Fiscal Histories

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Abstract

The fiscal theory states that the price level adjusts so that the real value of government debt equals the present value of real primary surpluses. Monetary policy remains important. The central bank can set an interest rate target, which determines expected inflation, and news about the present value of surpluses drives unexpected inflation. I exposit fiscal theory by offering an interpretation of historical episodes, including the gold standard, currency pegs, the ends of hyperinflations, the success of inflation targets, the rise and fall of inflation in the 1970s and 1980s, the long quiet zero bound of the 2010s, and the 2021-2022 inflation. Going forward, fiscal theory warns that inflation will have to be tamed by coordinated monetary and fiscal policy.

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1. Introduction

Why does money have value? It only costs the government a few cents to print a dollar bill, yet we work hard to get those pieces of paper, and we can trade them for valuable goods. The bits on a computer that are most of today’s money cost essentially nothing to produce, and we work just as hard for those. Equivalently, what determines the overall level of prices and wages? What causes prices to rise in a time of inflation such as we experience in 2022?

The fiscal theory of the price level offers a novel answer to this age-old question. The fiscal theory states that:

- The price level adjusts so that the real value of government debt equals the present value of primary surpluses.

Let’s unpack that. Most simply, money is valuable because we need money to pay taxes. If, on average, people have more money than they need to pay taxes, they try to buy things, driving up prices. In the words of Adam Smith,

A prince, who should enact that a certain proportion of his taxes be paid in a paper money of a certain kind, might thereby give a certain value to this paper money. (*Wealth of Nations*, Vol. I, Book II, Chapter II.)

Taxes are a percentage of income. Thus, as prices and wages rise, your dollar income rises, and the amount of money you must pay in taxes rises. A higher price level soaks up more money with tax payments. Equivalently, the real value of money, the amount of goods and services a dollar buys, declines as the price level rises. But the real value of your taxes does not change, so a higher price level lowers the real value of money until it equals the real value of tax payments.

Obviously, this story is simplistic. We add more realistic ingredients in order to make the theory useful to think about economic events and policy.

First, the government also spends and transfers money to people. So money is soaked up by government *surpluses*, the excess of taxes over spending, not just by taxes.
Second, governments also sell bonds. If you buy a one-year bond, you give the government $1 today, and the government gives you $1 plus interest, say $1.05, in a year. So, bonds that come due today generate new money ($1.05), and thus also push toward inflation. The government can also soak up money by selling new bonds, not just from this year’s surplus. The government can run deficits, a negative surplus, by selling bonds. But the government cannot keep rolling over its debts forever, issuing new bonds to pay principal and interest on old bonds. Eventually, all of the money outstanding today and all of the money promised by outstanding government debt must be soaked up by surpluses. Thus, the price level adjusts until the real value of all government debt, including money, equals the present value of current and future surpluses. In short, the price level adjusts until the government debt valuation equation holds.1

The economic logic is the same as the basic way we think of stock and bond prices. The stock or bond price—what you pay—adjusts so that the value of shares or bonds is equal to the expected discounted present value2 of dividends or coupons—what you get in return. The stock or bond price adjusts until the stock or bond valuation equations hold. We can see fiscal theory as an application of this standard idea to government debt. If we used mutual fund shares as our money—if a car cost 10 shares of an S&P500 index fund rather than $40,000—then we would start our quest for “what determines the price level?” by the present value of the dividends people expect from the fund. Government bonds, repaid by surpluses, are effectively stock in the government.

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1 In equations,

\[ \frac{B_{t-1}}{P_t} = E_t \sum_{j=0}^{\infty} \frac{\Lambda_{t+j}}{\Lambda_t} s_{t+j} \]

Where \( B = \)nominal government debt, \( P = \)price level, \( \Lambda \) is a stochastic discount factor such as marginal utility or the inverse cumulative return, and \( s \) is the real primary government surplus. Money (cash and reserves) are part of \( B \).

2 To compute a present value, you sum up all the expected future dividends or coupons that a stock or bond pays, multiplied by “discount factors” that account for time and risk. For example, if the interest rates is 5%, a promise of a dollar next year is worth 1/1.05 or approximately $0.95 today; that is the present value of a dollar.
(This article coincides with a book, Cochrane (2023), which lays out the models explicitly, includes much detail on these episodes, and covers the literature and historical development of the fiscal theory.)

2. Money

The most familiar theory of inflation is based on money supply and money demand, the famous $MV=PY$, money times velocity equals price level times real income.

This theory has two crucial ingredients. First, money is special, different from other financial assets. People need money to make transactions, or to satisfy “liquidity,” “precautionary,” and similar needs that stocks and bonds do not satisfy. People are therefore willing to hold an inventory of money, even though money offers a lower rate of return than other securities, which they hold as long-term investments. In the famous Allais (1947) Baumol (1952) Tobin (1956) model, for example, a consumer might take money out of an interest-paying bank account once a week, to make that week’s purchases.

Second, the government limits the money supply. Money supply equals money demand then determines the price level. If the price level is too low, people have more money than they need to make the week’s transactions. They try to put it in the bank, but with fixed money supply they can’t all do that. So they start buying, pushing up the price of goods and services. As the price level rises, they need more money to make the same week’s transactions. Inflation stops when this higher money demand equals the supply.

At first glance, the monetary and fiscal stories sound awfully similar. Too much money chases too few goods, too much “aggregate demand” sends prices up. And that is a good thing for fiscal theory. If you live in a fiscal theory economy, as I think you do, but you have learned the standard monetary story or a more Keynesian “aggregate demand” story, you wouldn’t immediately notice a difference just by looking out the window, and neither would the generations of smart economists who have come before us.

But there are crucial differences. First, just which money is inflationary? In the monetarist story, both “inside” and “outside” money satisfy money demand, so both are inflationary. Checking account are classic “inside” money. The bank basically writes an IOU to a borrower,
who can send that IOU around to pay bills. Thus, in the monetarist view the government must control checking accounts and other “inside” money. For example, the Fed may require that the bank hold a fraction of each checking account as reserves. By controlling the quantity of reserves, the Fed then controls the quantity of checking accounts.

In the basic fiscal theory, only government money, cash and reserves, matter for inflation. Checking accounts net to zero – they are an asset to you, but a liability to the bank, so more checking accounts do not make the private sector as a whole feel wealthier and desire to spend more. However, in the basic fiscal theory, government debt, which promises money, is just as inflationary as money itself. Reserves and cash are just overnight government debt.

What about episodes in which we see inflation caused by printing money, including hyperinflations such as post WWI Germany and Austria, or Venezuela and Zimbabwe recently? These countries print money to finance intractable fiscal deficits. They are expansions of government debt relative to the government’s ability to repay debt. They are equally inflationary in fiscal theory. Similarly, Milton Friedman once joked that the government could easily cause inflation, by dropping money from helicopters. But dropping money from helicopters is a fiscal operation too. It is a transfer payment.

