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CF40 Policy Brief

The Fiscal Theory of the Price Level – Some Inferences Based on Literature Review

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Abstract: The paper made a literature review and drew some inferences from the fiscal theory of the price level (FTPL), which may help us think about the impacts of the US high debt on inflation and asset prices and what it means for resolving China's local government debt.

The central equation of the theory can be explained as "the government's present real debt needs to be equal to the net present value of the future government's real primary surplus". This leads to the fundamental conclusion and prediction that a decline in the government's surplus leads to an increase in the price level, i.e., inflation. The fiscal theory of the price level is not consistent with the belief that "inflation is a monetary phenomenon" and does not necessarily lead to inflation through the mechanism of fiscal overdrafts from the monetary authority or mint taxes, but is essentially a theory of asset pricing.

Under specific assumption, there are three intuitive inferences from the fiscal theory of the price level: 1) unexpected increases in government expenditures lead to higher prices, i.e., inflation; 2) given the same increase in government expenditures, the larger the government's existing debt, the less prices will rise; and 3) given the same increase in government expenditures, the longer the duration of the government's existing debt, the less prices will rise. Comparisons of OECD data by Robert Barro of Harvard University and Francesco Bianchi of Johns Hopkins University, as well as Barro's calculations of U.S. data, have tested these inferences.

Lastly, based on the framework of fiscal theory of the price level, the paper also briefly deduced the implications of China's local government debt for supply of base money, inflation, trend of bond interest rates, exchange rate changes, etc.

The English version is post-edited machine translation. In case of any discrepancy or ambiguity between the English and Chinese versions, the Chinese version shall prevail.

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The first time I heard about inflation was when I heard older generations talk about how the "gold yuan" notes issued by the nationalist government before the war of liberation had become worthless, and eventually, some people even used the notes to make fire. It remains to be seen whether banknotes can be used to start a fire, but it is certainly true that gold yuan was worthless. Old people cannot tell exactly why gold yuan became worthless and only said too much money was printed. Later on in history class, these things become relatively clear in the books. The general story should be that the Nationalist Party could not support the huge financial expenditure, which was mainly for military purposes, so the party could only rely on printing money to make up for the shortfall. Because of the excessive printing of money and the lack of actual assets to back it up, the value of the banknotes plummeted rapidly and turned worthless.

This is my earliest understanding of inflation, and it is a story of how fiscal policy leads to hyperinflation. A similar story might be the hyperinflation crisis of the Weimar Republic, the key reason of which was obviously excessive money printing to pay off war reparations. Therefore, fiscal policy is actually a classic determinant of inflation. It is only because modern central banks have gained increasingly "independent" control over money supply and the fact that hyperinflation has become a rare event in major economies that the fiscal impact on inflation is paid less attention to. But in fact, a closer look at the laws of central banks reveals that direct fiscal financing is explicitly forbidden and becomes a discipline but also restrictive protection, which might be related to the lessons learned from the previous crises when runaway fiscal policy impacted the money supply and ultimately led to inflation.

Modern Monetary Theory (MMT), which has always been brought up in recent years, is essentially an extreme theory that argues inflation is determined by fiscal policy. In modern monetary theory, money policy has been completely subordinate to fiscal policy. As long as there is no inflation, fiscal expenditure can be unlimited and the shortfall is paid by money printing. The only restriction on fiscal spending is inflation. In modern monetary theory, inflation is addressed through fiscal policy, and the role of monetary policy is to finance fiscal policy.

To be honest, if we use the above-mentioned rough facts and distorted theory to understand fiscal policy and inflation, we may be a bit ignorant of the research and development of macroeconomics in the past 100 years. The relationship between fiscal policy and inflation is one of the most fundamental topics of macroeconomics and a whole book could be written simply by making a literature review of it. One of the relatively minor schools of thought that I recently read over again (but whose main proponents are some of the renowned macroeconomists, including Nobel Prize winner Chris Sims from Princeton University, John Cochrane from the University of Chicago, Robert Barro from Harvard University, and the great Michael Woodford, among others) is the Fiscal Theory of the Price Level. The last time I read relevant literature was 15 years ago when I was studying issues related to exchange rates. I was surprised to find that with very few constraints imposed, the classical theory that exchange rates are determined by momentary policy can be changed through simply algebraic transformation into one in which exchange rates are determined by fiscal policy. I could make a macro model in which there was no money at all (the money supply could be zero, and is only a unit of account) but there were still exchange rates and rate changes. Such a conclusion might suggest that monetary determination of the exchange rate might not be the ultimate truth. It is also since then that I've been convinced that the fiscal theory of the price level is a profound (though not necessarily valid) theory. Rereading this literature might help us think about the impact of high US debt on inflation and asset prices, as well as the implications for resolving China's local government debt.

