 426–77.

51. Richard H. Clarida, "Models, Markets, and Monetary Policy," in *Strategies for Monetary Policy*, ed. John H. Cochrane and John B. Taylor (Stanford, CA: Hoover Institution Press, 2020), 13.

inflation changes infrequently, any composite forecast including asset prices would react continually in real time to policy innovations. In principle, targeting an optimal forecast of inflation one or two years in the future is little different from targeting an exchange rate or the price of gold.

The Fed could instruct its Open Market Trading Desk to engage in sufficient open market purchases and sales to essentially peg the inflation forecast at a position equal to the policy target. Thus, suppose the inflation forecast based on non-real-time data (consensus forecast of private economists plus the Fed's macro models) predicts 2.2 percent inflation during the current month. That forecast might be given a 50 percent weight in the Fed's forecast of inflation. In that case, the Fed would engage in open market operations with the goal of producing an asset market forecast of 1.8 percent inflation, so that the overall inflation forecast was 2 percent.

This approach does not necessarily require a 1.8 percent Treasury Inflation-Protected Securities (TIPS) spread, partly because (a) TIPS are adjusted according to CPI inflation, whereas the Fed targets personal consumption expenditure inflation, and (b) the Fed may have *some* ability to estimate a risk or liquidity premium that biases the TIPS spread away from the actual market forecast of inflation. In other words, although one could imagine asset prices being used to create a completely *rules-based model*, strictly speaking this approach is equally compatible with a fair degree of policy discretion. The point is to remove the need for Taylor rule-type models from policy making, because interest rate targeting tends to be especially unreliable during periods of near-zero interest rates or an unstable natural interest rate.

Thus, the ultimate goal should be to remove interest rates entirely from the policy-making process. To do that, one needs to develop a flexible price target that is highly correlated with the optimal forecast of the goal variable (inflation or nominal GDP). If such a price forecast can be created, then open market operations can directly target asset prices, rather than indirectly influence inflation expectations by manipulating interest rates according to a macroeconomic model.⁵²

Even without an efficient asset market to guide monetary policy, it is important to avoid ambiguous forward guidance of the future path of interest rates. At the zero bound, central banks should commit to purchasing whatever amount of assets is necessary (perhaps combined with negative IOER) to reach the price level (or nominal GDP level) target path over time. A vague promise to keep interest rates near zero indefinitely is equally consistent with Japanese-style stagnation. It is not enough.

The Fed should also consider eliminating (or at least reducing) the payment of interest on bank reserves. Although Ireland showed that the price level could be controlled via open

52. Scott B. Sumner, "Nudging the Fed toward a Rules-Based Policy Regime," *Cato Journal* 36, no. 2 (2016): 315–35.

market operations even in a regime with IOER,⁵³ the quantity of bonds that the Fed would need to purchase to achieve a given-size price increase would be substantially larger, and a bloated Fed balance sheet might raise some tricky political economy issues. Before 2008, the Fed operated quite effectively without paying any IOER.

Moving Past the Keynesian-NeoFisherian Dispute

I have discussed the ideas in this chapter with a number of other economists, in a variety of settings. One common response is to argue that I have oversimplified the standard view of monetary policy, that most good economists are aware of the pitfalls in using interest rates as indicators of the stance of policy. Reasoning from a price change is not a problem.

Arguably, there is some validity to criticisms of oversimplification in this chapter. Nonetheless, the fact that a number of highly distinguished economists have staked out radically different positions on the relationship between interest rates and monetary policy shows that mainstream monetary theory has a serious problem. NeoFisherians believe that Keynesians are wrong in claiming that lower interest rates are expansionary. Keynesians believe NeoFisherians are wrong in claiming that lower interest rates are disinflationary. At least one group is wrong; I would argue both are wrong.

Peter Ireland recently suggested that interest rates were not enough and that control of the money supply was also necessary to pin down the price level.⁵⁴ In the comment section, John Cochrane responded that pegging the interest rate and allowing the money supply to respond endogenously should be enough.⁵⁵ (Ironically, elsewhere Cochrane has challenged the dominant [Keynesian] view of how interest rates affect the economy. If one returns to the bus analogy, having both Keynesians and NeoFisherians advocate that interest rate targeting would be like a bus passenger expressing confidence in the bus driver's steering mechanism, even though the passenger thought turning the steering wheel to the left made the bus go to the left, whereas the bus driver believed that turning the wheel to the left made the bus go to the right!) In any case, Ireland responded,

This is what you hear from central bankers during a hyperinflation. They'll say, "But we have to keep printing money to keep up with the demand, because the price level is rising so fast." I'm uneasy about an intellectual framework that appears to suggest, in

53. Ireland, "Macroeconomic Effects of Interest on Reserves."

54. Peter N. Ireland, Discussant Remarks for "Perspectives on US Monetary Policy Tools and Instruments," in *Strategies for Monetary Policy*, ed. John H. Cochrane and John B. Taylor (Stanford, CA: Hoover Institution Press, 2020), 173–216.

55. Ireland, Discussant Remarks, 207.

exactly the same way, that an expansion in a nominal magnitude is just done exclusively to accommodate demand.⁵⁶

In fairness to Cochrane, the end of the famous German hyperinflation looks very NeoFisherian, when both inflation and interest rates suddenly plunged to low levels in 1924. Of course, that plunge does not mean that the German hyperinflation was ended by cutting interest rates. Nonetheless, monetary policies that are highly effective (such as Svensson's foolproof escape from a liquidity trap) often look more NeoFisherian than Keynesian.

Interestingly, Cochrane has suggested a special case where Keynesians might be correct, while Mariana García-Schmidt and Michael Woodford have suggested a special case where NeoFisherians might be correct.⁵⁷ However, each paper found its hypothesized special case to be implausible. Cochrane suggests that the Keynesian result occurs only under a very specific assumption about fiscal policy, whereas García-Schmidt and Woodford argue that the NeoFisherian result requires completely rational expectations. Both sides seem too willing to dismiss the empirical relevance of the alternative hypothesis, because one can easily sketch out exchange rate paths that yield either outcome and find empirical examples of just such policies.

The Keynesian-NeoFisherian dispute cannot be resolved if one starts with the assumption that interest rate adjustments represent monetary policy and, therefore, all one needs to do is determine the effect of a change in interest rates. That is reasoning from a price change. If one reframes the debate by looking at how monetary policy shocks affect spot and forward exchange rates, or nominal GDP growth expectations, then previously puzzling issues suddenly become much clearer.

If the analysis in this chapter is correct, then interest rate changes should be viewed as an epiphenomenon—just one of many effects of a change in monetary policy—and far from the most powerful part of the transmission mechanism. Whether a reduction in interest rates is a side effect of easier money or tighter money depends on a wide range of circumstances, including the expected future path of the money supply, exchange rates, or both. Movements in interest rates are not that important, once one has considered other indicators, such as exchange rates and the money supply.

At a minimum, the Keynesian-NeoFisherian debate is clear evidence that something is wrong with using interest rates as a policy indicator. I suspect that flaws in the way policymakers interpret interest rates have played an important role in the failure of many central banks to achieve their inflation targets in recent years. Fixing the problem will

56. Ireland, Discussant Remarks, 208.

57. Cochrane, "Michelson-Morley, Fisher, and Occam"; García-Schmidt and Woodford, "Are Low Interest Rates Deflationary?"

require the development of less ambiguous indicators of the stance of monetary policy, indicators that include highly flexible asset prices.

One recent paper suggests that economists are already moving in this direction. Marek Jarociński and Peter Karadi show that “a surprise policy tightening raises interest rates and reduces stock prices, while the complementary positive central bank information shock [i.e., more optimistic growth forecast] raises both.”⁵⁸ Stock prices are an imperfect indicator of demand shocks, and ultimately one can expect economists to develop even better market indicators of monetary policy shocks.

Summary

Interest rates are widely viewed as a reliable indicator of changes in the stance of monetary policy, with lower rates viewed as a more expansionary policy, and vice versa. This is an example of reasoning from a price change.

There are two reasons that lower interest rates may not indicate easier money. First, a Fed announcement that leads to lower rates may contain other information that reduces the natural interest rate even more sharply. For instance, if the policy announcement leads to expectations of lower inflation, then lower interest rates may reflect the Fisher effect from a tight money policy. The January 2015 Swiss devaluation is an example. Second, when the natural rate of interest falls for nonpolicy reasons, the Fed often reduces its target interest rate less sharply, effectively tightening policy. The severe slumps of 1929–1933 and 2007–2009 are two examples of this phenomenon.

Some of the problems associated with using interest rates as a policy indicator can be avoided by using alternative variables, such as the money supply, exchange rates, and other asset prices. However, these variables are also affected by nonmonetary factors and do not always provide a reliable policy indicator. In my view, market indicators of inflation expectations or, better yet, market forecasts of nominal GDP growth expectations are the best policy indicator.