The key question is whether exchanging money for debt causes inflation. The question is, if the central bank issues money, but takes government debt in return, does that inflate? This “open market operation” is what central banks do. Central banks must buy or lend, they may not hand out money. In the monetarist view, yes. In the basic fiscal view, no. It’s like taking your $20 bills and giving you two $5s and a $10. The answer is not so obvious.

The monetary theory isn’t wrong. It’s logically consistent. It just doesn’t apply to today’s economy. First, monetary theory requires a meaningful distinction between “money,” special assets used for transactions and “liquidity” purposes, and “bonds,” or savings vehicles, and that money pays substantially less interest than bonds. This precondition is rapidly evaporating. Most of us use mobile phones, credit or debit cards, or electronic payments to make transactions. The story of going once a week to the bank to get cash for the week’s transactions...
must seem like a dated anachronism when taught today. Businesses hold a wide variety of liquid inside interest-paying assets that can be quickly sold to make payments, including repurchase agreements and money market investments. Reserves pay the same or more interest as Treasury bills, and at near-zero interest rates so does cash. We can use liquid assets held entirely for savings purposes to make transactions.

Second, and more importantly, the monetary theory requires that the government controls the money supply. Otherwise, inflation starts up, people want more money relative to bonds to make their transactions, the government or banks supply that money, and there is no force to contain inflation. But our governments do not begin to control the money supply. Reserve requirements do not bind, and the Fed eliminated reserve requirements altogether in 2020. Our central banks make no pretense of monitoring or controlling monetary aggregates such as M1, M2, or M3. Our central banks set interest rate targets, not money supply targets; they offer a horizontal money supply curve.

By contrast, fiscal theory is completely consistent with uncontrolled inside money, financial and payments innovation, cryptocurrency, interest rate targets, unstable money demand, elastic money supply policies, and the disappearance of a meaningful distinction between monetary and investment assets.

Third, our fiscal reality has changed. Monetarism always acknowledged fiscal limits: The government must run a sober fiscal policy, and easily repay debts, so it doesn’t have to print money to finance deficits. But our governments no longer obviously have a lot of fiscal space. Debt is 100% of GDP and rising. Structural deficits are larger, and unfunded entitlements that much closer.
3. Monetary policy

Fiscal theory does not mean one must start all over. Fiscal theory fits well into standard economic models, in which central banks set interest rate targets and have an important influence on inflation.

In the statement that the price level is determined by the government debt valuation equation, three quantities interact: surpluses, the quantity of debt, and the real interest rates that discount future surpluses. Yes, bad news about surpluses will cause unexpected inflation. But the other two influences also matter.

If the government issues additional debt without changing surpluses, it raises expected inflation and raises the nominal interest rate. More debt coming due in the future, with no change in the future surplus, raises the future price level, which means more inflation. This operation works like a share split: If a corporation offers two new shares for each old share, the stock price falls by half. Likewise, if the government offers debt for sale at a fixed interest rate, without changing surpluses, then people buy debt up to the point that expected inflation matches the interest rate. And the central bank is the agency of the government that buys and sells government debt, but may not touch surpluses. In sum, in the simplest fiscal-theory view of the world,

- The central bank can set an interest rate target. By setting an interest rate target, with no change in fiscal policy, the central bank controls expected inflation.

Central banks are still crucially important. But they aren’t everything:

- Fiscal policy determines unexpected inflation. Unexpected inflation is driven by news about current and future deficits.

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4 The nominal interest rate is the rate you pay or receive in dollars. The real interest rate is that rate less the expected rate of inflation, and thus the real amount of goods and services you receive in the future in return for giving up some today.
Bad news about deficits, that will not be financed by subsequent surpluses, must inflate away some government debt. Monetary policy only has partial control over inflation.

When we add sticky prices, long-term debt, and other important complications to this thinking, the relationship between interest rates and inflation becomes drawn out. Figure 1 presents a simulation for concreteness. I use the simplest standard sticky-price model.\(^5\)

The top panel presents the response to a 1% fiscal shock—the sum of current and future surpluses declines by 1%—with no change in interest rates. This plot generalizes the idea of a fiscal shock that gives rise to one period of unexpected inflation. The fiscal shock now leads to a protracted inflation, which is much more realistic. Bondholders lose from a long period of negative real interest rates—inflation above the interest rate—not a price-level jump.

More generally, with sticky prices the short-run dynamic story is different: The real interest rate, generated by the spread between the path of nominal interest rate and inflation, adjusts to equilibrate the value of government debt and the present value of surpluses, both by slowly devaluing outstanding debt, and by modifying the discount rate applied to future surpluses.

The bottom panel presents the response to an interest rate rise with no change in fiscal surpluses. This plot generalizes the idea of an interest rate rise which raises expected inflation. By including long-term debt, this model expresses the common idea that an interest rate rise temporarily lowers inflation. But higher interest rates still eventually raise inflation. The above bullet points still describe the long run, with these more interesting short-run dynamics.

\(^5\) The model is

\[
\begin{align*}
    x_t &= E_t x_{t+1} - \sigma(i_t - E_t \pi_{t+1}) \\
    \pi_t &= E_t \pi_{t+1} + \kappa x_t \\
    i_{t+1} &= \eta i_t + E_{t+1} \\
    \rho v_{t+1} &= v_t + r^v_{t+1} - \pi_{t+1} - \tilde{s}_{t+1} \\
    E_t r^n_{t+1} &= i_t \\
    r^v_{t+1} &= \omega q_{t+1} - q_t
\end{align*}
\]

where \(x_t = \) output gap, \(i_t = \) interest rate, \(\pi_t = \) inflation, \(v_t = \) real value of debt, \(\tilde{s}_t = \) real primary surplus scaled by the value of debt, \(r^v_{t+1} = \) nominal return on government debt, \(q_t = \) price of the government debt bond portfolio. \(\omega = 0.8\) describes a geometric maturity structure of debt. \(\sigma = 0.5, \kappa = 0.5, \eta = 0.9, \rho = 0.98.\)
Figure 1: Responses of inflation and output in a simple fiscal-theory sticky-price model. Top: 1% deficit shock with constant interest rate. Bottom: Interest rate shock with constant surpluses.
4. Events

Here, I think through how fiscal theory can account for important episodes. A first purpose is expositional: by this method we can understand how fiscal theory works, and what elaborations it might need. A second purpose is more serious: analyzing episodes is the crucial way we evaluate all macroeconomic models.

I mostly tell plausible stories, rather than summarize well-worked out and published economic history or quantitative analysis. Fiscal theory is new, and that work is just beginning. But stories rightly come first. Formal analysis always builds on plausible stories. Moreover, that there are such plausible stories, that it provides a framework that can possibly account for history as MV=PY and IS-LM do, is news, since many people opine that fiscal theory can be quickly dismissed by well-known episodes. I also hope to inspire detailed analysis.

