The Fiscal Theory of the Price Level: An Introduction and Overview

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Abstract

I introduce and summarize the fiscal theory of the price level. 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 then innovations to the present value of surpluses pick unexpected inflation. Fiscal theory is a frictionless supply and demand foundation, on which we can add interesting ingredients. Long-term debt is an important buffer and allows a higher interest rate to lower inflation without a fiscal shock. An s-shaped surplus process and time-varying interest rate are crucial to fitting data. One can easily integrate fiscal theory with standard new-Keynesian macroeconomic models. The models are observationally equivalent. That equivalence is a feature not a bug. It opens the door to easy translation. It focuses our attention on direct information about government policy rather than statistical tests. It shows how to fix the current generation of fiscal theory models to describe the whole sample, and better, not just periods of undesirable high inflation. Fiscal theory overturns many traditional doctrines of monetary policy. It accounts for the stability of inflation at the zero bound. Fiscal theory offers a warning that containing a new inflation will be harder, as interest costs on a large debt and the fiscal costs of debt revaluation will be larger.

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> "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."
>
> Adam Smith, *Wealth of Nations*, Vol. I, Book II, Chapter II.

1 Introduction

Suppose inflation breaks out, and the U.S. decides to repeat the policy of the early 1980s. But this time, we start from a 100% debt-to-GDP ratio, not 25%. If the Fed raises interest rates by 5%, that adds 5% of GDP to the interest costs of the debt, more than $1 trillion, per year. The government must tighten fiscal policy by $1 trillion per year, or borrow against credible future tightening. If it does not do so, even higher inflation must result. The ECB faces a related dilemma. Italy's debt-to-GDP ratio is 160%. Higher interest costs on its debt could spark the debt crisis that the ECB has been trying so hard to avoid for a decade.

Moreover, an unexpected inflation decline is a windfall to bondholders. If inflation declines 5 percentage points unexpectedly at 100% of GDP, the government must come up with 5 percentage points of GDP in extra taxes or lower spending to pay them off without defaulting. If it does not, the attempted disinflation will fail. This happened. people who bought 10-year Treasury bonds in September 1981 got a 15.84% yield, as markets expected inflation to continue. From September 1981 to September 1991, the CPI grew at a 3.9% average rate. By this back-of-the-envelope calculation, those bondholders got a 12% annual real return, courtesy of U.S. taxpayers. Will it happen again?

What if the government keeps borrowing with no attention to long-run repayment, and people lose faith it will ever repay the debt? Eventually, people see the end coming and try to sell government debt. Doing so, they drive up the cost of everything else. In such a fiscal inflation, there is not much that the Federal Reserve alone can do.

Welcome to the fiscal theory of the price level.

2 What is the fiscal theory?

Think of a simple two-day economy, as illustrated in Figure 1. In the morning of the second day, people redeem maturing one-period nominal government bonds. Nominal bonds each promise to deliver one dollar. The government prints a new dollar to redeem each bond. People take the money and go about their business. The government may also print more money, and hand it out as transfers. By the end of the day, the government requires that each household pay taxes, in dollars, equal to a fraction of their nominal income. The government burns the money that it collects in taxes.

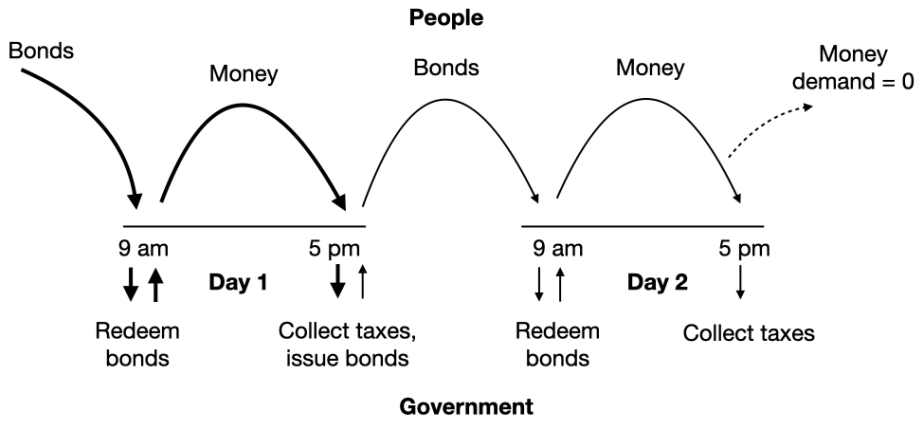

Figure 1: Timing in a two-day fiscal theory economy

People do not want to hold any money or debt overnight after the one day is over. Towards the end of the day, people who have more money than they need to pay taxes try to buy something with it. People who do not have enough money to pay taxes try to sell. If there are more buyers than sellers, aggregate demand is too large. There is too much money chasing too few goods. The price level rises. As the price level rises, however, the amount of money due in taxes also rises. So, the price level rises until all the money printed up to retire nominal debt in the morning is soaked up by primary surpluses – the difference between taxes and transfers – by the evening.

We have just determined the price level. This is the fiscal theory of the price level.

Moving back to the first day, the government again prints up money to redeem maturing bonds, and soaks some up with primary surpluses. But now it can also soak up

money by selling debt, coming due on the second day. By previous logic, the real value of that debt is the present value of the second day's surpluses. Thus, *The price level adjusts so that the real value of nominal debt equals the present value of real primary surpluses.*

I refer to the latter condition (after "adjusts") as the "government debt valuation equation," since it operates like asset pricing valuation equations. Money is like stock. If we used Apple shares as numeraire, we would start the theory of the price level at the present value of Apple dividends. The fiscal theory notices that nominal debt is a residual claim to primary surpluses, and applies the same economic logic.