Although interest rates are not a reliable policy *indicator*, central banks may find rates to be a useful policy *instrument*. For instance, interest rate targeting performed relatively well during the Great Moderation of 1984–2007. In recent years, however, the zero bound has become an increasingly important constraint in many developed economies. In this environment, the short-term interest rate is no longer a reliable policy instrument. Instead, central banks should consider alternative instruments, such as exchange rates (in small economies) and market inflation forecasts (in large economies).

58. Marek Jarociński and Peter Karadi, “Deconstructing Monetary Policy Surprises—The Role of Information Shocks,” *American Economic Journal: Macroeconomics* 12, no. 2 (2020): 1.

Because central bankers are reluctant to rely exclusively on market inflation forecasts, the Fed should consider a hybrid policy target that is a weighted average of model-based inflation forecasts and (liquidity-adjusted) inflation forecasts derived from asset prices. The Fed could use open market operations to target these forecasts directly, without any target interest rate. Doing so would not preclude continuing the payment of interest on bank reserves at a floating rate slightly below short-term market interest rates.

Chapter 7: A Critique of Modern Monetary Theory

In recent years, a heterodox model called *Modern Monetary Theory* (MMT) has gained adherents. For those who follow the policy debate in the media, this theory is most often associated with advocates of expansionary fiscal policy, perhaps financed by money creation. A federal jobs guarantee is another important MMT policy idea. But theories are about more than real-world policies, and it is important to understand the theoretical model that underlies these policy recommendations.

Mainstream economists have been somewhat dismissive of MMT, even where they might agree with particular MMT fiscal policies in the special case of a *liquidity trap*, that is, in a world of zero interest rates. Brad DeLong complained that the model is mislabeled, that it is neither modern nor about money nor a theory.¹ One might call it an old fiscal tautology. I will show that to accept Modern Monetary Theory, one must reject modern monetary theory—that is, the current view of mainstream economists on the role of monetary policy.

In this chapter, I begin with an explanation of how MMTers view the role of fiscal policy. I show that they overestimate the role of fiscal policy precisely because they *underestimate* the importance of monetary policy. In addition, MMTers are too dismissive of the constraints faced by governments that wish to borrow money to finance spending.

The biggest problem with MMT, however, is its model of monetary policy, which is deficient in a number of respects. In the second section, I discuss why MMTers deny that monetary policy determines the path of aggregate demand, and hence why in their view it is pointless to give central banks a 2 percent inflation target. They see the path of inflation as being determined by fiscal policy.

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1. Brad DeLong, “Is ‘Modern Monetary Theory’ Modern or Monetary or a Theory?,” *Grasping Reality by Brad DeLong* (blog), April 15, 2011.

MMT Views on Fiscal Policy

Economists William Mitchell, Randall Wray, and Martin Watts have written an undergraduate macroeconomics textbook that uses the MMT approach.² They define private-sector *net saving* as follows:

$$(GNP - C - T) - I \equiv (G - T) + (X - M + FNI) \quad (7.1)$$

The terms in equation (7.1) are relatively easy to understand now. The term $(GNP - C - T)$ represents total income less the amount consumed by households less the amount paid by households to government in taxes net of transfers. Thus, it represents household saving.

The left-hand side of Equation (7.1), $(GNP - C - T) - I$, thus is the overall net saving of the private domestic sector, which is distinct from total household saving (S) denoted by the term $(GNP - C - T)$.³

The equation itself is fine, as it merely rearranges terms in the national income identity. The definition of private sector net saving, however, is radically different from the way mainstream economists define the term. This can be seen most easily in a closed economy where there are no trade imbalances, or alternatively using the entire global economy. In that case, the MMT net saving identity reduces to

$$(GNP - C - T) - I = (G - T)$$

In plain English, in the MMT closed economy model, net saving equals the budget deficit. To a mainstream economist, $(GNP - C - T)$ by itself represents private-sector gross saving, and to get net saving, one subtracts depreciation. In contrast, MMTers define private-sector net saving as the difference between private-sector gross saving (conventionally defined) and investment spending. Because aggregate saving must equal aggregate investment, any excess private-sector saving represents negative public-sector saving, that is, the budget deficit $(G - T)$.

I don't think it is a good idea to radically redefine basic economic terms in an undergraduate textbook on macroeconomics, as students would be hopelessly confused if they later took a mainstream economics course. But the biggest problem with MMT is not semantics; it is the way the authors seem to draw *causal* implications from a tautology. The authors claim,

If the external account is in deficit and the private domestic sector is saving overall, then the drain on aggregate demand would require the government to run a deficit of

2. William Mitchell, L. Randall Wray, and Martin Watts, *Macroeconomics* (London: Red Globe Press, 2019).

3. Mitchell, Wray, and Watts, *Macroeconomics*, 85.

sufficient size to ensure that the total spending is sufficient to absorb the real productive capacity in the economy.⁴

Identities have no necessary causal implications. Indeed, at one level, the previous statement does nothing more than repeat the fact that net saving is defined by MMTers as the budget deficit plus the trade surplus. The authors are implying that this equation shows that an attempt to save more will *cause* a recession unless the government runs a budget deficit (which is negative public saving).

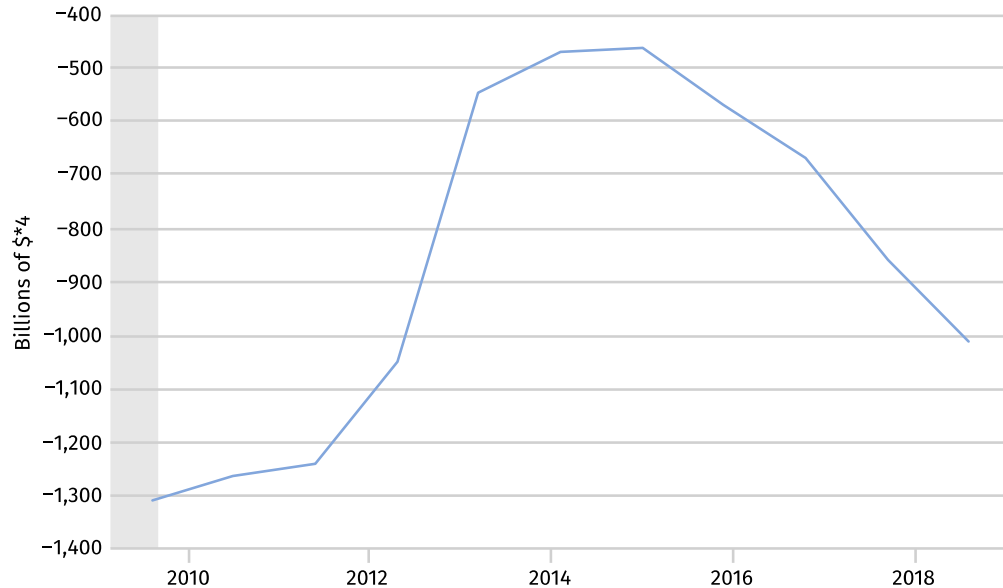
It is certainly *possible* that causation goes from some sort of increased desire to save among the public to reduced aggregate demand. Indeed, in early Keynesian models, there was a concept called the *paradox of thrift*. In these models, if the public tried to save more, it could push the economy into recession. But this is not necessarily the case, as the central bank could offset the effect by easing monetary policy. Again, the national income identity has no causal implications.

In the MMT model, a decreased budget deficit (i.e., “austerity”) is likely to be contractionary and perhaps disinflationary. That’s because a smaller deficit forces the public to engage in less “net saving” (as defined by MMTers, not actual net saving). This will be brought about by a decrease in aggregate demand and thus a reduced national income, which leads to less net saving.

However, this is not what happens in the real world. A near-perfect experiment occurred in 2013, when congressional Republicans forced a sharp move toward austerity. The budget deficit plunged from \$1,061 billion in calendar year 2012 to \$561 billion in calendar 2013. (See figure 7.1.) Yet growth in aggregate demand actually *accelerated*. MMTers missed the fact that the Federal Reserve tries to offset the effect of changes in fiscal policy in order to keep inflation close to 2 percent. Right after the fiscal austerity was announced in late 2012, the Fed adopted a much more expansionary monetary policy. There was no recession in 2013.

4. Mitchell, Wray, and Watts, *Macroeconomics*, 88.

Figure 7.1: Federal Government Budget Surplus or Deficit, 2010–2018



Source: FRED (Federal Reserve Economic Data), Federal Bank of St. Louis, <https://fred.stlouisfed.org/>.

Note: Gray bar indicates period of recession as defined by the National Bureau of Economic Research (NBER).

An even clearer example occurred in 1968, when President Lyndon B. Johnson raised taxes to slow inflation. Even though the federal budget quickly swung into surplus, inflation continued to accelerate because of an expansionary monetary policy. Fiscal policy does not determine aggregate demand.