4.1 Deficits and inflation; present values

You might think that fiscal theory predicts inflation when deficits are large or when there is a lot of debt. However, though some inflations correlate with debt and deficits, there often is none. The inflation of the 1970s broke out with debt below 30% of GDP. The 2010s had low inflation despite large debt and deficits. Deficits are large in recessions, when inflation is typically low, and smaller or surpluses in in expansions, when inflation is typically larger. Internationally, some debts precede inflation, devaluation, or default, but many do not (Reinhart and Rogoff (2011)).

The fact that the present value of surpluses matters quickly refutes this sort of armchair rejection of fiscal theory, and opens the door to a more interesting interpretation of events. If the government runs a big deficit, but people trust that deficit will be repaid by higher subsequent surpluses, then people are happy to hold the extra debt rather than try to spend it, and there will be no inflation. That hypothesis is sensible. When corporation borrows to build a factory, it runs a big deficit, and then slowly pays off the bonds, a long stream of surpluses. Governments that want to borrow, to raise revenue to fight wars or recessions, and do not want to create inflation, will promise repayment, and on average will do so. Fiscal theory does
not predict a tight relationship between debt, or deficits and inflation. Fiscal theory only predicts inflation when debt is larger than what people think the government can or will repay.

Moreover, discount rates matter to present values. When interest rates rise, bond values fall. A higher real interest rate makes the same stream of expected surpluses less valuable. So, higher real interest rates lower the value of debt, and act as an inflationary force independent of surpluses. Equivalently, a higher real interest rate means that the government has to pay more to finance its debt, just as households with floating-rate mortgages have to pay more.

For example, consider the sharp recession of 2008-2009 after the financial crisis. The deficit widened dramatically, from 1.1% of GDP in 2007 to 9.8%, 8.6% and 8.3% in 2009-2011. Yet inflation declined. From a peak of 5.5% in July 2008, inflation fell to -2%—2% deflation—in July 2009, and then stayed below 2% for the rest of the decade. Shouldn’t those deficits cause inflation?

Not necessarily. In the first instance, people might have expected that deficits, financing temporary spending to meet an extraordinary crisis, would be repaid by higher surpluses when the crisis was over. The Obama administration promised that debt reduction would follow the stimulus. That’s at least possible. However, I don’t think that is plausible in this case, and it is not what happened ex-post. Instead, and visible at the time, real and nominal interest rates fell like proverbial stones. The Federal Funds rate fell from 5.25% in July 2008 to effectively zero, 0.25% and stayed there until 2016. The real short-term interest rate was thus nearly negative 2% for nearly a decade. In a quantitative evaluation of events like the 2008 recession, (Cochrane (2021), Cochrane (2019), Cochrane (2023) Chapter 4) I find that this decline in real interest rates—discount rates, debt service costs—accounts quantitatively for lower inflation in recessions, despite adverse fiscal news, and conversely in booms; and that two thirds of all inflation shocks corresponds to such discount-rate variation. Similarly, Japan has a debt to GDP ratio of over 200%, yet slight deflation. Why? Among other reasons, Japan has had very low real interest rates for three decades.
4.2 Stable inflation at the zero bound

The zero bound era following the financial crisis of 2008 offers an illuminating test of monetary theories. Figure 2 illustrates this episode in the United States. Interest rates were essentially zero from 2009 to 2016. The episode is longer in Europe, where interest rates stayed at zero to slightly negative through early 2022, and longer still in Japan where interest rates effectively hit zero 1995, and have been there ever since.

What happens to inflation if interest rates cannot move downward, if they stay at zero for many years, and are expected to remain at zero for more years? Nothing. The pattern of inflation following the 2008 recession was nearly identical to that following the 2000 recession. Inflation at the long zero bound was if anything less volatile than in the earlier period.

Classic theories of inflation make clear and contrary predictions. Keynesian IS-LM models, classic monetarism, and conventional doctrines clearly predict a “deflation spiral.” Inflation is unstable at the zero bound. Insufficient aggregate demand produces a recession and lower inflation or deflation. The Fed normally lowers nominal interest rates to get under inflation, and to lower real interest rates. But when interest rates hit zero, the Fed can do no more. Now real interest rates are too high. That lowers aggregate demand, provoking lower inflation, which raises real interest rates even more, in a never-ending loop. Central bankers and macroeconomic policy analysts around the world warned, correctly given this model, of the danger.

It did not happen. Deflation spirals never broke out. Even in Japan, deflation bumped around one or two percent at worst.

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6 We call it the “zero lower bound,” because negative interest rates will prompt people to take all their money out of banks and hold cash. Several central banks set some interest rates as low as -1%, and the inconvenience of cash kept cash arbitrage from breaking out. Since the bound is not exactly zero, it is sometimes called the “effective lower bound” instead. This section summarizes Cochrane (2018) and Cochrane (2023) Chapter 20.
Figure 2: Inflation, Interest Rates and Reserves in the United States. Reserves are in trillions of dollars, interest rates are in percent. Reproduced from Cochrane (2023).

New-Keynesian models substitute forward-looking expectations for the backward-looking expectations of classic models. In deciding to consume or save, to work, or to set prices, people guess future inflation as best they can, rather than mechanically assume that future inflation will equal past inflation. In particular, the real interest rate depends on the nominal rate less expected future inflation, not past inflation, which can cut off the “spiral” dynamic. With this change, new-Keynesian models make a different prediction: At the zero bound, inflation becomes *indeterminate* and thus volatile. The interest rate sets expected inflation, but without fiscal theory, unexpected inflation can wander randomly. In normal times, in this model, the Fed can cut off these “multiple equilibria” by threatening to raise or lower interest rates aggressively. But once interest rates hit zero, the Fed is powerless to do so.
This too is a central and robust prediction. For example, the main empirical success in Clarida, Gali, and Gertler’s (2000) famous new-Keynesian analysis is to tie volatile inflation in the 1970s to an estimate that the Fed reacted less than one-for-one to inflation, and less volatile inflation in the 1980s to a more aggressive Fed. Benhabib, Schmitt-Grohé, and Uribe (2001) (2002) warn of multiple-equilibrium volatility to come if the economy should hit the zero bound, and summarize the large literature repeating that warning.

It did not happen. Again, inflation was if anything less volatile with interest rates stuck at zero than before.

Fiscal theory is consistent with the long quiet zero bound. The interest rate target determines expected inflation. Unexpected inflation is uniquely determined by news to the present value of future surpluses. Inflation is both stable and determinate at the zero bound. If there is no fiscal news, and no change in the discount rate, or if those forces offset, there is no unexpected inflation either. That’s not proof; I don’t have an independent measure that people expected the deficits of the 2010s to be repaid, or (more likely) an estimate of how much they expected low interest costs to drive low inflation. But fiscal theory is at least consistent with the episode. And it’s at least plausible that the steady recovery, combined with very low real interest rates, led people not to worry any more or less than before about debt repayment.