I draw the first-day lines thicker in Figure 1 to illustrate a case that half of the debt outstanding at the beginning of the first day is repaid by the first-day's surplus, and half by the second day's surplus. The first day could have a deficit, reversing the size of the lines. I draw different size lines to emphasize that the quantity of debt on the two days is not the same, and first-day surpluses raise or lower that quantity.

That the *present value* of surpluses matters, not the immediate surplus or deficit, is important. Fiscal theory does not tie inflation tightly to current deficits and debts, which is fortunate because there is little immediate correlation between debt, deficits and inflation. What matters is debt relative to people's assessment whether the government can and will eventually repay that debt. Governments with large debts or deficits, but sound long-run finances that can run surpluses to pay off those debts, need not see inflation. Contrariwise, even governments with small debts or deficits may see unexpected inflation, coming seemingly out of nowhere, when people lose faith that future surpluses will materialize. Finally, the present value of surpluses can change when the discount rate – approximately, the real interest rate – for government debt changes, with no news about surpluses at all. Higher real interest rates lower the present value of surpluses, and are thus an inflationary force. Equivalently, higher real interest rates raise the interest costs of the debt, which enter the budget just like lower primary surpluses.

This is an economic model, not just a story. Stories are often wrong, especially in monetary affairs. To believe that this is a coherent story, you should check that objectives, budget constraints and equilibrium conditions are written down and solved correctly. I present this model, and the rest discussed in this article, with equations in Cochrane (2022), summarizing decades of research. A proper theory also requires answers to a long string of what-abouts, what-ifs, and theoretical objections. What about budget con-

straints? What about $r < g$? And so on. I cover these issues also in greater, perhaps agonizing, detail there. Finally, that book summarizes the voluminous literature far more comprehensively and fairly than I can attempt here. This essay is largely a summary of that effort.

My story may seem simple, and obvious. (It is!) What's absent is what's novel and distinctive. There is no special money demand. There are no monetary or financial frictions. It does not matter if people use government money or something else for transactions. The government need not control money supply. There is no redemption promise, commodity standard, gold standard or foreign exchange peg giving value to money. Prices are fully flexible. There is no interest rate rule that promises to cut off multiple equilibria via interest-rate policy. The fiscal theory is a complete and fundamentally different theory of the price level from monetarist, commodity-standard, Keynesian, or new-Keynesian theories of the price level. We can regard fiscal theory as a backing theory. Fiat money, issued by a government, is in fact backed by its value in paying taxes, as Adam Smith intuited long ago. We can also say that money is backed by the government's willingness and ability to soak up any excess money with primary surpluses.

We can add all sorts of frictions, and we will. But fiscal theory allows us to *start* with a simple frictionless supply-and-demand view of the price level, and they layer on frictions as needed. That is distinctive, and beautiful.

Fiscal theory is not an impressive piece of machinery, like game theory or general relativity. It is a less-is-more theory. The hard decades-long effort is the development, elaboration, specification, and application of this simple basic idea, to the point that today it is ready to be *useful*, to understand history and to analyze policy.

3 Fiscal and Monetary Policy

Suppose at the end of the first day, the government sells more nominal debt, without changing current or future surpluses. Since the real value of debt is the present value of unchanged surpluses, the revenue raised from the bond sale is unchanged. Bond prices fall one-for-one with the larger nominal debt; nominal interest rates rise. (To keep the story simple, I imagine a constant real interest rate and risk-neutral pricing. You can specify a constant endowment in the two periods.) Then, when on day two the larger

debt shows up with unchanged surpluses, the price level rises. Thus, selling more nominal debt *without* changing surpluses raises nominal interest rates, lowers bond prices, raises expected future inflation, and has no effect on the current time-1 price level.

The government could also offer to buy and sell nominal government debt freely at a fixed interest rate, while holding surpluses constant. If the expected future price level is too low, the prospective return on government bonds exceeds the real interest and discount rate. People will buy bonds. As they buy nominal bonds, the expected future price level rises, until the expected real return on government bonds equals the real rate.

Thus, the government can set a nominal interest rate target, offering to buy and sell government bonds at a fixed rate with no change in surpluses. This form of "monetary policy" controls expected inflation. Though this is "fiscal theory," monetary policy remains centrally important to inflation. Fiscal policy, surprises in the second-day surplus, sets unexpected inflation.

If the government sells nominal debt, and simultaneously *does* promise higher subsequent surpluses to repay that debt, the government raises additional real revenue from the debt sale. It could use this revenue to finance a deficit. This is the normal course of fiscal policy: deficit today, sell debt, promise credibly to repay the debt, and then, on average, repay the debt with subsequent surpluses. A pattern of such normal fiscal policy is completely consistent with fiscal theory. Fiscal theory can have wide variation in debt and deficits, with no inflation at all.

The "monetary policy" debt sale with no change in surpluses, and the "fiscal policy" debt sale that finances a deficit by promising later surpluses, are analogous to a share split vs. an equity offering. In a split, a corporation issues additional shares, but there is no expected change in dividends. The company raises no revenue, but changes the stock price. In an offering, a corporation issues additional shares, but expected dividends rise. The company raises revenue (finances a current deficit), which it uses to make investments that fund the higher dividends. The stock price does not change. How do people know what future dividends to expect? The share split and equity issue are conducted in starkly different legal and institutional environments, with clear commitments to convey the different expectations.