The exact opposite occurred in 2015–2019, when a doubling of the budget deficit led the Fed to increase interest rates nine times, with the goal of preventing inflation from overshooting its 2 percent target. In retrospect, the Fed overreacted a bit, but the basic point is that monetary policymakers set policy at a position expected to lead to macroeconomic stability. It is monetary policy that determines the path of aggregate demand, not fiscal policy.

To be clear, this isn't just a problem of "causation doesn't imply correlation." Although budget deficits usually get much bigger during recessions, that by itself does not mean that budget deficits are contractionary. That would be confusing correlation with causation, which is not a valid criticism of MMT. But the austerity of 2013 and the fiscal expansion of 2016–2019 were *exogenous shocks*, that is, fiscal policy changes that were not caused by changes in the business cycle.

For instance, the economy was still somewhat depressed in 2013; thus, the budget deficit did not suddenly decline by \$500 billion for cyclical reasons. By 2018/19, the economy was booming; consequently, there was no need to switch to a highly expansionary fiscal policy. The surge in deficit spending in 2018 and 2019 was not caused by an economic slump in the way that the surge in deficit spending during 2008/09 was caused by the

Great Recession. Indeed, both the 2013 and the 2018/19 fiscal shocks reflected domestic political considerations, not stabilization policy.

Rather than being a stabilizing factor, reckless and irresponsible shocks to federal deficit spending often push the Fed to adjust monetary policy to avoid a change in aggregate demand. When the budget deficit is inappropriately enlarged, the Fed responds with tighter money to keep inflation at 2 percent, and vice versa.

In the next section, I will show that MMTers get fiscal policy wrong because they get monetary policy wrong—they underestimate the extent to which monetary policy offsets the impact of fiscal policy changes.

MMT Views on Monetary Policy

During the 1930s, John Maynard Keynes began to question the efficacy of monetary policy, especially when interest rates were near zero. As an alternative, Keynes recommended using fiscal policy to ensure an adequate level of aggregate demand, especially during periods when the public mood turned bearish, business investment plunged, or the propensity to save rose sharply.

MMTers take this idea much further than even Keynes. They aren't just skeptical of the efficacy of monetary policy when interest rates are near zero; they argue that monetary policy is largely ineffective even during normal times, that is, when interest rates are positive.

For instance, when interest rates are positive, mainstream economists believe that open market purchases of bonds by the central bank are highly expansionary and will boost aggregate demand. In contrast, MMTers don't believe that open market operations have a significant impact on the economy, even if they enlarge the size of the monetary base. Here is Mitchell, Wray, and Watts:

Second, [MMTers] would challenge the theory of inflation based on [the quantity theory of money], and argue that if a fiscal deficit gives rise to demand pull inflation, then the *ex post* composition of $\Delta B + \Delta Mb$ in Equation (21.1) is irrelevant. Overall spending in the economy is the driver of the inflation process, and not the *ex post* distribution of net financial assets created between bonds and base money.⁵

Thus, MMTers claim that money-financed deficits are no more inflationary than bond-financed deficits. This is an extremely radical claim, which would not be accepted by most economists, at least when interest rates are positive.

Let's go back to 1998, when the monetary base was roughly \$500 billion and risk-free short-term interest rates were about 5 percent. In mainstream economic models, a Fed

5. Mitchell, Wray, and Watts, *Macroeconomics*, 342.

purchase of another \$500 billion in bonds, paid for with newly issued base money, would be highly expansionary and highly inflationary. This action would immediately double the size of the monetary base.

Monetarists would explain the effects by focusing on the increased money supply. There would be a surge in spending as the public and banks tried to get rid of *excess cash balances*. Keynesians would focus on the role of interest rates. The huge open market purchase would push rates much lower—probably to zero—leading to a surge in aggregate demand.

MMTers take the Keynesian model as a starting point and assume that this sort of large open market purchase would drive rates down close to zero. But MMTers don't believe that interest rates have much impact on aggregate spending.

Because MMTers don't believe that money creation is inflationary, they don't worry about the burden of a large government debt, at least for countries with their own currency. They argue that there is no danger of default, as the government could repay the debt by printing money. That may be true in a technical sense; but throughout history, a policy of monetizing debts has often led to hyperinflation.

So where does this heterodox MMT view of money come from? Just as with the net saving equation discussed earlier, the MMT model of money includes claims that do not mean what MMTers think they mean. Their model of money is often summed up in a series of maxims:

- Banks don't lend out reserves.
- There is no money multiplier.
- Money is endogenous.
- There is no natural interest rate (other than zero).

In each case, there is a kernel of truth, and in each case, MMTers draw implications that go far beyond what is justified by the narrow sense in which each statement has validity.

For instance, when banks make loans, they often credit the borrower's account at the bank. MMTers point out that unless the borrower withdraws the funds as cash, there is no *direct* impact on the total aggregate stock of bank reserves. But this does not mean that a Fed injection of new reserves into the banking system has no *indirect* impact on the quantity of loans. Here's Paul Krugman responding to MMT criticism of his claim that increased bank reserves will spur more lending:

When we ask, "Are interest rates determined by the supply and demand of loanable funds, or are they determined by the tradeoff between liquidity and return?", the correct answer is "Yes"—it's a simultaneous system.

Similarly, if we ask, "Is the volume of bank lending determined by the amount the public chooses to deposit in banks, or is the amount deposited in banks determined by the amount banks choose to lend?", the answer is once again "Yes"; financial prices adjust to make those choices consistent.

Now, think about what happens when the Fed makes an open market purchase of securities from banks. This unbalances the banks' portfolio—they're holding fewer securities and more reserve—and they will proceed to try to rebalance, buying more securities, and in the process will induce the public to hold both more currency and more deposits. That's all that I mean when I say that the banks lend out the newly created reserves; you may consider this shorthand way of describing the process misleading, but I at least am not confused about the nature of the adjustment.⁶

To mainstream economists, everything in the macroeconomy is interrelated. That is what Krugman meant by suggesting that “it's a simultaneous system.” Thus, although some bankers might believe that a Fed open market purchase of Treasury bonds makes their banks no more likely to make a loan to the local property developer, economists see an open market operation as setting in motion a series of changes in asset prices that affect the economy through what is sometimes called a *money multiplier*.

MMTers often say that there is no money multiplier. If that means the money multiplier is often unstable, then the claim is true. But mainstream economists have always understood that the money multiplier can be unstable at times. MMTers seem to go even further, denying that an injection of reserves into the banking system will boost lending, deposits, and, ultimately, nominal GDP. That claim is not valid. Indeed, when interest rates are positive, a doubling of the monetary base will double all nominal variables in the long run, including the broader monetary aggregates (M1 and M2), the price level (consumer price index), and nominal GDP.

When confronted with thought experiments such as the effect of doubling the money supply, MMTers respond that the central bank is unable to control the money supply. On closer inspection, however, their actual claim is that the money supply is endogenous if the Fed is targeting interest rates at a positive level.⁷ In other words, they believe the Fed must passively adjust the money supply to hit their interest rate target.

Once again, there is a grain of truth in the MMT claim that the money supply is endogenous when the central bank targets interest rates. But MMTers overlook the fact that interest rates are also endogenous when the central bank targets inflation. The central bank must passively adjust interest rates as necessary to hit the 2 percent inflation target. Yet MMTers view interest rates as the instrument of monetary policy.

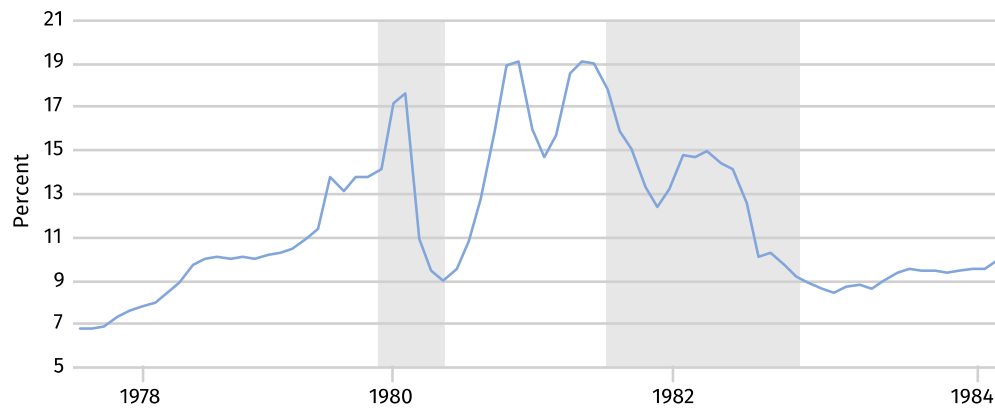
More important, endogeneity doesn't mean what MMTers think it means. It doesn't mean that central banks cannot, do not, or should not control the money supply; it just means that to do so, the central bank must allow interest rates to fluctuate. But we

6. Paul R. Krugman, “Bans and the Monetary Base (Wonkish),” *Paul Krugman* (blog), *New York Times*, August 16, 2013.

7. Even MMTers concede that the Fed can control the monetary base when interest rates are zero, or interest is paid on bank reserves; I focus on the positive interest rate case where MMTers' views are most distinctive relative to those of mainstream economists.

know that central banks are willing to adjust their interest rate target quite actively, if that is what is required to control the money supply and inflation. Look at how sharply interest rates moved around during 1979–1982, when Paul Volcker’s Fed was willing to allow dramatic moves in short-term interest rates to get the money supply and inflation under control, as shown in figure 7.2.