In monetarist thought, the zero bound does not constrain monetary policy. The Fed can still create reserves or print cash, buy bonds, and let more M in MV=PY do its work to raise PY. Starting in 2009, central banks embarked on a massive “quantitative easing” (QE) program, buying bonds to create new reserves, illustrated by the dramatic rise in Fed assets in Figure 2. Bank reserves rose from $15 billion in 2007 to $2,759 billion by August 2014, an 18,400% increase. Europe, the United Kingdom, and Japan followed similar policies. The monetarist prediction is clear: hyperinflation.

It did not happen. Inflation trundled along a bit less than 2%. In Figure 2, it is hard to see any effect of QE operations. We learn that money and bonds are perfect substitutes after all when they pay the same rate of interest; higher M just results in lower V with no change in PY. Yes, economists continue to debate whether QE had a few tenths of a percentage point effect
on long-term interest rates, but for our purposes the debate is over. An 18,000% increase in the money supply is an atom bomb. If you’re debating whether somebody heard a firecracker, it was a dud. Fiscal theory, compatible with a perfect substitutability between money and bonds, survives unscathed.

The zero bound era is thus a powerful experiment. These theories were hard to tell apart in normal times, with positive and varying interest rates and small open market operations. The theories make clear and sharply different predictions about the long zero bound and QE. The predictions of classic Keynesianism, adaptive expectations, new-Keynesianism and monetarism are large, clear, and fail. Fiscal theory is at least consistent with—not rejected by—the episode.

4.3 The absence of deflation and “active” fiscal policy

Why was there no spiral, no large deflation in 2008, or in Japan’s three decades of zero rates? Many people worried that we would repeat the early 1930s, with a 30% cumulative deflation and many models predicted it. Fiscal theory offers an answer, and a story better than an appeal to “anchoring,” just “people’s expectations of surpluses must not have changed.”

Imagine that prices and wages decline by 30%. Now, government bonds are worth 30% more in real terms. To avoid default, the government must raise taxes or cut spending to pay a windfall to bondholders. Equivalently, the government’s tax revenues fall by 30%, but it must make the same payments to bondholders. And this happens in a huge recession. Can you imagine our Congress and administration saying that the government must dramatically raise taxes, cut spending, subject us to “austerity,” all to pay an unexpected and, it will surely be argued undeserved, windfall to bondholders, Wall Street banks, “the rich,” and Chinese central bankers? Isn’t the government instead likely to pursue fiscal stimulus? Is it not likely to regard deflation as a “bubble,” a temporary aberration that fiscal policy should ignore, if only because once the desired reflation occurs, so will government revenues? That is, of course, exactly what governments did with the minor deflation we observed. And if that is what people expect, a large deflation cannot happen in the first place. Deflation only happens if the expected present value of surpluses rises, on its own or in reaction to the deflation.
Conventional theories specify this sort of circular policy: Deflation raises the value of debt, governments respond with fiscal austerity, which raises the present value of surpluses to match the higher value of debt. That’s why in conventional theories, which include the valuation equation, that equation does not pin down the price level. I have made vivid here the central contrary assumption of fiscal theory: Fiscal policy does not respond one-for-one to arbitrary inflation and deflation, paying bondholders whatever the whims of a changed price level require. You can see in this instance that it is not an unreasonable assumption. The fiscal-theory assumption is called “active” fiscal policy, and the conventional assumption “passive,” following Leeper’s (1991) characterization. Despite the name, “active” fiscal policy involves not reacting to inflation and deflation.

4.4 The gold standard

In an idealized gold standard, the government promises that you can always bring in a dollar and get, say, 1/20 of an ounce of gold. This promise appears to nail down the price level.

The gold standard retains an allure. Monetary policy follows a simple and transparent rule, not requiring divinations by clairvoyant central bankers. The U.S. didn’t even have a central bank in most of the 19th century. Under the gold standard, the price level was stable for centuries. (The actual gold standard was more complex, but its details are not important here.)

But the gold standard is really a case of fiscal theory, not an alternative theory. The government has to have the gold! Governments did not back currency issues 100% with gold, and they certainly never backed their debts 100% with gold. If they had that much gold, they wouldn’t have had to borrow in the first place. So, if people wanted to turn in a lot of currency for gold, the government had to raise taxes or borrow against credible future taxes in order to get the needed gold. Currency and nominal debt were backed by the government’s ability to tax, not by vaults of gold.

Sims (1999) cites a nice example:

From 1890 to 1894 in the U.S., gold reserves shrank rapidly. U.S. paper currency supposedly backed by gold was being presented at the Treasury and gold was being
requested in return. Grover Cleveland, then the president, repeatedly issued bonds for the purpose of buying gold to replenish reserves. This strategy eventually succeeded.

Cleveland persuaded bond buyers that the United States would run larger future fiscal surpluses, so those buyers were willing to lend.

The United States’ final abandonment of gold promises in 1971 followed a similar outflow of gold to foreign central banks, who presented dollars for gold. The Nixon administration was unable or unwilling to take the fiscal steps necessary to buy or borrow gold. In part, it likely did not want to suffer the deflation that restoring gold parity would have implied.

The gold standard is a fiscal commitment. The stream of expected future surpluses has been a bit nebulous so far. The gold standard offers a commitment of just what that stream will be. The government will raise taxes or cut spending just enough to repay money and government debt at the gold value (e.g. $20 per ounce), no more and no less. Bond and money holders don’t need specific surplus forecasts, they just need to understand the commitment, and a general sense that the government has the fiscal space and the will to do whatever it takes so that the present value of surpluses will, in fact, be the value of government debt.

The gold standard had many flaws, however. First, the gold standard era also featured inflation, devaluation, runs, and crises when governments couldn’t or wouldn’t tax or borrow to get gold. Those episodes reinforce the fundamentally fiscal nature of the gold standard, and they remind us that all governments have fiscal limits.

Second, there was much short-run inflation and deflation under the gold standard. Money does not rise or fall in value relative to gold, but money and gold together can rise and fall in value relative to goods and services. We want a standard that stabilizes the general price level.

Third, the gold standard is a flawed fiscal commitment. It proved vulnerable to deflation, a rise in the value of gold and currency relative to goods, services, and wages. When such deflation raises the value of debt, the government is committed to raise taxes or cut spending in order to pay a windfall to bondholders, who get more goods and services than they bargained for. Gold standard fiscal policy is “active,” refusing to validate changes in the value of currency relative to gold, but fiscal policy is “passive” to deflation in which both currency and
gold gain value. We would like the government to commit to pay off nominal debt at a given price level, not a given gold value.

The acid test came in 1933. (Jacobson, Leeper, and Preston (2019) provide an excellent account.) The Roosevelt administration faced a cumulative 30% deflation amid deep depression and failing borrowers and banks. What did they do? They abrogated the gold commitment. They devalued the official rate, from $20.61 dollars per ounce to $35 dollars per ounce, and greatly restricted gold holding, no longer allowing most people to convert dollars to gold. The UK, France and other countries also abandoned gold. They refused to raise surpluses in reaction to deflation, and thereby restored the price level. They restored “active” fiscal policy.