This analogy suggests a reason for the institutional separation between a treasury

and a central bank. When a treasury issues debt, it tries to maintain a commitment for paying it off, in order to raise revenue. By contrast, a central bank is an institution that trades government debt for money, but may not tax or spend. That separation helps people to see that central bank operations are share splits, and treasury issues are backed.

This discussion points to a larger theme of fiscal theory: A wise government will not just leave the price level to the whim of people's expectations of future surpluses. It will create institutions, commitments, and (hopefully) believable signals of its plans. It will find ways to commit that some kinds of debt issues are backed, so that by committing to repay the treasury raises revenue and does not cause inflation. It will find ways to commit that other kinds of debt issue are not backed, when it wants to create or fight expected inflation. The gold standard, commodity standards, foreign exchange rate pegs, legal separation between treasury and central banks, separate balance sheets, central bank independence with limited mandates, legal prohibitions on inflationary finance, are all such institutions.

The simple story is a foundation, not the building. We are ready, as needed to match facts and to fruitfully analyze policy, to think about the stochastic specification of shocks, and to add monetary and fiscal policy rules, long-term debt, monetary frictions, liquidity spreads in government debt, sticky prices, financial frictions, preference and technologies of modern DSGE (dynamic stochastic general equilibrium) models.

4 Long-term debt

Long-term debt adds interesting and realistic effects to this fiscal theory analysis. Suppose there is a negative shock to the present value of surpluses. Now, long-term bond prices might fall, so that the nominal value of nominal debt falls, with no change in the price level. However, a fall in long-term bond prices means that expected future inflation must rise. (Again, I simplify for the moment to constant real interest rates.) Thus, with long-term debt outstanding, fiscal shocks may be met by future expected inflation, which devalues outstanding long-term bonds when they come due, rather than a price-level jump.

Already, this observation also brings us closer to reality. We do not see big price-level jumps that devalue outstanding short-term debt. Fiscal troubles seem to lead to

protracted periods of inflation. Long-term debt is a first ingredient that can describe that result. (Sticky prices also draw out dynamics.) In many models, and in common sense, a slow protracted inflation, even if cumulatively larger, is less damaging than a short sharp inflation. In this way, long-term debt is a buffer, lowering the impact of fiscal shocks.

But current vs. future inflation is only a possibility so far. Which is it? Since monetary policy chooses expected inflation, monetary policy chooses whether a fiscal shock leads to a price-level jump, devaluing all debt immediately, or whether it leads to protracted inflation, falling more heavily on long-term debt. Monetary policy chooses *when* inflation happens, but not if it will happen.

Long-term debt also introduces a first mechanism by which higher interest rates lower inflation, without a contemporaneous fiscal shock. Suppose there is no change in surpluses, but monetary policy raises the interest-rate target persistently. In this simple world, that move raises expected future inflation. But with long-term debt, it also lowers nominal long-term bond prices. At a lower bond price, with unchanged surpluses, long-term bonds are great investments. People try to buy them, reducing aggregate demand and thus the price level.

While the sign is familiar, the mechanism is not the usual one. We still have flexible prices and a constant real rate. This result does not come by higher nominal rates giving higher real rates, lowering aggregate demand and pushing down inflation.

The fiscal and monetary effects can interact. A monetary policy rule that raises interest rates in response to inflation automatically smooths fiscal shocks. The fiscal shock leads to current inflation. If the central bank raises interest rates in response to this inflation, the central bank creates future inflation, which lowers current inflation. We get a protracted small inflation, falling on long-term bonds, rather than a large price-level jump. We have a new reason why Taylor-type policy rules can be desirable. Of course, if the fiscal "shock" is desired, not external; if it represents deliberate stimulus or austerity, then endogenous monetary policy offsets the desired stimulative or cooling effects of fiscal policy.

Long-term debt is a buffer in several additional ways. Short-term debt imbues a run-like character to inflation as it does everywhere in finance. People do not necessarily get rid of government debt because they fear default in 30 years. They simply fear that other investors may not roll over the debt next year. Inflation can then appear unpre-

dictably on ephemeral news about news. Also, doubts about debt can lead to a higher required return, raising interest costs, in a self-reinforcing "doom loop," that leads to inflation if not default.

But if the government finances itself entirely by long-term debt these mechanisms are absent. Long-term debt also frees monetary policy to raise interest rates without needing a fiscal tightening to pay higher interest costs.

5 Surplus, discount factors, and data

How can we make sense of U.S. time-series data from a fiscal theory point of view? Two characteristics are crucial. First, we must allow the surplus to follow a time-series process with an s-shaped moving average representation, in which deficits today are followed by surpluses that partially or fully repay the debt. For a counterexample, if we specify that deficits uniformly lead to subsequent deficits, as in an AR(1), then the government debt valuation equation says that a deficit is followed by *lower* real value of the debt. All deficits are financed by inflation. The government raises no revenue from bond sales. This is a drastically counterfactual prediction. Imposing an AR(1) or similar process and then rejecting the fiscal theory is a common error.

Second, we must allow for variation in real interest rates, i.e. the discount factor for government debt or real interest costs on the debt.