Figure 7.2: Effective Federal Funds Rate, 1978–1984



Source: FRED, Federal Reserve Bank of St. Louis, <https://fred.stlouisfed.org/>.

Note: Gray bars indicate NBER-defined periods of recession.

Even if the Fed is targeting interest rates, it remains true that an adjustment in the interest rate target (say a rate cut) that leads to an increase in the money supply will have the same sort of multiplier effect on the economy that would occur if the central bank simply injected money without worrying about the impact on interest rates.

The central bank of Singapore targets exchange rates, not interest rates. In Singapore, both the interest rate and the money supply are endogenous. But its decision about where to set exchange rates affects both interest rates and the money supply. And those policy decisions affect the economy just as much as if they were directly targeting the money supply or interest rates.

Ultimately, MMTers seem confused about the meaning of *endogenous*. Variables are not inherently exogenous or inherently endogenous. Instead, economists treat variables as exogenous or endogenous for purposes of convenience. An endogenous variable is a variable explained by the model being considered, whereas an exogenous variable is one that is not explained by the model.

MMTers assume that saying “money is endogenous” is equivalent to saying that the central bank cannot control the quantity of money. Not so. It merely indicates that to control the stock of money, the central bank must allow variables such as exchange rates and interest rates to move around.

As long as the Fed targets interest rates at a fixed rate, say 2.25 percent, it has no independent ability to adjust the monetary base. But if central banks wish to increase the

monetary base, they can simply engage in open market purchases and simultaneously reduce their target interest rate. At this point, MMTers would argue that any attempt to force significantly more base money into the economy would quickly reduce interest rates to zero. This is not necessarily the case, as MMTers tend to ignore the role of the *natural rate of interest*.

Economists generally define the natural interest rate as the short-term interest rate that will lead to macroeconomic equilibrium. For simplicity, define the natural interest rate as the interest rate setting that allows the Fed to hit its 2 percent inflation target. This rate is sometimes viewed as being policy invariant, which is not the case. If previous Fed policy has been much too tight, producing a severe recession, then the interest rate setting required to hit a 2 percent inflation target will be lower than if previous monetary policy had been expansionary. The natural interest rate moves around for many reasons, including factors related to monetary policy. It almost always declines during recessions.

Unfortunately, the fact that the natural interest rate moves around over time doesn't mean what many people seem to think it means. Contrary to the assumption of MMTers, an injection of new base money into the economy can easily raise both the natural rate of interest and actual market interest rates. This result occurs because monetary stimulus boosts both inflation and (in the short run) real GDP. An inflationary or booming economy will have a higher natural rate of interest because of the income effect and the Fisher effect.

In the previous thought experiment where the Fed suddenly doubled the monetary base back in 1998, MMTers would assume the action would immediately push interest rates down to zero. But it is at least as likely that this action could produce extremely *high* inflation, which would push interest rates up into double digits. There are many examples in Latin America and elsewhere where rapid money supply growth is associated with high inflation and high nominal interest rates.

The income effect is also quite important. During a recession, interest rates tend to fall, as there is less borrowing to finance investment spending. MMTers see this decline as representing "monetary policy," but interest rates declined during recessions even before the Fed was created. Because MMTers see all interest rate movements as representing monetary policy, they even deny that a positive "investment–saving (IS) shock" (such as a housing boom or a tech boom) would push up interest rates. Here are Mitchell, Wray, and Watts:

The fact that the money supply is endogenously determined means that the LM [liquidity preference–money supply] schedule will be horizontal at the policy interest rate. All shifts in the interest rates are thus set by the central bank and funds are supplied elastically at that rate in response to the demand. In this case, shifts in the IS curve would not impact on interest rates. From a policy perspective this means the

simple notion that the central bank can solve unemployment by increasing the money supply is flawed.⁸

Once again, MMTers misunderstand the concept of endogeneity, as the final two sentences don't follow from the first two sentences. Because central banks target inflation, an investment shock will lead central banks to adjust their interest rate target to avoid missing their inflation target. This is why changes in the business cycle do affect interest rates.

Indeed, market interest rates respond even before the central bank adjusts its official interest rate target. Thus, the election of Donald Trump in November 2016 immediately led to higher market interest rates, as investors looked ahead to the impact of his proposed corporate tax cut. To claim that central banks determine the path of interest rates is like claiming that a little boy that runs out ahead of a Rose Bowl parade is determining the path of the parade through the city.

In the first two sections, I explained how adherents of Modern Monetary Theory overestimate the role of fiscal policy because they *underestimate* the role of monetary policy. MMT denies that monetary policy determines the path of aggregate demand, rendering it pointless to give central banks an inflation target. In the next section, I show where MMT fits on the ideological spectrum, relative to other schools of thought. On a wide range of issues, MMT occupies a position on one extreme of the ideological spectrum, whereas Chicago School economists such as Milton Friedman are at the other extreme. Finally, I examine why MMTers have difficulty communicating their ideas to other economists.

Putting MMT onto the Ideological Spectrum

One way to understand the views of MMTers is to compare their beliefs about a wide range of issues with those of mainstream economists, as well as those on the other end of the ideological spectrum. First, a word of caution; not all MMTers hold the same views.

As an analogy, most Keynesians are left of center, but Martin Feldstein was a relatively conservative Keynesian, as is Gregory Mankiw. While Keynesians often favor government spending during a slump, the basic Keynesian model also suggests that tax cuts can provide economic stimulus when demand is depressed. Similarly, not everyone who is skeptical of the efficacy of monetary policy is left wing.

Nonetheless, MMTers do tend to be left of center on a wide range of issues. There are a striking number of examples where the MMT view is almost the exact opposite of the

8. Mitchell, Wray, and Watts, *Macroeconomics*, 464.

views of “Chicago School” economists, such as Milton Friedman. Here are a few examples:

- Chicago School economists see the supply-and-demand model as applicable to a wide range of industries—even many industries that are less than perfectly competitive. MMTers tend to be skeptical of the usefulness of supply-and-demand models, whereas mainstream economists are somewhere in between the two extremes.

- Chicago School economists favor free-market policies in the overwhelming majority of cases. Mainstream economists believe that free-market policies are often appropriate. The MMT textbook written by Mitchell, Wray, and Watts is highly skeptical of “neoliberalism” and suggests that free-market ideology has become a sort of religion, accepted as a matter of faith. Many MMTers advocate a more activist government, including a guaranteed jobs program.

- Chicago School economists do not believe there is much value in talking to bankers when trying to understand how monetary policy works. In their model, an injection of reserves into the banking system leads to changes in a wide range of asset prices, which indirectly lead banks to engage in more lending. MMTers believe that knowledge of the nuts and bolts of the banking industry is highly important when trying to understand monetary policy. Because bankers report that the availability of reserves is not a constraint on lending, this makes MMTers skeptical of the efficacy of monetary policy.

- Chicago School economists believe that the concept of opportunity cost is extremely important and applies to almost all policy debates. Mainstream Keynesians believe that opportunity costs are often an important consideration. In contrast, MMTers believe that the economy is generally well below full employment, and thus there is no opportunity cost to additional government expenditure.

- Chicago School economists are extremely skeptical of the “Phillips curve” approach to business cycles and inflation. Milton Friedman developed a model of the *natural rate of unemployment* where there was a short-run trade-off between inflation and unemployment, but no long-run trade-off. Mainstream economists mostly agree with Friedman but allow for the possibility that there might be some long-run trade-off due to the effect of unemployment on job market skills and employability. This idea, termed hysteresis, suggests that on some occasions the actual rate of unemployment can get stuck well above the natural rate. MMTers are at the other extreme from the monetarists. In their view, aggregate demand determines the unemployment rate, even in the long run. They are quite skeptical of claims that unemployment will automatically adjust back to the natural rate once inflation expectations adjust to actual inflation.

- Chicago School economists favor employing monetary policy to control nominal spending and are highly skeptical of the efficacy of fiscal policy. Mainstream economists favor a mix of the two, whereas MMTers prefer fiscal policy and are skeptical of the efficacy of monetary policy.

- Chicago School economists argue that it is most useful to treat money as exogenous, that is, under control of the central bank, at least under a fiat money regime. Mainstream

economists treat money as endogenous in short-run models with interest rate targeting, and exogenous in long-run models trying to explain large changes in the trend rate of inflation. MMTers treat money as being almost completely endogenous.