This reputation, that the government will not raise taxes or cut spending in a depression to validate deflation, is exactly, in my reading of the last section, why the feared deflation of 1933 did not break out again in 2008.

On its own, the present value of surpluses is a somewhat nebulous quantity, as is the present value of dividends. The gold standard is an institution designed to control, communicate, and commit to that present value. Such institutions abound in government finance, including independent central banks, inflation or foreign exchange targets, and the hard-won reputations of treasuries for repaying debts without inflation. Fiscal theory leads us to study such institutions and think about how to improve them.

4.5 Currency pegs

A foreign exchange peg is a lot like a gold standard. Here, a government promises to freely exchange its currency, say pesos, for another, say dollars, at a fixed rate. The foreign currency peg is likewise a fiscal commitment. It says, “We promise to generate enough fiscal surpluses to redeem our money and debt at this value measured in foreign currency.”

As with gold, attention often focuses on reserves—how many dollars the central bank has. But, as with gold, no country ever has backed all of its currency and all of its debt with reserves. So in the end, the foreign currency peg depends on the government’s ability to tax, to get dollars, or to promise future taxes, to borrow dollars. Even currency boards, which back currency 100%, can fail. When the government can no longer borrow to finance deficits, it
abrogates the board and grabs its assets. Argentina’s (imperfect) currency board, which pegged the peso to the dollar one for one from 1991 to 2002 with large dollar reserves, fell apart in this way.

Most clearly, suppose a country thinks its exchange rate, 2 pesos to the dollar, is undervalued, and wishes it to be 1 peso to the dollar. Well, let the central bank simply offer to buy and sell one peso to the dollar at will. That monetary policy should nail down the exchange rate. But people will rush to convert, and the central bank will quickly run out of dollars. The peg depends on the government’s fiscal commitment to raise as many dollars as it takes.

An exchange rate peg also suffers the same practical and fiscal problem as the gold standard. A rise in the real exchange rate forces an unwanted deflation, and forces the government to validate that deflation with fiscal austerity.

4.6 Foreign or indexed debt

Many governments choose to borrow in foreign currency as well as in their own currency, or issue indexed debt, a milder commitment than a peg or dollarization. A higher price level or a lower exchange rate does not reduce the real value of foreign currency debt or indexed debt. The government must raise surpluses to pay off such debt, or default.

Thus foreign or indexed debt act like corporate debt, which must be repaid to avoid default. Domestic currency debt acts like corporate equity, whose price can fall to meet the lower expected dividends.

We can then think of the choice between domestic and foreign currency debt or nominal versus indexed debt as we think of a corporation’s choice between debt and equity. Nominal debt, effectively government equity, allows the government to share the risks of fiscal stress, to let inflation or currency devaluation avoid the pain of crises or formal default. On this basis, for example, Sims (2001) argues that Mexico should not adopt the dollar. The same argument lies behind the view that countries like Greece should not join the euro.

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7 An indexed bond protects investors against inflation. In simple terms, rather than get $1 a year from now, an indexed bond pays $1 adjusted upward for any increase in the CPI. Naturally, you pay more for this protection up front. TIPS (treasury inflation protected securities) are indexed debt in the US.
But equity invites moral hazard. Surpluses are choices, not exogenous shocks. Countries that borrow in domestic currency face the temptation to inflate rather than fix fiscal problems. Countries that borrow in foreign currency or indexed debt have an extra incentive to run the surpluses ex-post that they promised ex-ante. That precommitment allows them to borrow in the first place, and at a lower rate. So, despite the risk-sharing and default-cost reductions of equity, corporate finance recommends widespread use of debt.

Nominal government debt, like corporate equity, works better when government accounts are more trustworthy and transparent, and when the country has other means to commit to repay. The control rights of shareholders are that mechanism for corporate equity. What are the equivalent of control rights for nominal government debt? Why do governments not always inflate away debt ex-post? Most naturally, voters. If nominal government debt is inflated away, a whole class of voters is really mad. Beyond those who lose value of their government bonds or private nominal debts, the chaos of inflation hurts everyone.

Thus, the standard ideas of corporate finance suggest that countries with precommitment problems, poor fiscal institutions, unstable politics in which new leaders routinely overturn the commitments of ousted ones, and untrustworthy government accounts; countries that tend to issue and then default or inflate, should choose to or have to issue indexed or foreign currency debt. Countries that have alternative precommitment mechanisms, strong institutions, and stable democracies with a widespread class of people who prefer less inflation, have their own currencies and borrow in those currencies.

Confirming this view, dollarization, currency pegs, and foreign debt are common in the developing and undemocratic world. Successful non-inflating currencies and large domestic-currency debts seem to be the province of stable democracies.

4.7 Inflation targets

In the early 1990s, several countries that were experiencing inflation instituted inflation targets, including New Zealand, Canada, Sweden, and Israel. The targets included a formal agreement between government and central bank, mandating that the central bank focus on
inflation, and, by implication, not on other goals. Inflation dropped on the announcement of the inflation targets and stayed there.

Just how were these miracles achieved? Did previous central banks just lack the guts to do what’s right, in the face of political pressure to inflate? Moreover, just what does the central bank do to produce low inflation after the inflation target is announced? One would have thought, and most people did think, that the point of an inflation-targeting agreement is to insulate the bank from political pressure during a long period high interest rates and painful recession, such as the US and UK experienced in the early 1980s. But nothing of the sort occurred. Inflation simply fell like a stone on the announcement of the target. Well, “expectations became anchored” when the target was announced, but why? The long history of inflation certainly did not lack for speeches and promises from politicians.

Inflation targets are an agreement between central bank and government. They therefore include an implicit commitment by the government to run fiscal affairs so as to pay off debt at (say) 2% inflation, no more, and no less. Above-target inflation will lead to fiscal tightening. Below-target inflation will lead to stimulus.

The inflation-targeting economies came out of periods of low economic growth and fiscal trouble. The inflation targets were part of a suite of fiscal, financial, regulatory, and pro-growth reforms. The latter matter: Tax revenue equals tax rate times income, so the surest way to get more tax revenue is to allow more economic growth which raises income and reduces spending needs. Raising tax rates is like walking up a sand dune, since each rise in tax rate lowers income.

Thus, in this reading, the inflation target functions as a gold price or exchange rate target, as a fiscal commitment to adjust the stream of surpluses to pay off debt at the inflation target. But the inflation target aims at the CPI directly, not the price of gold or exchange rate, eliminating that unwelcome source of relative price variation. And the inflation target avoids the run-inducing promise to freely trade cash for gold or foreign currency.

That inflation fell quickly, without a period of high interest rates or recession is also revealing. The Phillips curve underlying most macroeconomic models specifies that inflation is lower today if expected future inflation is lower, and when output is low or unemployment is
high. If firms expect lower future prices, they lower prices today. Traditional analysis specifies that expectations react slowly to observed inflation, so a long period of low output and high unemployment is necessary to drive down inflation. In the inflation-targeting episodes, expected inflation fell quickly when people saw the underlying fiscal problem was solved, with no period of high unemployment and no gradual adjustment. These episodes show that expectations can change quickly, and in response to underlying economic and political news, not just news about past inflation.