In Cochrane (2021a) I examine US time-series data to interpret inflation through the lens of the fiscal theory, with these ingredients in mind. If we discount using ex-post returns, the present value relation is an identity. Linearizing that identity, the sum of current and future unexpected inflation, weighted by the maturity structure of government debt, is equal to the negative of the innovation in the sum of current and future expected surpluses, scaled by the value of debt, plus the sum of changes to expected real government bond returns.[1] The linearization allows us to add surplus and discount rate

[1] Formally,

$$\sum_{j=0}^{\infty} \omega^j \Delta E_{t+1} \pi_{t+1+j} = -\sum_{j=0}^{\infty} \Delta E_{t+1}(\tilde{s}_{t+1+j} + g_{1+t}) + \sum_{j=1}^{\infty} \Delta E_{t+1}(1-\omega^j) r_{t+1+j}$$

where $\Delta E_{t+1} \equiv E_{t+1} - E_t$, π is inflation, $\tilde{s}$ is the surplus/consumption ratio scaled by the steady-state value of debt, g is consumption growth, r is the real return on the portfolio of government debt, and ω^j describes a geometric maturity structure of government debt as a point of linearization.

terms, rather than divide one by the other. This is an *identity*, not a theory, and holds in all models.

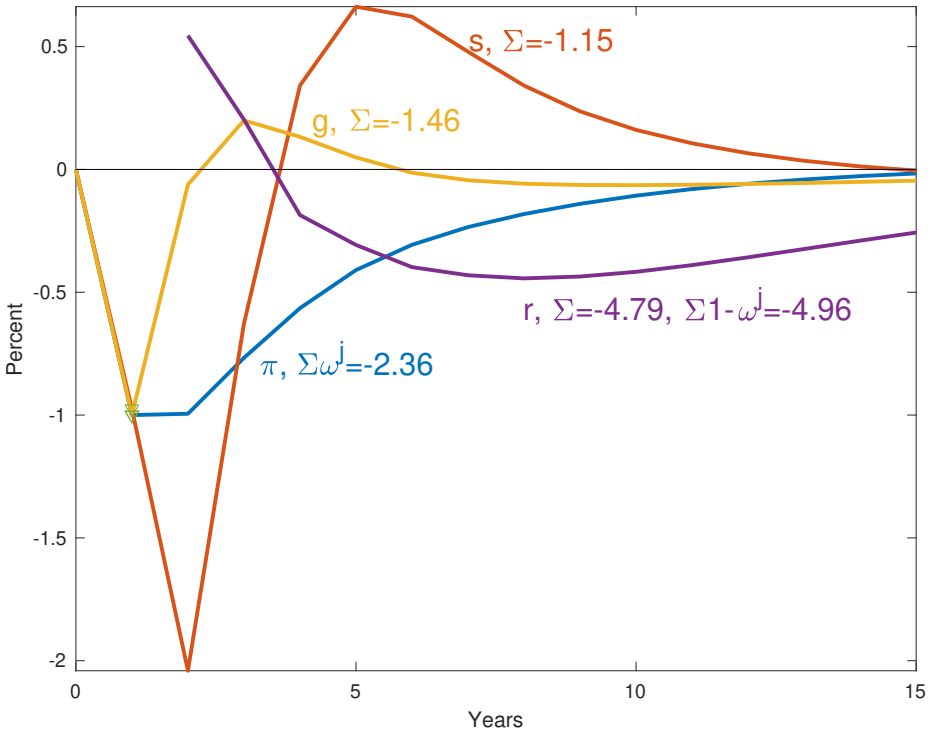

Figure 2: VAR responses to an "aggregate demand" shock. π is inflation, g is consumption growth, s is the surplus/consumption ratio scaled by the value of debt, r is the real return on government debt. "Σ" reports the sum of the indicated response. "$\Sigma\omega^j$" reports the sum of the response, weighted by a geometric fit to the maturity structure of government debt. This is the response function of a VAR including these variables, the debt/GDP ratio, the three-month and 10-year government bond rate, 1948-2018. The shock starts at $pi_1 = g_1 = -1$, allowing other variables to move contemporaneously. The graph answers the question, which terms of the identity account for inflation, and by what pattern? Source: Cochrane (2021a).

Figure 2 presents one exercise from this paper. I estimate a VAR using the debt-to-consumption ratio, consumption growth, the surplus-to-consumption ratio, inflation, the return on the portfolio of government bonds, and the 10-year and 3-month treasury rates. I plot the response to a shock that sends both growth and inflation down 1%, allowing other variables to move at the same time. The plot shows how this shock changes our forecast of other variables.

I undertook this exercise to answer the question, how might the fiscal theory in-

terpret an event like 2008, with a big reduction in inflation but also big deficits? The plot does not represent this particular event, as we do not know whether people expected the history following 2008. Instead, the VAR captures the *average* behavior of variables after such an event in postwar history, which can inform us of what people believe.

Inflation and growth both decline 1%, by construction. Inflation is persistently low, so that the total rise in the real payoff to bond hodlers, including long-term bonds, is 2.36 percentage points. So, where is the 2.36% *rise* in the value of surpluses?