- Chicago School economists believe that changes in interest rates primarily reflect the income and Fisher effects. Thus, falling interest rates are usually an indication that money has been tight in the recent past. Mainstream economists view interest rates as being heavily influenced by monetary policy (the liquidity effect), but also reflecting the income and Fisher effects, especially in the long run. MMTers see interest rates as almost entirely reflecting monetary policy, at least under a fiat money regime. They mostly ignore the income and Fisher effects and reject models of the “natural rate of interest.”

- Chicago School economists see investment being determined by savings rates. Mainstream economists see investment being determined by savings rates during normal times, but also worry about a “paradox of thrift” when interest rates are extremely low. In this view, an attempt by the public to save more may end up depressing national income, and in the end neither saving nor investment will increase. MMTers see the paradox of thrift as being the norm, even when interest rates are positive.

- Chicago School economists believe high inflation is caused by excessive money growth. Mainstream economists see high inflation as being caused by a mix of monetary policy and supply shocks. MMTers see high inflation as mostly reflecting aggregate supply problems.

MMT Tends to Have More Appeal to Noneconomists

During my three decades of teaching economics, I often encountered students who were confused by certain economic theories. For instance, students would often have trouble understanding how the income and Fisher effects impacted interest rates, as they were so used to thinking of interest rates as being set by the central bank. I would frequently find myself in a position of needing to correct these “myths” about monetary economics. Those same students would likely be much more open to the MMT view of interest rate determination, which focuses almost exclusively on the role of the central bank.

Noneconomists often see Japanese monetary policy as being highly expansionary because interest rates in Japan have been close to zero for the past quarter century. Mainstream economists would generally attribute those low interest rates to the negative impact of extremely low rates of growth in prices and output. In contrast, MMTers often point to Japan as a sort of success story, demonstrating that a central bank can arbitrarily hold interest rates down to zero for an extended period

But if Japan is an MMT success story, it is a very peculiar one.⁹ Since the mid-1990s, Japan has seen by far the weakest growth in aggregate demand of any major industrial economy—perhaps the slowest growth in modern history. Some conservative economists don't see that as a big problem—after all, Japan has fairly low unemployment—but MMTers view growth in aggregate demand as the *sine qua non* of a healthy economy. Thus, it is odd to single out a “success story” that achieved low interest rates by an extraordinarily slow rate of growth in nominal spending.

Mainstream economists often complain that MMT theories are difficult to understand. Previously, I discussed their odd definition of “net saving”; but there are other communications barriers as well. Paul Krugman compared debating MMTers to playing Calvinball—just when you've addressed one issue, you are told that they are actually making a different point. Here, Paul Krugman tries to get a prominent MMTer to answer some specific questions on monetary and fiscal policy:

Are MMTers claiming, as Kelton seems to, that there is only one deficit level consistent with full employment, that there is no ability to substitute monetary for fiscal policy? Are they claiming that expansionary fiscal policy actually reduces interest rates? Yes or no answers, please, with explanations of how you got these answers and why the straightforward framework I laid out above is wrong. No more Calvinball.¹⁰

And here's how Stephanie Kelton responded:

Quick responses first, followed by explanations behind my thinking.

#1: Is there only one right deficit level? Answer: No. The right deficit depends on private behavior, which changes. MMT would set public spending *always* to the level required to achieve full employment, and then accept whatever deficit may result.

#2: Is there no ability to substitute monetary for fiscal policy? Answer: Little to none. In a slump, cutting interest rates is weak tea against depressed expectations of profits. In a boom, raising interest rates does little to quell new activity, and higher rates could even support the expansion via the interest income channel.

#3: Does expansionary fiscal policy reduce interest rates? Answer: Yes. Pumping money into the economy *increases* bank reserves and *reduces* banks' bids for federal funds. Any banker will tell you this.¹¹

Here, it seems like Kelton has not understood Krugman's questions. In context, it is clear that she thinks the answer to the first question is yes, and yet she says no. Indeed, she

9. Ben Dooley, “Modern Monetary Theory's Reluctant Poster Child: Japan,” *New York Times*, June 5, 2019.

10. Paul R. Krugman, “Running on MMT (Wonkish),” *New York Times*, February 25, 2019. Another term for this game is “whack-a-mole.”

11. Stephanie Kelton, “Paul Krugman Asked Me about Modern Monetary Theory. Here Are 4 Answers,” StephanieKelton.com. Previously published at Bloomberg, March 1, 2019.

wrongly believes the first question is actually two separate questions. Then, she responds to the question about fiscal policy as if Krugman had asked about monetary policy.

On Twitter, Paul Krugman offered a point-by-point rebuttal, and then concluded as follows:

Sorry, but this is just a mess. Kelton's response misrepresents standard macroeconomics, my own views, the effects of interest rates, and the process of money creation.

Otherwise I guess it's all fine.

See what I mean about Calvinball?¹²

Because MMTers define terms such as *saving*, *monetary policy*, and *fiscal space* in a way that is radically different from the definitions used by mainstream economists, it is difficult to engage in a fruitful debate on these issues. It is as if claims must be translated from French into English before their validity can be evaluated.

As a theoretical model, MMT is clearly not ready for prime time. That does not mean that MMT will have no policy impact. Over the past 40 years, the natural rate of interest has been declining steadily in all major economies. This makes deficit spending much more attractive than during the 1980s, and hence it is quite possible that the world will see larger budget deficits and near-zero interest rates for an extended period.

To mainstream economists, those large budget deficits will represent a sensible response to new economic conditions. To MMTers, the low interest rates and large deficits will be seen as proof of the validity of their model; indeed, they often cite the example of Japan. On closer inspection, however, the Japanese case is actually at odds with much of what MMTers have been advocating. Between 1993 and 2012, Japan saw no growth in nominal GDP, despite some of the largest peacetime budget deficits in world history.

During that period, Japan's gross government debt rose from below 100 percent to nearly 240 percent of GDP.¹³ When Prime Minister Shinzo Abe took office at the beginning of 2013, Japan switched to a policy regime combining fiscal austerity and monetary stimulus. After the beginning of 2013, Japan's nominal GDP finally began rising, even as the national debt leveled off.

This pattern is exactly the opposite of what the MMT model would have predicted.

12. Paul Krugman (@paulkrugman), "Stephanie Kelton responds—and I feel a sense of despair 1/," Twitter, March 1, 2019, 3:41 p.m.

13. While some measures of net debt are considerably lower, even that figure rose sharply. In addition, there are also large future pension obligations in Japan, so all these estimates are imprecise.

Conclusion

Modern Monetary Theory adopts some of the ideas of traditional Keynesian economics, including the advocacy of fiscal stimulus in a depressed economy and skepticism about the efficacy of monetary policy. They push this idea much further, however, even questioning the potency of monetary policy in an economy with interest rates well above zero.

Given that my own views on macroeconomics are in some respects out of the mainstream, I do not automatically reject a theory just because it is unconventional. Even if some of their nontraditional claims are valid, however, MMTers are likely to remain a fringe group unless they are able to present their ideas in a way that is intelligible to mainstream economists who might be receptive to some of their policy proposals, especially Keynesians like Paul Krugman. Thus far, they have been unable to do so.

Chapter 8: A Critique of Libertarian Monetary Economics

There is no single libertarian approach to monetary economics. Nonetheless, there are a number of ideas that are often advocated by libertarians:

The United States should adopt a gold standard.

Targeting nominal gross domestic product (NGDP) is a form of central planning.

We should abolish central banks.

The impact of monetary policy depends a great deal on where the new money is injected (Cantillon effects).

In recent decades, central banks have been artificially depressing interest rates.

There is a sort of Fed “put” to prop up asset prices.

Monetary policy creates asset bubbles.

Easy money does more harm than tight money.

In my view, all these ideas are either partly or entirely false. (I should add that some of these views are held by people on the left, particularly the suspicion that monetary policy favors powerful financial interests.)

All That Glitters Isn't an International Gold Standard

Libertarians often argue that the international gold standard worked pretty well, and thus that a gold standard offers a viable alternative to central banking. Although there are no major technical barriers to abolishing the Federal Reserve and adopting a gold standard, it would be a very bad idea. The purchasing power of gold has been highly unstable in recent decades, and an unstable medium of account can cause great macroeconomic instability.