An inflation target failed instructively in Argentina 2015-2019 (Cachanosky and Mazza (2021) and Sturzenegger (2019)), one of many cases in which Latin American inflation monetary policies failed because the countries did not solve the underlying fiscal problems (Kehoe and Nicolini (2021)). These failures reinforces my point that a successful inflation target is as much a commitment by the government as commandment to the central bank.

This sort of fiscal commitment is not written in official inflation targeting agreements, nor is it (yet) much discussed in the surrounding literature. But it surely seems like a reasonable expectation of what the commitments to fiscal and microeconomic reform in inflation-targeting legislation mean. A more formal fiscal rule, announcing how fiscal policy will and won’t react to inflation, might anchor expectations more solidly.

4.8 The ends of inflations

One can read the success of inflation targets as a modern instance of Sargent’s (1982) classic study of the ends of hyperinflations in Austria, Germany, Poland, and Hungary in the early 1920s. Figure 3 reproduces Sargent’s famous plot of the German price level in this period. Notice the exponents on the vertical axis.
Germany’s central problem was fiscal:

Germany owed staggering reparations to the Allied countries . . . considerably larger sums were initially expected of Germany than it ever was eventually able to pay.

Fiscal uncertainty is also important, an important consideration in present values:

the extent of Germany’s total obligation and the required schedule of payments was for a long time uncertain and under negotiation. . .the uncertainty about the reparations owed by the German government necessarily cast a long shadow over its prospects for a stable currency.

Germany was printing money to finance intractable deficits. Germany’s hyperinflation stopped when the long-term fiscal problem was solved.
Germany . . . obtained relief from her reparation obligations. Reparations payments were temporarily suspended, and the Dawes plan assigned Germany a much more manageable schedule of payments.

The fiscal trouble was not all reparations, and included permanent changes to the government budget, in particular firing a great many unnecessary government workers.

With the fiscal problem solved,

Simultaneously and abruptly three things happened: additional government borrowing from the central bank stopped, the government budget swung into balance, and inflation stopped.

The stabilization did not involve monetary stringency. The opposite occurred. When the inflation stopped, Germany printed more money. Absent inflation, people are willing to hold a larger real quantity of money. In the similar Austrian case, “the circulating notes of the Austrian central bank increased by a factor of over 6” after stabilization. There was also no recession:

By all available measures, the stabilization of the German mark was accompanied by increases in output and employment and decreases in unemployment.

In Sargent’s larger survey, restoring central bank independence was also important, but primarily as a fiscal precommitment, to make it harder for the central bank to print money to finance fiscal deficits. After describing the new Austrian central bank that backed note issue by foreign currency and gold, Sargent continues, that its currency was backed

ultimately by the power of the government to collect taxes . . . by the commitment of the government to run a fiscal policy compatible with maintaining the convertibility of its liabilities into dollars. Given such a fiscal regime, to a first approximation, the intermediating activities of the central bank did not affect the value of the crown . . .

Sargent emphasizes the importance of a change in regime. For people to believe that the present value of surpluses has changed, people need to see that fiscal and monetary affairs have changed in a durable way. Announcements, decisions, promises, temporary and reversible “austerity” policies by today’s politicians don’t budge long-term expectations. Again, people’s
expectations did shift, suddenly, on fundamental political news, not after a slow period of learning by watching inflation itself.

Recognizing the potential reaction that this is all very well, but hyperinflations are special, Sargent studied the end of the more moderate French inflation of the 1920s, Chapter 4 in Sargent (2013). Poincaré’s election, signaling the resolution of the fiscal problem, stopped inflation in its tracks before the exact nature of the stabilization was worked out.

The lessons of these episodes are worth summarizing in a bullet point

• Successful inflation stabilizations involve joint monetary, fiscal, and microeconomic reform, in a durable new regime. They do not have to involve recessions.

4.9 Currency crises

Emerging-market currency crashes have always been fertile ground fiscal foundations. Many inflations and devaluations have clearly fiscal underpinnings. On the other hand, many large debts and deficits have not led to currency devaluation or inflation, and inflation and devaluation has often happened with few ex-ante fiscal problems.

The fiscal theory insight that expected future surpluses and deficits, discounted, matter offers a way to understand these episodes. Burnside Eichenbaum and Rebelo (2001) is a classic. They study the East Asian financial crises of the late 1990s. In these crises, pegged exchange rates suddenly collapsed. Why? The economies were growing well, the governments did not have substantial debts or deficits, and there was no extraordinary monetary loosening. However, Burnside Eichenbaum and Rebelo show that the crises were precipitated by bad news about prospective deficits. Banks had borrowed a lot of short-term foreign-currency debt. The government was poised to bail out banks. A run on banks then became a run on government surpluses.

The episode has broader lessons. The form of international investment matters. Equity investors who wish to pull out must sell to locals at low prices. Short-term foreign currency debt is the danger, not the fickle desires of international investors. A small country that guarantees banks with large foreign currency exposure is in a dangerous situation. Iceland and
Ireland, who hosted large euro bank deposits that were invested in US mortgage backed securities, found out this danger after the financial crisis of 2008. Contingent, off-the-books liabilities, such as a habit of bailing out banks and other financial institutions, or businesses, homeowners, and student debts, can quickly explode government liabilities, and are not reflected in conventional surplus and deficit forecasts. Contingent liabilities make a government more fragile to inflation and devaluation.

4.10 The great inflation and its end

The US, UK, and much of the rest of the world last experienced a major inflation in the 1970s, which ended in the 1980s. Figure 4 presents inflation and the federal funds interest rate during the period. Inflation came in three great waves, punctuated by recessions.

The conventional story of this episode focuses on monetary policy: Policy was too loose in the 1960s and 1970s, reacted too slowly to the oil price shocks of the 1970s, and reacted too slowly to inflation. Though interest rates rose promptly and one for one with inflation, this is thought not to be sufficient. Inflation was conquered in the early 1980s by persistently high real interest rates, at the cost of a bruising recession.

The fiscal side of the story is less well investigated, but suggestive. Figure 5 plots the real primary surplus. The graph emphasizes that most variation in deficits and surpluses comes from business cycles: Tax receipts fall as income falls in a recession, spending on automatic stabilizers such as unemployment insurance as well as discretionary stimulus rises. The budget reliably swung towards surplus, repaying some if not all of that debt, in subsequent expansions. We have to see changes in the present value of surpluses on top of this regular pattern. I plot the unemployment rate to allow some eyeball corrections for business cycles.