The event includes three years of big deficits (s), which on their own would cause inflation. But current deficits don't matter per se if they turn to future surpluses to pay off the debt. And they do. The surplus s line shows an "s shaped" response, and illustrates what I mean by that term. But, sensibly, it is not enough. Of the 3.7% cumulative deficits, the rise in surplus/consumption ratio pays off 2.55%, but leaves 1.15% outstanding. Actual surpluses are composed of the surplus/consumption ratio s plus cumulative growth g. Growth declines, but the level of consumption does not recover. So deficits less expected repayment on their own produce 1.15% + 1.46% = 2.61% *inflation*.

So how do we account for lower inflation? Well, in the graph, as in 2008, real interest rates fall persistently. Nominal interest rates (not shown) fall and stay low, while inflation recovers. A low expected return on government bonds is a low discount rate, which raises the value of government debt, a deflationary force. Equivalently, low returns on government debt lower interest costs, which acts just like additional surpluses. The real interest rate effect produces 4.96 percentage points of deflation, overcoming the inflationary pressure coming from deficits to fully account (it must, it's an identity) for disinflation.

If we want to understand the time-series of U.S. inflation in business cycles up to 2020, variation in the *discount rate* for government debt is a major driving force. It produces a fiscal Phillips-curve correlation; disinflation in recessions despite deficits, due to low real rates, and inflation in booms despite surpluses, due to high real rates. Since this is an identity, it is equally informative of the nature of "passive" fiscal policy assumed by new-Keynesian or monetarist models. (2020 is such a different recession, with such different policy, that it may follow a different pattern.)

6 Price stickiness and new-Keynesian models

To construct realistic models of inflation and the economy, we clearly need to add ingredients such as sticky prices, and the rest of the detailed modeling of contemporary macroeconomics. Fortunately, we do not need to reinvent the wheel. It is straightforward to adapt any macroeconomic model to fiscal theory.

Return first to the simple world with one-period debt, constant real interest rates, and flexible prices. The new-Keynesian approach to this world (Woodford (2003)) also specifies that the interest rate equals expected inflation, a rule by which the central bank sets interest rates, and the government debt valuation condition, which relates unexpected inflation to the present value of future surpluses.

The new-Keynesian approach solves the same equations differently. The central bank still determines expected inflation by the interest-rate target. But new-Keynesians assume "passive" fiscal policy, that surpluses adjust ex-post in response to any unexpected inflation or deflation. By that assumption, the government debt valuation equation holds automatically and no longer helps to determine unexpected inflation. Instead, new-Keynesians add an equilibrium-selection provision to the interest-rate policy rule: Should unexpected inflation come out higher than the central bank's unexpected-inflation target, the central bank will *raise* subsequent expected inflation, explosively, driving the economy to hyperinflation. Adding a rule against such nominal explosions, new-Keynesians now determine both expected and unexpected inflation.

Mechanically, then, delete this equilibrium-selection rule, rescue the government debt valuation equation from footnotes, and let the present value of surpluses determine unexpected inflation. The same approach applies to new-Keynesian models of arbitrary complexity.

Now, specifying a realistic s-shaped surplus process takes a little bit of algebraic carpentry. To do it, I specify that the government can commit to repay debts accumulated from past deficits, and thereby can borrow in the first place, but at the same time the government refuses to accommodate changes in the value of debt that result from unexpected and undesired inflation and deflation. With this specification, Cochrane (2021b) constructs a fiscal-theory version of the standard three-equation new-Keynesian model, with an s-shaped surplus process, fiscal and monetary policy rules that react to inflation and output.

I compute impulse-response functions to monetary and fiscal policy shocks. In response to a fiscal policy shock, sticky prices deliver a long period of inflation. Monetary policy that responds to inflation makes the inflation response even more persistent, but thereby reduces unexpected inflation and practically eliminates output variation.

In response to a monetary policy shock with no change in surpluses, inflation and output decline temporarily, giving the classic picture. Fiscal policy rules can change the response to monetary policy substantially however. If fiscal policy responds to higher output and inflation with more surpluses, then monetary policy that raises future inflation can raise future surpluses, and thereby produce lower current inflation, even without long-term debt.

One lesson: It is important in evaluating monetary policy to ask an interesting question of fiscal policy. Does one want no change in surpluses, no change in the surplus rule reaction to inflation and output, or to allow a fiscal policy shock that follows its customary response to whatever event provokes the desire to change monetary policy? The answers are different.

Current VARs do not attempt to orthogonalize fiscal and monetary policy in this way, so we do not have direct empirical evidence.

7 Observational equivalence

You may see a problem, which is really an opportunity: The new-Keynesian, monetarist, and fiscal theory versions of any model make observationally-equivalent predictions for observable time series. The crucial parameters that distinguish the models are not identified. The equilibrium conditions of the models are the same. Whether inflation causes surpluses to change or surpluses cause inflation to change leaves no trace in equilibrium dynamics. If the Fed threatens hyperinflation or deflation for all but one value of unexpected inflation, and that threat is successful, we do not see that threat in equilibrium time series. If we add a money demand curve, $MV = Py$, that equality holds equally in fiscal and monetarist models, whether money supply causes inflation or inflation causes passively-provided money to move.

Observational equivalence does not mean either theory is empty. Observational equivalence theorems litter economics and finance. For example, behavioral and ratio-

nal finance are observationally equivalent, a fact recognized since Fama (1970) "joint hypothesis" theorem. Marginal utility and probability always enter together in asset pricing formulas. This fact has not stopped both paradigms from many useful contributions, or a productive debate.

As elsewhere, the observational equivalence theorem is a powerful guide to construct and productively evaluate theories.