Gold standard proponents don't deny that gold's value has been highly unstable in recent decades but suggest that this is because the world is no longer on the gold standard. They

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argue that if the United States returned to the gold standard, the value of gold would become fairly stable. I don't believe that's true, for several reasons:

1. Gold proponents often cite the period from 1879 to 1913, when the value of gold didn't change much (although there were some year-to-year fluctuations). But that is partly because most of the world was on the gold standard during that period. If the United States went back to a gold standard, the metal's purchasing power would continue to be highly volatile because of shifts in the demand for gold in the rest of the world, especially China and India. The United States' returning to gold would not, by itself, lead to the sort of *international* gold standard that worked tolerably well during 1879–1913.
2. The demand for gold becomes much less stable when interest rates fall to zero. That did not occur much during the so-called classical gold standard. Today, zero interest rates are relatively common, and would be even more common under a gold standard, where the trend rate of inflation would fall from America's 2 percent to Japan's 0 percent. Note that when interest rates did fall close to zero in the 1930s, the demand for gold increased sharply, contributing to deflation.
3. The demand for gold becomes much less stable when there is uncertainty as to the long-run survival of the gold price peg. Even the classical gold standard was not immune to speculative attacks—the deflation of the mid-1890s was partly caused by agitation for the United States to leave the gold standard. That sort of uncertainty is much more likely to occur in today's political climate than in the late 19th century. Today, governments are much more receptive to voter demand for economic “stimulus.”
4. Gold proponents tend to gloss over periods where the gold standard did not work well, such as 1926–1933. They claim that governments mismanaged the interwar system. That's partly true, but what makes them think that governments would not mismanage the system once again? The whole point of the gold standard is to tie the hands of policymakers, to prevent governments from mismanaging currency. Even if you abolish the central bank, the Treasury could easily devalue the dollar against gold. Argentina's currency board collapsed in 2001, despite being a system that was supposedly immune to government interference.

Is NGDP Targeting Central Planning?

In the past, communist regimes would often target real GDP (RGDP). That fact leads some people to wrongly assume that NGDP targeting is “central planning.” Nothing could be further from the truth. Even though the two terms sound quite similar, NGDP and RGDP are conceptually unrelated concepts. In 2008, Zimbabwe had one of the fastest-growing NGDPs in world history, even as its RGDP fell during a deep depression.

You can think of RGDP as “the economy,” the sum total of the production of all final goods and services. It is a physical measure of output. You can think of NGDP as one of many methods used to measure the value of the dollar. Thus, targeting NGDP is essentially the same as targeting the value of the dollar. If the monetary authority targets NGDP at \$20 trillion, then it is setting the value of \$1 to equal 1/20,000,000,000,000th of total spending in the economy. This is no more “central planning” than setting the value of gold at \$2,000 an ounce.

Abolish Central Banks

It is not obvious what a libertarian monetary regime would look like. In earlier centuries, it might have been a commodity money regime where private banks issued currency notes backed by a medium of account, such as gold or silver. Today, the answer is much less clear.

When people discuss a laissez-faire monetary system, they often conflate three separate issues:

1. Should the value of the medium of account be stabilized in terms of something like gold or NGDP? Or should its quantity be fixed according to some formula?
2. Should the monetary system be determined by the government or the private sector?
3. Should banking be regulated, or should we allow free banking?

Because these are three independent questions, the answers can be combined in at least 12 different ways.

I often hear people say things that make no sense to me, such as they oppose NGDP targeting because they favor free banking. Or they want to abolish the Fed because they favor a gold standard. In fact, choosing one does not in any way preclude also choosing the other. We once had a gold standard combined with a central bank, and I favor NGDP targeting combined with free banking.

Here are some feasible systems:

The monetary authority (public or private) might do nothing more than define the US dollar as 1/2,000 ounce of gold. Or it might define the dollar as 1/20,000,000,000,000th of NGDP, as measured by an NGDP futures contract. The first would cause the market price of gold to equal \$2,000 an ounce, whereas the second would stabilize NGDP at \$20 trillion. Alternatively, the monetary authority might fix the monetary base at a constant level.

None of those options are obviously any more libertarian than the other two. In each case, you either artificially fix the value of the dollar or you artificially fix the quantity of dollars. Furthermore, any of those three systems could in principle be determined by

either the government or the private sector. So that makes six possible *monetary* combinations. And for each of those six possible types of monetary systems, you could either regulate the banking system (our current system), or allow a completely unregulated free banking system, even allowing banks to issue banknotes for use as hand-to-hand currency.

My own preference is NGDP targeting, done by the government, combined with a 100 percent unregulated free banking system. But even if you don't agree with me, it is useful to keep the issues separate. The role of the government in monetary policy is one thing. The price or quantity of the medium of account is another thing. And the status of commercial banking regulation is a third thing.

I don't plan to spend much time talking about free banking, because I'm convinced the libertarians are basically correct on that issue.¹ We'd be better off with absolutely no regulations of the banking system (other than laws against fraud).²

Free banking is a banking policy. In this book, however, my focus is on monetary policy, not banking policy. And that's the area where libertarian ideas often fall short.

For instance, what does it mean when libertarians suggest that we should "abolish the central bank"? It is certainly possible to have a system without a central bank—the United States did fairly well in the period before 1913—but it is not at all clear how we could get from here to there. If the Federal Reserve were abolished tomorrow, the United States would not return to the monetary system of 1912. To make things a bit easier to see, let's start with a simpler example: abolishing a smaller central bank.

Paul Simon once wrote a song titled "50 Ways to Leave Your Lover." I imagine there are at least 50 ways in which the Bank of Canada could be abolished. Let's start with the most implausible method:

1. ***Monetary nihilism.*** The Bank of Canada (BoC) could suddenly announce it was closing shop, washing its hands of any role in the monetary system. It could tell Canadians that they are free to construct any system they like. Counterfeiting would be legalized.

The legalization of counterfeiting would almost immediately reduce the value of Canadian currency and Canadian-denominated bonds to roughly zero. This option would be extremely unpopular and obviously would not happen. So let's consider some more measured approaches to getting the

1. For those who are interested, excellent work has been done by Lawrence White, George Selgin, David Glasner, Kevin Dowd, William Woolsey, and many other researchers.

2. To be clear, that doesn't mean I support all attempts at deregulation. If we already have government distortions, such as the Federal Deposit Insurance Corporation, "too big to fail," and implicit banking of government-sponsored enterprises, then regulations to discourage excessive risk taking might make sense. But the ideal system would involve a completely free market in banking.

Canadian government out of the monetary system.

2. **Auction of the BoC.** The BoC could be auctioned to the highest bidder. In this case, the winning bidder would gain the right to print Canadian currency and counterfeiting would remain illegal. Banking would be deregulated so that competing entities could offer competing currencies.

I'm not quite certain what would happen in that case, but here's my best guess. A consortium of large Canadian banks would buy the BoC. Perhaps it would have a board that determined the BoC's monetary policy, and each commercial bank in the consortium could have one voting member. But many other options are possible. Perhaps a large US firm or a large Chinese firm would buy the BoC. I just don't know.

Because of network effects, it is overwhelmingly likely that one currency would achieve a dominant position in Canada. People like their wages to be in the same kind of money they'll spend at the store. It makes life much easier. Thus, I would expect that the Canadian dollar would remain dominant in Canada.

The biggest question mark is inflation. Many studies have estimated the profit-maximizing rate of inflation (or seigniorage), and all the estimates are extremely high. One study estimated that seigniorage would be maximized in the long run with a sustained inflation rate of 266 percent a year.³ Even if one assumes that that estimate is too high, and that dollarization would occur at that rate, the revenue-maximizing rate for a monopoly currency supplier is almost certainly higher than the optimal rate of inflation for society as a whole.

Network effects in currency are very powerful, and it's hard for competing currencies to gain much traction until the dominant currency is extremely badly mismanaged—as in places like Zimbabwe or Venezuela. Perhaps the following thought experiment would make it easier to see this point.

Consider a central bank deciding between two options:

- Increase the monetary base at 4 percent a year.
- Increase the monetary base at 20 percent a year.

The second option will provide more seigniorage unless it reduces base demand by more than 80 percent as a share of GDP. That would be a huge reduction in base demand. Is the amount of money you typically carry in your wallet highly sensitive to the inflation rate? Probably not. Studies show that people do carry less cash as a share of GDP at higher inflation rates, but not dramatically less. That's why the profit-maximizing inflation

3. William R. Easterly, Paolo Mauro, and Klaus Schmidt-Hebbel, "Money Demand and Seigniorage-Maximizing Inflation," *Journal of Money, Credit and Banking* 27, no. 2 (1995): 583–603.

rate is so high. (This is true for many products—the revenue-maximizing tax rate for cigarettes is also very high.)

Of course, the Canadian government could auction off the BoC with a legal restriction on how fast the monetary base could be increased. But if the government has such specific macroeconomic goals, then why auction the BoC in the first place?

3. **A fresh start.** Let's say you buy my "network effects" argument and wish to make a fresh start in Canada with a level playing field. You wish to entirely abolish the Canadian dollar and give each alternative system an equal chance of success. In that case, Canadian dollars could all be redeemed for assets of roughly equal value, removing them from circulation. This is how individual European countries got rid of their national currencies. But instead of being paid off with a new money (euros), Canadians could be paid off with some existing asset, such as silver bullion, bitcoins, or equities in a global stock index fund.