I plot the primary surplus, not including interest costs on the debt, as the value of government debt equals the present value of real primary surpluses. Interest costs enter the government debt valuation equation through the discount rate. I plot actual real surpluses rather than surpluses divided by GDP, as it is surpluses themselves which repay debts. I plot NIPA quantities for easy reproducibility, but they are not ideal measures especially of interest costs of the debt.
Figure 4: CPI inflation and federal funds rate in the great inflation

Figure 5: Real primary surplus and negative unemployment rate 1980-2000. Primary surplus is Federal net lending or borrowing plus federal interest payments, converted to 2012 dollars via GDP deflator.

Standard history recognizes fiscal deficits of the late 1960s as a cause for inflation, due to President Johnson’s desire to fund both the Great Society and the Vietnam War without tax increases. These deficits are hard to see in the graphs, and they are smaller than deficits that came later. The stresses of the Bretton Woods era are less well recognized. Under Bretton Woods, the US committed to exchange dollars for gold at a fixed rate with foreign central banks, and capital markets were largely closed: people could not easily buy stocks and bonds across borders. This system, effectively tying the price level to gold, is incompatible with any
sustained inflation, even the few percentage points of the 1960s. Closed capital markets are inconsistent with steady trade deficits, which the US could not finance by selling assets abroad, and instead had to finance with dollars and thereby gold. Both constraints provoked essentially a foreign exchange and debt crisis in 1971 when the US fully abandoned the gold and currency pegs of Bretton Woods.

The 1970s featured an economic slowdown, and a break in fiscal policy. Since WWII, the US had run moderate deficits in recessions, steady primary surpluses in expansions, and slowly paid off WWII debt. The growth slowdown and severe recessions provoked much larger deficits in recessions, lower surpluses in the following expansions, and concern over long-run debt sustainability. The 1975 deficit in particular was larger than anything seen since WWII.

One can digest the waves of inflation in the 1970s with the two experiments of Figure 1. Fiscal shocks lead to a sustained inflation. Monetary policy, tightening interest rates without any change in fiscal policy, can alleviate inflation temporarily, but eventually makes inflation worse. Sims (2011), describing a similar model, called that pattern “stepping on a rake.”

1980 was not just a monetary disinflation. It was a joint monetary, fiscal and microeconomic reform. First, the “Reagan deficits” of the early 1980s were not, in fact, unusually large primary deficits, especially given the severe recession. They were largely higher interest costs on existing debt. Second, the high interest rates of the early 1980s were quickly followed by two tax reforms, in 1982 and 1986, that slashed federal marginal tax rates\(^9\) (the top personal marginal tax rate fell from 70% to 28%) while removing many exclusions, “loopholes,” and thereby broadening the base. Third, the government began a set of deregulatory reforms, starting with airlines, trucks, and telephones under President Carter, that at least slowed down the pace of regulation and were at least aimed at increasing economic growth. Whether for these reasons or just good luck, economic growth rose, tax revenues rose, and so did surpluses. As Figure 5 shows, by the late 1990s, the government was running large primary surpluses. Ex-

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\(^9\) The marginal tax rate is the extra amount of taxes that you pay if you earn an extra dollar. Marginal tax rates drive economic incentives and distortions. Always distinguish between taxes and marginal tax rates!
post, at least, the present value of surpluses did rise, and dramatically so, fully justifying the disinflation.

In the opposite of the 2010s experience, interest costs on the debt rose with the high real interest rates of the 1980s, an inflationary force. As Figure 4 emphasizes, the government had to finance debt at 3% to 5% interest rates for a decade. Taxpayers paid for that. Investors who bought 10 year bonds at 15% yield in 1980, expecting inflation, got repaid in an environment of 3% inflation, a 12% windfall real return. Taxpayers paid for that too.

Thus, we should understand the end of inflation in the 1980s as a joint monetary, fiscal, and microeconomic reform, like the end of inflations or inflation targets studied above. In the context of Figure 1, there was a disinflationary shock to the present value of surpluses, largely the effect of larger economic growth. That allowed the additional temporary disinflationary effect of higher interest rates to push down inflation quickly and, this time, durably. Without the surpluses, to pay a windfall to bondholders and high interest costs on the debt, the stabilization would have failed.

The government debt valuation formula, discounted by returns, is an identity. We know, at least ex-post, that the disinflation of the 1980s corresponded to a rise in the subsequent 20 years of surpluses, overcoming high interest rates. And we know that without those surpluses, any durable disinflation could not have happened. We can, and should, analyze how soon people plausibly figured that out, and to what extent greater surpluses came from the economic reforms of the 1980s, as I have suggested, or just plain good luck.

The fiscal reform came after the monetary tightening, and surely it was unclear that the fiscal stabilization and economic revival would be as successful as they turned out to be. In turn, that may help to explain why the recessions of 1980-1982 were so bruising, while hyperinflations and inflation targets stopped inflation with little pain. That this one would stick, and would be followed by the necessary reforms and consequent economic growth, that a durable “regime change” had happened, that expected inflation should rapidly decline, may well have been unclear. The high ex-post real interest rates of the 1980s may reflect some decent probability that the whole thing would unravel once again. Latin American history is
likewise full of examples in which monetary stringency temporarily stops inflations, but fiscal reforms fail to materialize and inflation spirals away again, or indeed the higher interest costs make inflation worse immediately (Kehoe and Nicolini (2021)).

### 4.11 The 2000s and beyond

Fiscal events turned around in 2000, as illustrated in Figure 6.\(^\text{10}\) A sharp reduction in trend GDP growth in 2000, and the recessions of 2000, 2008, and 2020 provoked successively larger deficits. The 10% of GDP deficit in 2008 looked huge at the time, only to be dwarfed by 30% of GDP in 2021. The US (public) debt to GDP ratio rose from 55% in 2000 to 135% in 2020, declining to 125% in 2022 only by the force of 10% cumulative inflation in the denominator. CBO long-term forecasts point to steady 5% of GDP primary deficits, followed by even worse deficits as aging boomers drain Social Security and Medicare. And even those forecasts assume we don’t have another crisis, war, or pandemic. Yet inflation stayed subdued all the way until 2022, as shown in Figure 2.

![Figure 6: Primary surplus/GDP and negative unemployment rate](image)

The first question is, why did inflation stay so low for the first two decades of the 2000s in the face of these large and persistent deficits? The most natural candidate is, once again, discount rates: Real interest rates, and consequently debt costs, went on a steady downward

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\(^\text{10}\) In this figure I plot primary surpluses/GDP, to focus on fiscal policy itself rather than the size of the surpluses that repaid debt from the 1980s.
trend, becoming negative for the entire 2010s (Figure 2, top). The policy discussion turned to “$r < g$,” the possibility that with interest rates permanently below economic growth, government debt never has to be repaid. Olivier Blanchard’s (2019) AEA presidential address is a prominent example, notable for the careful discussion of the issue, presenting the case that “public debt may have no fiscal cost.” Calls for cost-free fiscal expansion based on “secular stagnation” and “modern monetary theory” grew.

Whether true or not, these views captures a widespread set of expectations, that paying back debt would be easy. People were willing to hold US government debt despite very low rates of return.