Observational equivalence warns us against attempting grand statistical tests for one entire class of theory against another. Testing for new-Keyesian vs. fiscal theory is likely to be as productive as testing for rational vs. behavioral finance, monetarist vs. Keynesian economics. Such tests must be tests of identifying assumptions. Observational equivalence drives us to examine those assumptions carefully. The fiscal theory literature has, rightly, spent a long time searching for identifying assumptions to allow such tests. The real case against such tests is that the assumptions, when ferreted out and examined, are not credible.

Armchair tests abound. One is tempted to look at puzzles of the government debt valuation equation and mis-interpret them as tests of fiscal theory. What about Japan? Why is U.S. debt so high and inflation so far muted? But the same government debt valuation equation is present in all theories. If we reject the government debt valuation equation, we similarly reject new-Keynesian models and monetarist models. The equation is still there, and must be satisfied in all these models. These are puzzles of debt sustainability, not of fiscal theory per se.

Observational equivalence is great news for the new kid on the block. It means you can't prove fiscal theory wrong! It opens the door to using fiscal theory to describe a whole sample. It provides a recipe for translating new-Keynesian models to fiscal theory. First, write the model in a form that expresses observational equivalence. Then set the unidentified parameters to fiscal-theory values.

Observational equivalence only says that you can't tell apart time-series taken from equilibrium. You can look at lots of other evidence! Rather than pretend to be agnostic and let statistics sort it out for us, observational equivalence tells us to look hard at the foundations of each regime, and whether those foundations are consistent with how policy makers say they behave, how people believe they will act, and the policies encoded in law, tradition, norms, and institutions.

The new-Keynesian story asserts that in response to undesired inflation, the central bank will raise subsequent inflation more than one for one ad infinitum. The central bank takes an economy that left alone (with an interest rate peg) is stable, but suffers multiple equilibria, and deliberately makes the economy unstable, explosive for all but one initial value of inflation, in order to regain determinacy. No central bank on the planet says anything of the sort. They uniformly swear that if inflation is larger than they desire, that they will do what it takes to *reduce* subsequent inflation. Their job is to make the economy stable, not unstable. The Federal Reserve's strategy review (Federal Open Market Committee (2020)), minutes of FOMC meetings are evidence too. What matters in the end is what people *expect* the Federal Reserve to do. Read any amount of financial commentary. See if you can find a whisper of the idea that the Fed intentionally de-stabilizes the economy in order to quash multiple equilibria.

The monetarist story requires a money demand for special, definable liquid assets, a separation between "money" held for liquidity and transactions purposes and "bonds" held for savings purposes. That distinction has dried up, especially in the era of abundant reserves that pay full interest. Most of all, the monetarist view requires the central bank to limit money supply. Whatever "money" is, central banks do not even pretend to limit its supply. The Fed targets interest rates, and officially abandoned reserve requirements.

The fiscal story should be examined as well. For example, in response to unexpected deflation, which raises the value of nominal debt, we assume that fiscal authorities will not raise taxes and cut spending to validate an unexpected real windfall to bondholders. If anything, they will do the opposite, and adopt fiscal stimulus, helicopter money, and forward-guidance promises of future largesse, to try to get inflation going again. They will regard the deflation as a "bubble," or transitory off-equilibrium event that fiscal policy should ignore. Institutions such as a gold standard, foreign exchange rate target, or inflation target are further means that governments announce and try to commit to repaying debts at one particular price level, but to ignore changes in the price level away from these targets, while nonetheless promising to raise surpluses to pay off debts accumulated by borrowing to finance deficits.

I conclude that the foundations of new-Keyensian equilibrium-selection and monetarist price-level determination do not fit what we know about monetary and fiscal policy from a trove of evidence. The fiscal theory is the only economic theory we have that

is complete, coherent, and consistent with basic facts about our monetary and fiscal policy institutions. Tests are pointless. Our job is to figure out how to specify and use fiscal theory. That is a hard job. In this context, observational equivalence is truly a feature not a bug, as it tells us we can always fit the data at least as well as these other models can do.

At a minimum, this fiscal tour should convince new-Keynesian modelers to rescue fiscal policy from footnotes, and to examine the "passive" fiscal policies underlying their models. For example, in the classic new-Keynesian model, higher interest rates only lower inflation if there is an accompanying fiscal policy tightening. Even if it is "passively" achieved, let us look at the size of that austerity, whether it is there historically, and question whether a large fiscal tightening could accompany future monetary policy.

8 Observational equivalence and fiscal theory models

A vibrant literature has emerged studying fiscal models, essentially models proceeding as I described above, using standard new-Keynesian/DSGE ingredients but solving them by fiscal theory rather than central bank equilibrium-selection threats. (Leeper and Leith (2016) is a good recent overview; Cochrane (2022) Ch. 22 and 24 summarizes the literature with these points in mind.) The literature is well focused on policy evaluation.

Most of this literature however tries to estimate and test fiscal vs new-Keynesian regimes, and Markov-switching between the regimes. To do that, authors impose implicit identifying restrictions. Most importantly, they specify that a government in a fiscal theory of the price level cannot pledge future surpluses when it runs a current deficit; it cannot follow an s-shaped surplus process. (Some specifications allow a limited s-shape, but not much.) This implicit assumption severely reduces the fiscal theory's ability to fit data. As above, it implies large inflation correlated with deficits, and that deficits lower rather than raise the value of debt. Authors do not look at or defend this assumption, as an awareness of observational equivalence would suggest. Looked at, there is no reason to impose it.