I. WHAT IS FISCAL THEORY OF THE PRICE LEVEL?

What is succinct and profound about the fiscal theory of the price level (and certainly a source of controversy) is that its most central equation is actually a government's intertemporal budget:

Government's nominal outstanding debt/price level = net present value of government's current and future real budget surpluses

Simply put, this equation means that the government's current real debt needs to be equal to the net present value of the government's real primary surplus in the future. For ordinary people, firms, or households, this equation basically means that "you have to pay back what you borrowed," which is a hard intertemporal budget constraint. For the government, in the context of this theory, this equation does not technically refer to the rule of "borrowed money has to be repaid", or a budget constraint. Rather, because "borrowed money needs to be paid off", the government's real outstanding debt will always be adjusted to a level that it can pay back and price adjustment is the key to real outstanding debt adjustment. The simplest example is when the government's real budget surplus falls (e.g. due to higher spending or less revenue), the right side of the equation decreases; with the price of government bonds unchanged, the price level would rise accordingly and lead to a decrease in the real value of government debt, which occurs on the right side of the equation. This is the most basic conclusion and prediction of the fiscal theory of the price level: a drop in government budget surplus will push up the price level, i.e. inflation.

There are three noteworthy points about theory:

First, it is completely inconsistent with what Friedman said: "Inflation is always and everywhere a monetary phenomenon". The theory seems to argue that "inflation is always and everywhere a fiscal phenomenon." Michael Woodford has even demonstrated in several papers that an economy without money can still have well-defined prices and inflation. Indeed, inflation can occur in an economy without money.

Second, the theory does not necessarily mean that inflation is caused by fiscal overdrafts on the monetary authority or the mechanism of mint taxes. The mechanism of "government's nominal outstanding debt/price level = net present value of government's current and future real budget surpluses" does not depend on fiscal overdrafts on the monetary authority, but instead holds under any monetary policy. In other words, an economy with a completely unchanged money supply, or no money supply at all, can be just as inflationary (or deflationary) as a result of changes in fiscal surpluses. Thus, the

story of the gold yuan notes at the beginning of this paper may serve as one possibility for the theory to play out in the real world, but it is not the only possibility or even the main one.

Third, the theory is essentially a theory of asset pricing. Isn't' "government's nominal outstanding debt/price level = net present value of government's current and future real budget surpluses" a basic equation for pricing the real value of government bonds? The left side is asset prices and the right side is the discounted present value of future cash flows. Therefore, the theory mainly works through asset price changes. Here, asset prices have two components, i.e., the nominal value of government governments and the price level. When the government's future cash flows fall, the government's real debt must also drop accordingly, either by way of falling bond prices or by way of inflation, both of which reduce the government's real debt balance.

II. WHAT TESTABLE COROLLARIES OF THE FTPL?

The FTPL is not easily translated into simple and testable corollaries, because it is essentially an asset pricing theory, so any conclusions ultimately depend on government fiscal policy, monetary policy, and public debt management. These factors influence the government's future stock of debt, its cash flows, and discount factors. However, under certain specific assumptions (which will be skipped here for now because it's a bit complicated - all the in-depth research on the FTPL is looking at what assumptions are more plausible), there are three straightforward corollaries:

Corollary 1: Unexpected increases in government spending can lead to higher prices, also known as inflation.

This is an easy corollary to draw: an additional increase in government spending leads to a fall in government surplus, which is equivalent to a reduction in cash flow. This, in turn, requires a decrease in the real debt stock of the government to balance it out. If the nominal government bond stock is not expected to change in the short run, a reduction in the real stock of debt

must be done through inflation. Therefore, an unexpected increase in spending can result in inflation.

Corollary 2: For the same increase in government spending, the more outstanding debt the government has, the less the impact on rising prices.

It might sound counterintuitive, but if you think about it, this corollary makes logical sense. Following the logic of Corollary 1, the greater the existing government debt, the more significant the decrease in real debt caused by the rise in unit prices. Therefore, for the same increase in government spending, countries with higher levels of outstanding government debt may experience lower inflation.

Corollary 3: For the same increase in government spending, the longer the duration of the government's outstanding debt, the less impact it has on causing prices to rise.

If you understand Corollary 2, Corollary 3 will be straightforward. For the same nominal interest rate increase, the longer the duration, the more bond prices fall. Typically, the reduction in real government debt is achieved through a simultaneous decrease in the nominal value of bonds and an increase in price levels. This corresponds to a real-world scenario where nominal interest rates and inflation levels rise simultaneously. With a longer duration, even a modest increase in inflation and nominal interest rates can lead to a more significant reduction in real debt. Therefore, for the same increase in government spending, the longer the duration of the government's outstanding debt, the less price increase is required.

III. THE REAL-WORLD EVIDENCE FOR FTPL

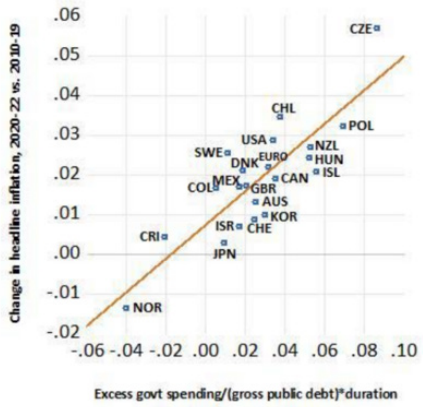
Robert Barro of Harvard and Francesco Bianchi of Johns Hopkins (Fiscal Influences on Inflation in OECD Countries, 2020-2022) take the FTPL seriously by arguing that the high inflation of the last few years can be explained by the FTPL but hardly by the traditional monetary theories. Their rationale

lies in the similarity between the monetary policies of central banks such as the Fed and the ECB before and after 2008; there has been high inflation in recent years compared to the lack of such inflation post-2008, pointing to significant differences in fiscal policies during these periods.