In that case, I'd expect the Canadian public to spontaneously adopt the US dollar. I cannot be certain—perhaps they'd adopt the gold standard—but I suspect the US dollar is the most likely winner in an open contest for the Canadian public to pick a new monetary regime. If this transition occurred in Denmark or Sweden, their public would probably adopt the euro.

These are just 3 of at least 50 ways that Canada could get rid of the BoC. I have no doubt that there are many others. And note that these are not three outcomes that would occur spontaneously. The Canadian government would have to decide how it plans to fold up shop. It is not possible to just wave a magic wand and move from a government fiat monopoly to a laissez-faire regime. Hard decisions about what to do with the existing monetary base and the existing stock of Canadian dollar-denominated debt are unavoidable.

If the Canadians were to adopt the US dollar, then they would have merely traded one central bank currency for another. But that leaves a more fundamental question—how is the US dollar to be managed? It is not easy to just walk away from fiat money. More than \$2 trillion in currency are in circulation, and more than \$20 trillion in dollar-dominated Treasury debt. It seems unthinkable that the US government would simply abandon the dollar regime; many people rely on the dollar having at least a fairly stable value.

Another option might be to allow the existing US monetary base to continue circulating, but not issue any new money. That would allow the United States to abolish the Fed, while continuing to enforce anti-counterfeiting laws.

Unfortunately, the global demand for dollars is voracious. Roughly \$100 billion per year flows out of the United States to be held by foreign individuals. Today, the Fed accommodates that fast-growing currency demand by increasing the monetary base each year. Without an increase in the base, the outflow of currency would push the United States into deflation.

Unfortunately, falling prices (and NGDP) would be merely the first effect of a frozen monetary base. The secondary effects would be even worse. The deflation would almost certainly cause a severe financial crisis, and a rush for liquidity. The foreign ongoing demand for base money would be supplemented by panicky domestic banks hoarding reserves, further boosting base demand and raising the purchasing power of base money.

This policy could easily produce a depression even worse than the 1930s (a period when the price level fell because of money hoarding despite a large rise in the monetary base). Before that happened, the government would likely step in and reverse its decision to freeze the monetary base. New money would be injected into the economy, quickly ending the libertarian experiment.

Could the needed liquidity be supplied by private banks issuing dollar-backed banknotes? That seems unlikely. Unless the two assets were perfect substitutes, changes in the demand for Federal Reserve notes would continue to be a problem. During a financial crisis, distrust in the soundness of private banknotes would result in their being converted into Federal Reserve Notes, just as dollar bills were converted into gold by panicky currency holders during the 1930s. And as with gold, the zero-bound issue would present an especially big challenge for any monetary regime with a frozen base.

With fiat money, we have a tiger by the tail. Indeed, our entire economy is built around fiat money. It won't be easy to simply blow up the central bank and move away from this system. It makes much more sense to adjust policy in such a way as to minimize the damage from fiat money, by setting a target for NGDP to grow at a slow but steady rate.

Cantillon Effects Are Overrated

Libertarians often focus on the question of *how* money gets injected into the economy. Who gets the money first? And what assets are purchased? The first question is almost entirely unimportant. The second is potentially important, but not very important in practice.

Let's start with the question of who gets the money first. If this were important, then the following two monetary policy options should have dramatically different effects:

- Inject \$1 billion in new money by purchasing Treasury debt.
- Inject \$1 billion in new money through base money payments to ordinary people (Social Security payments, tax rebates, etc.).

In the first case, bondholders are first to receive the new base money, while in the second case average people get the money first. There seems to be an idea floating around that the first group to receive the new money gets some sort of unfair advantage. It is hard to see why.

Consider the pre-2008 monetary regime, where there was no payment of interest on bank reserves. In that case, base money is not a particularly attractive asset. Average people have access to base money whenever they wish to add to their cash balances, via

withdrawals from an ATM. But most people prefer to hold relatively small quantities of base money, as it does not pay interest.

Those who get new base money from the Fed will generally not hold on to the asset; rather, they'll convert it into an asset that offers a better rate of return. Thus, when Treasury bondholders sell their bonds to the Fed, any money they receive will generally be converted into an alternative asset. The same is true of ordinary people. If Social Security payments or tax rebates were made in newly issued cash, most people would take the cash to a bank and convert it into a higher-yielding asset. Few people would see themselves as receiving special treatment by being the first to get the new money; indeed, they might be annoyed.

There is a more sophisticated version of this argument: when the Fed buys Treasury bonds, it helps the bondholders by boosting the price of the asset they are selling. In contrast, if money were injected into the economy in payments to ordinary people, there would be no extra demand for Treasury bonds, and hence no boost to T-bond prices. This argument is wrong for two reasons. First, it's not clear that injecting money into the economy will boost T-bond prices. Second, even in the case where monetary injections do boost bond prices, it makes no difference whether the new money is injected by purchasing T-bonds or through payments to the public as part of existing government operations.

It might seem obvious that buying bonds would boost bond prices. Isn't it just a matter of supply and demand? It is true that Fed open market purchases directly increase the demand for T-bonds. But this sort of policy indirectly reduces bond demand by boosting inflation expectations. After the mid-1960s, the Fed rapidly increased the rate at which it purchased government securities. But those purchases boosted inflation, which sharply reduced bond prices. The Fisher effect dominated the liquidity effect. And as we saw earlier, during late 2007 and early 2008, the Fed stopped injecting money by purchasing bonds, and (counterintuitively) this had the effect of actually boosting bond prices.

Every transaction is two-sided. When you buy an asset with newly created money, you are putting upward pressure on the value of that asset and downward pressure on the value of money. If the asset represents a claim on future cash flows (as with bonds), the net effect on the asset's value can be negative.

Nonetheless, there are occasions when the liquidity effect dominates the Fisher effect. There are times when bond purchases have the effect of boosting bond prices. But in those cases, the monetary injection would have an almost identical impact on bond prices if the money were directly paid out to individuals (holding fiscal policy constant). Consider the previous two alternative methods of injecting \$1 billion into the economy:

- If the money is used to purchase T-bonds, then the net effect is to reduce the stock of Treasury debt held by the public by an amount exactly equal to the increase in the monetary base.
- If the money is paid out to Social Security recipients and taxpayers getting rebates, then the Treasury will reduce its issuance of new debt by \$1

billion. If those payments had not been made via newly issued base money, then the Treasury would have had to borrow an additional \$1 billion to finance the expenditures (holding taxes and spending constant in both methods).

The two methods have the same impact on both the money supply and the stock of Treasury debt held by the public. Thus, the impact on interest rates would be almost identical.

To be sure, not all methods of getting money to average people have the same impact. If the newly injected money were simply given to the public, then the impact on variables such as total spending might be different. But that hypothetical involves a combined monetary and fiscal stimulus. And a fiscal stimulus involving the Fed purchase of \$1 billion in Treasury debt combined with \$1 billion in direct payments from the Treasury to the public would have the same impact as simply giving \$1 billion in newly created money to the public.

Although it makes little or no difference who gets the money first, the impact of monetary injections could vary depending on which assets were purchased. Thus, a monetary injection that was used to purchase a stock index fund might boost equity prices by more than an injection used to buy Treasury debt. Nonetheless, this effect is likely to be relatively small if the central bank does not pay interest on reserves, and nominal interest rates are positive. In the pre-2008 monetary regime, increases in the monetary base were relatively small, and the effect on the macroeconomy was not very sensitive to the type of asset purchased.

If the central bank pays interest on reserves, if nominal interest rates fall to zero, or both, then large monetary base injections (quantitative easing [QE]) are much more likely to occur. The Fed was criticized for purchasing mortgage-backed securities during its various QE programs, which was seen as a subsidy to the real estate industry. Although I agree with this criticism, I suspect the impact of these purchases was relatively small. The Treasury had already implicitly backstopped this mortgage-backed debt, and hence these bonds were close substitutes for Treasury bonds.

Again, that doesn't make the critics wrong—the Fed purchase of mortgage-backed securities did slightly distort the allocation of capital. Even worse, Fed policy during the COVID-19 crisis involved an unprecedented interference in capital allocation. Nonetheless, Fed critics have often overstated the importance of Cantillon effects (especially before 2020). By far the most important impact of monetary injections comes from new money being created. In comparison, the method by which the new money is injected into the economy has a relatively minor consideration when its impact has been evaluated. Unfortunately, that may not be true in the future.

What Does It Mean to “Artificially” Depress Interest Rates?

Libertarians quite rightly object to government interference in the price system. Market prices are an efficient method of allocating resources, and regulations that distort market signals (such as controls on wages, prices, rents, interest rates, and exchange rates) cause economic inefficiency.

Monetary policy affects all nominal variables, including interest rates, prices, wages, rents, and exchange rates. But that does not mean that monetary policy artificially moves these prices away from equilibrium.