As a result, authors typically find that the fiscal theory regime only holds in brief times such as the 1970s, with volatile inflation, and when the similar identifying restrictions on the new-Keynesian equilibrium-selection (a strong response of interest rates to inflation) are even more at odds with the data. This result paints a picture, commonly

accepted, that fiscal theory and "fiscal dominance" are only a description of bad and volatile times, when intractable deficits drive inflation and central banks are unable or unwilling to stop them, while a "monetary dominant" regime is desirable and describes inflation control.

Observational equivalence opens the door to a profound re-evaluation and a completely different purpose and picture. If we allow a fiscal theory government to pledge future surpluses when it issues debt, then we can describe the whole sample with fiscal theory. We can describe changes such as the 1970s to the 1980s as changes in *policy rules*, how interest rates and surpluses respond to inflation, without tying those artificially to *equlibrium-selection rules*, whether the Fed threatens hyperinflation to trim multiple equilibria or whether the Congress refuses to raise taxes to repay inflation-induced windfalls to bond-holders. By definition, removing identifying restrictions that hamper a models' ability to fit data can only allow such models to fit data better.

9 Monetary doctrines, institutions, and stories

The fiscal theory changes quite a few monetary doctrines. That is a useful application to policy. And evaluating those doctrines is an additional way to evaluate the theory in light of observational equivalence and the futility of time-series tests. Many traditional doctrines are contradicted by current experience.

Monetarist doctrine states that the split of government liabilities between money (reserves) and bonds is crucial for the price level, and the overall level of government debt is not first-order relevant. Fiscal theory states that the split of liabilities is irrelevant to first order, implying at most slightly different interest costs of the debt, and the total quantity of debt relative to expectations of repayment are most important to the price level.

Monetarist doctrine states that passive money supply, the "elastic currency" the Fed was founded to provide, a flat supply of reserves, a real bills policy, or allowing inside money expansion, lead to uncontrolled inflation and deflation. Fiscal theory allows such passive money supply. Which is a good thing, because that's how the world works.

Monetarist doctrine warns that payments system innovation, interest-paying money, the zero bound, more liquid government debt, use of foreign currency or cryptocurrency

all threaten price-level control. Fiscal theory, which works in a completely frictionless model, denies any such danger. We can live the Friedman (1969) optimal quantity of money, either with a zero nominal rate, or with money that pays full interest, and enjoy any payment system innovation that comes along. (Inside moneys pose financial stability risks, but that's another issue.)

Standard doctrine states that an interest rate peg leads to unstable inflation with adaptive expectations (Friedman (1968)), or to indeterminate, multiple-equilibrium, sunspot inflation with rational expectations (Sargent and Wallace (1975)). Fiscal theory can fully determine inflation under an interest rate peg, and by extension "passive" monetary policy of interest rates and expected inflation that move less than one-for-one with current inflation. A deflationary sunspot or spiral must be validated by surpluses to pay a real windfall to bondholders. If that is absent, the deflation cannot happen. People will dump government debt and drive the price level back up.

If the government drops money from helicopters, that would surely cause inflation and prove that money causes inflation, no? Not necessarily. Central banks are forbidden to print money and send it to people and businesses. Central banks are even more forbidden money vacuums, confiscating currency. Those are fiscal policy. Central banks may only buy and sell. A helicopter drop combines monetary and fiscal policy. Imagine that while the helicopter drops $1,000 in your back yard, the Fed burglars remove $1,000 of treasury bonds from your house. Would you still spend more? The helicopter drop is a wealth effect, not a portfolio composition effect. The helicopter drop is a delightful illustration of how important to inflation it is whether people think debt will be repaid or not. A helicopter is a great signal of debt that will not be repaid!

Conversely, as Sargent (1982) showed long ago, hyperinflations have ended when governments solved their long-term fiscal problems. Those events came with additional money printing, to replenish real money demand, no period of high interest rates, and some continued short-term deficits.

Inflation-targeting regimes, in which the central bank is commanded only to pay attention to inflation, have in some cases such as New Zealand and Sweden been remarkable successes, while in other cases such as Argentina they have failed. A fiscal theory view suggests that an inflation target is successful when it equally binds the treasury, implicitly or explicitly, to repay nominal debt at the inflation target, no more and no less.

Successful inflation targets have usually come with fiscal and microeconomic reforms.

10 Recent history

The zero-bound era provided an interesting test of monetary theories. What happens if the nominal interest rate hits the zero bound and stays there for 10 years, or 30 in Japan? Standard adaptive-expectations models say that a deflation spiral will erupt. The real interest rate is too high, this lowers aggregate demand, lowers inflation, and the real interest rate is higher still. Rational-expectations new-Keynesian models predict sunspot volatility when interest rates are stuck. What happens with immense open-market operations, raising reserves from about $10 billion before the financial crisis, to $3,000 billion a few years later? A monetarist analysis must predict inflation.

None of this happened. Inflation remained low and quiet throughout the zero bound / quantitative easing era. For fiscal theory, inflation is naturally stable and quiet – the opposite of volatile – at the zero bound, so long as people retain confidence that governments will not respond to deflation by fiscal austerity, and debts will be repaid. This is a pretty clear test. Failing to predict large inflation or its conquest in the 1970s and 1980s attracts more attention. But clearly predicting inflation spirals or volatility that did not happen are scientifically just as powerful evidence.