Starting in January 2021, inflation surged, reaching 8% by the middle of 2022. From a simple fiscal-theory armchair, this event looks like a fiscal helicopter drop; a large version of the fiscal shock plotted in the top panel of Figure 1. From 2020 through 2021, the Fed and Treasury together sent people and businesses checks worth about $6 trillion, financed about half by new Treasury debt and half by new reserves. (See Cochrane (2023) Chapter 21 for details.) The cumulative deficit was about 30% of GDP or 38% of outstanding debt. No wonder inflation broke out.

It’s not so easy. In fiscal theory, a deficit is only inflationary if people do not expect it to be repaid by subsequent surpluses. So we must include a story why people do not expect this debt not to be repaid, in full or in part. And, what is different that people apparently did expect the debt of 2008-2020 to be repaid?

There are many suggestive stories. First, it is significant that politicians and administration officials did not emphasize repayment, while such promises were a constant theme of the earlier era. Instead they repeated the view that low interest rates allow for fiscal expansion without worrying about repayment. For example, in her January 2021 confirmation testimony,\(^{11}\) just before passage of the $1.9 trillion “American Rescue Plan,” and just as inflation started, Treasury Secretary Janet Yellen opined that “right now, with interest rates at historic lows, the smartest thing we can do is act big.” But unless $r < g$ magic allows any size of

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debt, it is unlikely that the 2020s will see an additional 3-5 percentage point decline in real interest rates, as I argued helped to pay for the 2008-2009 deficit. It is not unreasonable that people understood the lack of a plan for repayment, but distrusted the possibility that low interest rates would solve the problem.

Second, the 2020-2021 deficits were much larger than the 2008-2009 era stimulus, as seen in Figure 6. Moreover, the pandemic was largely a reduction in the economy’s productive capacity, not lack of demand. Restaurants were not closed because people didn’t have the money to go out to dinner. A massive increase in aggregate demand shows up more quickly in prices.

Third, it is plausible that creating reserves and sending checks to people is more quickly inflationary than borrowing in treasury markets and spending. Who gets debt matters to how quickly it is spent. What kind of debt matters to expectations of repayment. Treasury debt has a different reputation than reserves backing checking accounts.

How will inflation be contained? If, as I suggest, we have suffered a fiscal shock, as shown in the top panel of Figure 1, monetary (interest-rate) policy can only modify that inflation by adding the response shown in the bottom panel of Figure 1, as I argued of the 1970s. Monetary policy can give us lower inflation now, but at the cost of higher inflation later. Here, fiscal theory gives a generalized form Sargent and Wallace’s (1981) “unpleasant arithmetic.”

Postponing inflation is still useful: A smaller but longer lasting inflation is desirable in many economic models, as it reduces the output effects of inflation. A Taylor-type rule in which interest rates react to inflation produces such smooth but long lasting inflation, and reduces output volatility.

Still, in this analysis monetary policy alone cannot durably eliminate a fiscally-induced inflation. To durably end inflation, monetary and fiscal policy have to work together. We need a

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12 Sargent and Wallace showed that seigniorage, printing money to cover deficits, would have to happen sooner or later if deficits were not cured. The calculations of Figure 1 include devaluation of outstanding nominal debt and interest costs on the debt, but ignore seigniorage. So, the point is the same, but the channels for fiscal–monetary interaction are different, and a good deal larger. In the end, as shown in Figure 5, deficits were cured, so Sargent and Wallace’s feared future inflation did not come to pass.
deflationary fiscal shock, the negative of the top panel of Figure 1, as well as a positive monetary shock, the bottom panel of that figure.

The problem is four times larger than in 1980. In 1980, the debt to GDP ratio was 25%. Now it is 100% and rising. Today, a 5% real interest rate raises interest costs by 5% of GDP, $1.2 trillion, for every year it lasts. If fiscal policy does not tighten by at least that much, the rise in interest costs is an additional inflationary force. Without that fiscal help, raising rates can fail to lower inflation even in the short run.

Even this outlook assumes that we do not have additional adverse fiscal shocks. Having crossed the line that people do not think additional debt will be repaid once, will people think that additional smaller deficits in the next few years will be repaid by later surpluses? If—when—the next crisis hits, and the US wishes to borrow or print $5 trillion of new money and debt, will people lend and hold the extra debt, or will inflation come even more quickly?

Moreover, debt that is viewed as sustainable because of low interest costs is fundamentally unstable. If investors get scared and demand higher interest rates, the debt becomes unsustainable. Inflation surges, seemingly out of nowhere, or far out of proportion to the initial shock. Abundant fiscal space, a background of healthy long-run surpluses, and financing deficits with long-term debt, which passes higher rates more slowly to interest costs, would squelch all these worries. But we do not have that space.

5. Concluding comments

Fiscal theory is not by itself a theory. The government debt valuation is an ingredient of a theory, one of many equations of a fully specified model. How “fiscal theory” behaves depends on how one fills out the rest of that model. In this essay, I largely place fiscal theory in the context of the simplest new-Keynesian models. One can easily embed fiscal theory in more general models, featuring all the frictions and heterogeneities that make macroeconomics fun and interesting. Though such embedding is technically easy, the questions one is led to ask and the results can be quite different, as my Figure 1 differs from the standard textbook new-Keynesian analysis.
One might wish for formal tests rather than flesh out my interpretive histories. The history of economics warns against that approach, and 25 years of fiscal theory tests have not proved productive. Formal tests monetarist vs. Keynesian vs. rational expectations vs. real business cycle vs. new-Keynesian theories as a class have never been productive. Each of these has been evaluated by their ability to plausibly understand episodes and robust facts. Does money vs. autonomous spending account for the Great Depression? Why did Phillips curves shift in the 1970s, 1980, and ends of hyperinflations? What accounts for the relative cyclical volatility of output, consumption, hours, and wages? Fiscal theory, like these, will rise and fall on whether it is useful to understand episodes and analyze policy, not in some formal test. And that usefulness requires a good deal of elaboration before one begins testing anyway. The rest of the model matters to predictions.

In particular, the 50 years of rational vs. behavioral finance was never settled by a formal test. Tests of the present value relation for stocks have been fruitless. Trying to forecast dividends, discount them back, and reproduce the stock price, or declare failure in the attempt, has gone nowhere. People might know more than the forecast, and there always exists a discount factor that reproduces the observed price. But is it plausible? Aha, now we have something to work on. Thus, trying to independently forecast surpluses, discount them, and compare them to the observed value of debt is unlikely to be productive. Yet empirical asset pricing is one of the richest and most successful areas of economics. We should follow its lead in application, and not spend another 50 years re-learning its hard-won lessons.

A bottom line: Monetary and fiscal policy are both important to inflation, as exemplified by the simple case in which the interest rate sets expected inflation and fiscal news determines unexpected inflation. Monetary policy alone does not completely determine inflation. It’s not up to the Fed alone. A stable price level requires a well-designed monetary and fiscal regime.
References