Consider the US gold standard in operation from 1879 to 1913. The dollar was defined as 1/20.67 ounce of gold. That definition resulted in the market price of gold staying very close to \$20.67 an ounce. But there was nothing artificial about this price—the nominal gold price simply reflected the legal definition of \$1. The real value of gold continued to move around freely according to market conditions.

In contrast, minimum wage laws, price ceilings, rent ceilings, usury limits on interest rates, and exchange pegs *maintained via exchange controls* all have the effect of pushing the *real* price in question away from its equilibrium value. This effect generally creates a shortage or surplus in the relevant market.

Prior to 2008, when the Fed targeted the federal funds rate, it did not artificially control the interest rate in the federal funds market. Rather, it adjusted the supply and demand for base money until the *equilibrium* federal funds rate is equal to the target value. Similarly, Hong Kong does not maintain its fixed exchange rate with the US dollar using the sort of market-distorting exchange controls employed in many developing countries; rather, it moves the money supply to a position where the supply of Hong Kong dollars equals the demand for Hong Kong dollars at the official exchange rate.

Some have argued that inflation targeting is like price controls, an artificial interference in free-market pricing.⁴ In fact, under an inflation-targeting regime all relative or real prices can continue to be set by market forces.

To summarize, the central bank does not set interest rates at artificially low or high levels in the sense of levels inconsistent with market equilibrium in the federal funds markets. Interest rate targeting is not a form of price control. Nonetheless, there is a sense in which interest rates can be set at nonequilibrium values. If the central bank is targeting interest rates, it might mistakenly set them too high or too low to achieve equilibrium in *labor markets*, even as the federal funds market itself is in equilibrium.

During the early 2010s, interest rates were set too high to achieve labor market equilibrium and inflation generally ran below the Fed’s 2 percent target. Easier money

4. See, for example, John Tanny, “Price Stability Is an Economically Dangerous Fad,” *Forbes*, December 5, 2010.

was needed as the Fed’s interest rate target was above the “natural interest rate.” Ironically, during this period many libertarians argued that the Fed was artificially holding down interest rates, even as it set rates at too high a level to achieve macroeconomic equilibrium.

A better example for libertarians to point to would be 2021, when the Fed set rates too low to achieve macroeconomic equilibrium. But even in that case, I don’t find the “artificial” terminology to be helpful, as it leads people to conflate price controls that cause shortages and surpluses with suboptimal monetary policy that causes fluctuations in prices and output.

A Fed Put?

Some libertarians worry that the Fed is trying to manipulate asset market prices. Some pundits refer to a “Fed put,” an implied Fed commitment to inject money after a sharp market correction, which would presumably boost asset values. One complaint (shared by many progressives) is that the Fed cares more about Wall Street than Main Street.

It is certainly possible that the Fed cares a bit too much about the welfare of investors and Wall Street firms. However, I suspect that people exaggerate the extent to which the Fed cares about the welfare of investors. Consider a monetary regime where the following is true:

- The central bank tries to prevent recessions from occurring, while keeping inflation close to 2 percent.
- Recessions are very difficult to predict.
- Stock indices provide a noisy market forecast of recessions. On average, one-fourth of equity index price volatility reflects changes in expectations of GDP growth.
- The central bank puts no weight on the welfare of investors.

Under that sort of monetary regime, the central bank will often respond to a sharp market sell-off by easing monetary policy, even though (by assumption) it doesn’t care at all about the interests of stock investors. Just because the Fed responds to the stock markets doesn’t mean that it cares about the welfare of investors—stocks may be an indicator of other things the Fed does care about.

Asset Price Bubbles?

Just as libertarians worry about artificially low interest rates, they often argue that central banks create artificially high asset prices. An unexpected announcement of the easing of monetary policy often causes stock prices to shoot higher. This reaction makes it

appear that the central bank is creating an artificial asset price bubble,⁵ with the goal of boosting aggregate demand in the economy.

In fact, there is little evidence that easy money is good for *real* asset prices. The most expansionary Fed policy (outside of the two world wars) occurred during 1966–1981, when both prices and NGDP rose rapidly. Surprisingly, most financial assets did very poorly during this period, with the real value of both stocks and bonds falling sharply. Persistently high inflation indirectly boosts the real tax rate on financial assets, depressing their value.

There are occasions when easy money announcements did provide a boost to asset prices. That typically occurs when monetary policy has previously been too tight, such as during the 1930s and the 2010s. During those decades, expansionary policy surprises often led to sharply higher stock prices. This result is entirely consistent with the efficient market hypothesis—if tight money had been depressing output and employment, then investors should welcome a policy move that promised stronger economic growth and greater profits. Those asset price increases are not “artificial”; they reflect fundamentals.

Because the Fed targets the federal funds rate, many people wrongly assume that all movements in interest rates reflect monetary policy. But we’ve already seen that in the medium and longer run most of the movement in interest rates reflects the income and Fisher effects, not the direct effect of monetary policy (liquidity effect).

Since 1980, there has been a dramatic downward trend in both real and nominal interest rates. The fall in nominal rates reflects lower inflation expectations (until 2021), while the decline in real interest rates reflects a shift to the right in the saving schedule and a shift to the left in the investment schedule (with relatively little change in the equilibrium *quantity* of saving and investment). To the extent that monetary policy contributed to this long-run trend (i.e., the lower inflation), it was a *tighter* monetary policy.

With lower interest rates, the value of any expected future cash flow becomes greater. To the average person, it looks as though the value of many different asset classes is being inflated by an “easy money” policy. In fact (until 2021), monetary policy has mostly been getting tighter since 1980, and the rise in asset values reflects fundamental factors unrelated to monetary policy.

Easy Money Is Bad, Tight Money Is Worse

Many libertarians have a bias in favor of relatively contractionary monetary policies. That’s not to say they favor tight money, but they prefer to err in that direction when the

5. In my previous book, I argue that asset price bubbles do not exist. Here, I will focus on other problems with this hypothesis. Scott Sumner, *The Money Illusion: Market Monetarism, the Great Recession, and the Future of Monetary Policy* (Chicago: University of Chicago Press, 2021).

effects of monetary policy are uncertain. They tend to exaggerate the welfare costs of moderate (demand-side) inflation and underestimate the welfare costs of below-target inflation and NGDP growth.

As we've seen, not all deflation is bad. A fall in prices due to productivity growth is compatible with a healthy economy. But falling NGDP is extremely damaging to both the labor market and the financial system. It wasn't the hyperinflation of 1920–1923 that put Hitler into power; it was the deflation of 1929–1933 that boosted the Nazi Party from being a minor force in German politics into the dominant party.⁶

In some cases, libertarians are their own worst enemy. I've seen free-market types advocate monetary regimes that led to deflation and high unemployment. In almost every case, the general public (wrongly) blamed the resulting depression on “laissez-faire policies” or “neoliberalism.” The actual problem was tight money. In the United States, economic policy shifted left after NGDP fell in the early 1930s and again in 2008/09. In Argentina, public opinion shifted to the left after a currency board monetary regime led to falling NGDP during 1998–2001.

In contrast, the left often struggles during periods of high inflation, which the public tends to blame on socialist policies. If the goal is a right-wing economic (regulatory/spending/tax) regime, you'd be better off erring toward a slightly more expansionary monetary policy. In most parts of the world, economic policy turned to the right after the high inflation of the 1970s.

Where Libertarians Are Correct

Thus far, this chapter has been fairly critical of libertarian ideas in monetary economics. But libertarians get many of the big issues right:

- Central banks should not move beyond their core function of setting monetary policy. They should not try to allocate capital. They should refrain from financial bailouts. They should not pay interest on bank reserves. Wherever feasible, they should avoid buying assets other than Treasury debt. Most important, they should avoid highly political issues such as climate change and economic inequality.
- Boosting aggregate demand is not a durable way of creating prosperity. The Phillips curve (nonaccelerating inflation rate of unemployment) is not a reliable policy tool.
- Central banks should follow clear rules. Policy should not be discretionary.

6. I've been told that this interpretation is not the one that is taught in German schools, which is quite unfortunate.

In addition, some libertarians have advocated the price approach to monetary policy. Although I have reservations about many specific proposals, including the gold standard or a return to fixed exchange rates, I endorse the general idea that it makes more sense to stabilize the price of money (broadly defined) as compared with the rental cost of money (interest rates) or the quantity of money.

Libertarian ideas do best when market economies seem to effectively allocate resources, providing something close to full employment with stable prices. The best way to reduce the role of government is to target NGDP futures prices at a low rate of growth (no more than 4 percent). Under this sort of regime, voters will gradually learn that government favoritism to one sector doesn't "create jobs"; rather, it merely shifts resources away from other sectors.

Properly understood, economics is fundamentally about opportunity costs, about trade-offs between competing goals. Stabilizing NGDP growth will allow the public to see that reality more clearly; it will nudge the public into thinking like an economist, indeed thinking like a *libertarian* economist.