New-Keynesian models at the zero bound made a score of puzzling predictions: promises of small inflation or interest-rate changes many years in the future can have immense stimulative effect today, and the further in the future the promise, the larger the effect. Deliberate output destruction, wasted government spending, and technical regress stimulate, and promises of such policies in the future are stronger than policies today. As prices get *less* sticky the recession associated with the zero bound gets worse and these effects get *stronger*, without limit, until at the limit point of perfectly flexible prices they all vanish discontinuously. Though sticky prices are the only distortion in the model, structural reform to make prices less sticky makes matters worse.

All of these paradoxical puzzles, or enchanting possibilities, vanish with fiscal theory. They all rely on a fiscal policy that will validate an initial deflation by fiscal austerity. Even if a pure new-Keynesian just looks at that fiscal prediction, the puzzles are solved. (Cochrane (2017) Cochrane (2018), Cochrane (2022) Ch. 20 cover these points about the

zero-bound era.)

As I write in December 2021, inflation has suddenly surged. From a simple fiscal-theory armchair, this event looks like a classic fiscal helicopter drop. The Fed and Treasury together sent people about $6 trillion, financed by new Treasury debt and new reserves.[2] This cumulative expansion was about 30% of GDP ($21,481) or 38% of outstanding debt ($16,924). If people do not expect that any of that new debt will be repaid, it suggests a 38% price-level rise. If people expect Treasury debt to be repaid by surpluses but not reserves, then we still expect $2,506 / $16,924 = 15% cumulative inflation.

This interpretation raises deep questions, though: Why do people expect this debt not to be repaid, in full or in part, and apparently they did expect the debt of 2008-2020 to be repaid? Speculating, it is significant that politicians made no mention of repayment, of eventual deficit reduction this time, while such promises were a constant theme of the earlier era. The large debts of the post-2000 era also coincided with steadily lower real interest rates. People may not have believed in larger surpluses, they may simply have recognized lower discount rates and lower interest costs. Why real interest rates declined is a good question, but not unique to fiscal theory.

Most tantalizingly, the new debt was directly created as new reserves and sent to people likely to spend it, rather than borrowed from investors in Treasury markets, and then financing government spending. Perhaps this different method and holder of government debt did the trick. Recall earlier discussion of share splits vs. IPOs that the manner of issue matters.

From 2008 to 2020, governments tried in vain to raise inflation by fiscal stimulus, in this interpretation not able to convince bondholders that the governments would not pay back all of the debt. Our institutions evolved to precommit to debt repayment and against inflation. Finding institutions that do the opposite, in a limited manner, is not so obvious. Perhaps we finally found it.

This is speculation, and I include it only as an indication of how a fiscal theory

[2]

Quantity	Q1/Mar 2020	Q3/Sep 2021	Difference
A. Federal debt held by the public (includes Fed)	$17,228	$22,304	$5,076
B. Monetary base (currency+reserves) (H.6)	$3,883	$6,389	$2,506
C. Fed holdings of Treasury securities (H 4.1)	$4,187	$5,419	$1,232
A+B-C	$16,924	$23,274	$6,350

Billions of dollars.

analysis can, and I hope will, proceed.

Returning to the introduction, fiscal theory suggests that if inflation does rise in the next few years, and the Fed then wishes to contain inflation by raising interest rates, it will face a much stiffer fiscal headwind. And if inflation comes fundamentally from fiscal causes, from a loss of faith that debts can or will be repaid, its task will be harder still. All inflation stabilizations involve joint fiscal, monetary and microeconomic reform.

11 Fiscal theory today

The fiscal theory is a ship all fitted out and ready to sail on an ocean of discovery, not one that has returned to port with treasures to share.

It started with Sargent and Wallace (1981) "unpleasant monetarist arithmetic." They show the importance of fiscal-monetary interactions to policy at the time. They argue that the deficits of the early 1980s, if unreformed, would have to be monetized sooner or later. Monetary policy could trade less current inflation for more future inflation, but monetary policy alone could not avoid inflation altogether. The world turned out as they hoped: The 1986 tax reform, regulatory reform and other sources of economic growth wound up nearly paying off all federal debt by the end of the 1990s. This monetary tightening *was* in the end accompanied by a rise in present value of surpluses, though not immediate austerity, confirming their analysis that the present value matters.

Sargent and Wallace's analysis however posits real debt, that money supply controls inflation, and seigniorage is the only monetary-fiscal interaction. Leeper (1991) was the fiscal-theory watershed, modeling an interest-rate target and expressed in the same form as new-Keynesian sticky-price models. Following that cashless approach and adding nominal debt, revaluation of nominal debt and interest costs on the debt offer much larger fiscal-monetary interactions than seigniorage. A decade or so of theoretical controversies followed, now thankfully over.

Observational equivalence, long-term debt, an s-shaped surplus process, fiscal policy rules, and other advances, have only recently opened the door to fully integrating new-Keynesian models with fiscal theory, and to removing the needless identification assumptions that hobbled so much valiant fiscal theory. There is no lack of good stories to chase down. And while figuring out why there was little inflation is a valid scientific

pursuit, the resurgence of inflation makes the quest more interesting.

But actually doing that model-building, evaluation, model-based historical analysis, policy analysis, and designing better institutions for containing inflation and deflation remain largely in the future. Low-hanging fruit abounds.

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