To explore this, they gathered data from 37 OECD countries, comparing fiscal policies, total debt, and maturities, and got the following graph. It aligns closely with the three previous corollaries, that is, an unexpected increase in government spending leads to price increases, the more government debt, the less impact on rising prices, and the longer the duration of government debt, the less impact on rising prices. According to their estimates, during 2020-2022, 40%-50% of the additional expenditures in these countries were financed by reducing real debt balances through inflation.

Figure 1

Change in Headline CPI Inflation Rate versus Government Spending



Source: Robert Barro and Francesco Bianchi (2023).

Breaking it down, Robert Barro did some specific quantification of the US fiscal data in an April 2022 op-ed. His figures show that additional fiscal spending by Trump and Biden over the period 2020-2021 was $4.1 trillion, and at the time he wrote the article, the US experienced 11% higher-than-normal inflation during those years, implying that the real US debt had fallen by $2.3 trillion.

Barro also calculated that to entirely cover the additional spending with inflation, the US needed a 9.4% annual inflation rate from July 2022 or a 5.7%

two-year average, or a 3.5% five-year average. Fast forward to October 2023, the US has a 5.4% average inflation rate since July 2022. Despite over a year passing since Barro's column, these numbers suggest a significant alignment between the observed inflation trends and the predictions of the FTPL, at least for the US in the last couple of years.

IV. IF WE RELATE IT TO THE RESOLUTION OF CHINA'S LOCAL DEBTS

China is carrying out a package to resolve local debts. From the information that has been disclosed, the package at least includes plans to issue nearly 1.3 trillion yuan of special refinancing bonds; financial institutions utilize methods such as extending debt maturity, obtaining new loans to repay old ones, and replacement and other ways to lower the cost of debt and optimize maturity structure. The PBS is also prepared to provide emergency liquidity support to regions with relatively heavy debt burdens when necessary, if necessary.

Many people are curious about the potential implications of local debt resolution on currency, interest rates, inflation, and exchange rates. However envisioning the outcomes requires a basic theoretical framework; otherwise, it can be challenging to understand or may lead to misconceptions. While the FTPL may not necessarily be the correct framework for contemplating this issue, it is indeed a logical and coherent framework that can be used for analysis. So, how would the FTPL predict the implications? Perhaps the following, if the resolution is successful:

On the Implications of Base Currency Injection:

Some believe that the outcome of local debt resolution might involve an increase in the base currency. However, according to the FTPL, this is neither necessary nor certain. A key insight of this theory is that printing money to pay off debt is a primitive approach. Modern governments don't rely on coinage taxes nor need them to address revenue issues. When there's already a significant amount of existing debt, adjusting bond values and changing price levels are sufficient to generate substantial "income." In terms of magnitude, this income can be much larger than that derived from "coinage taxes."

On the Implications of Inflation:

A straightforward interpretation of the FTPL suggests that inflation is likely to rise at some point in the future. Additionally, if current inflation levels are lower, future inflation levels are expected to be higher. It's challenging to envision successful debt resolution in a low-inflation environment because lower inflation implies higher real debt, contradicting the direction of debt resolution. Moreover, if current inflation is lower, it means short-term real debt will increase more, requiring higher future inflation to absorb this portion of the debt.

On the Implications of Bond Interest Rate Trends:

Roughly speaking, at some point in the future, nominal interest rates may rise, while real interest rates may decline, with long-term nominal rates potentially surpassing the rise in short-term nominal rates. Higher nominal rates are necessary to reduce bond face values, aligning with higher inflation. Lower real rates are essential to ensure that real debt doesn't grow too rapidly, or future government surpluses can be more heavily discounted to the present. If short-term low inflation persists for a while, future inflation is likely to be higher, corresponding to a rise in long-term nominal rates exceeding short-term nominal rate increases.

On the Implications of Exchange Rates:

Understanding exchange rates is challenging as they are a relative concept. From a purely debt resolution perspective, considering that most of China's government debt is denominated in Renminbi, a devaluation of the currency is more favorable for debt resolution than appreciation. This aligns with higher nominal rates and higher inflation. However, if there is significant demand for debt resolution abroad, and the resolution is more comprehensive, the direction of exchange rate movements might be towards appreciation.

It must be emphasized that the above are some corollaries I have made using the FTPL. If proven wrong, it could be due to flaws in the theory or my incomplete understanding of it. Perhaps the greatest weakness of the FTPL is that, even if the above predictions hold, it cannot precisely predict when these changes will occur.

Fortunately, the distant future will arrive, requiring only a bit of patience.

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