



Economic Letter

Inflation Is Not Always and Everywhere a Monetary Phenomenon

by Antonella Tutino and Carlos E.J.M. Zarazaga

► Fiscal policy is as significant as, and sometimes more important than, monetary policy in determining the price level and, therefore, the dynamics of inflation.

The United States should be experiencing abnormally high inflation—at least that’s what the quantity theory of money says should be occurring, given the large amounts of money the Federal Reserve has put into the nation’s financial system during its series of “quantitative easing” programs following the Lehman Brothers collapse almost six years ago.

Quantitative easing helped expand the money base at an average annual rate of 32.3 percent from November 2008 to September 2012 (*Chart 1*).

According to the quantity theory of money, the annual inflation rate also should have been around 30 percent. Yet the corresponding average annualized inflation rate over that same period (also shown in *Chart 1*), as measured by the personal consumption expenditures price index, not only didn’t rise, but showed signs of declining.

There are also historical examples of the opposite situation, in which the inflation rate was several times higher than the money supply growth rate. The German hyperinflation of 1921–23 is one such case.

During that episode, prices on average quadrupled each month over a 16-month period,¹ but the money supply grew considerably less than that (*Chart 2*).

Scientists typically welcome extreme cases as a natural magnifying lens that may expose previously unnoticed flaws in existing theories. In that regard, the German hyperinflation seems to validate the hints from the more recent U.S. experience that something is wrong with Nobel laureate Milton Friedman’s famous observation that inflation is “always and everywhere a monetary phenomenon.”²

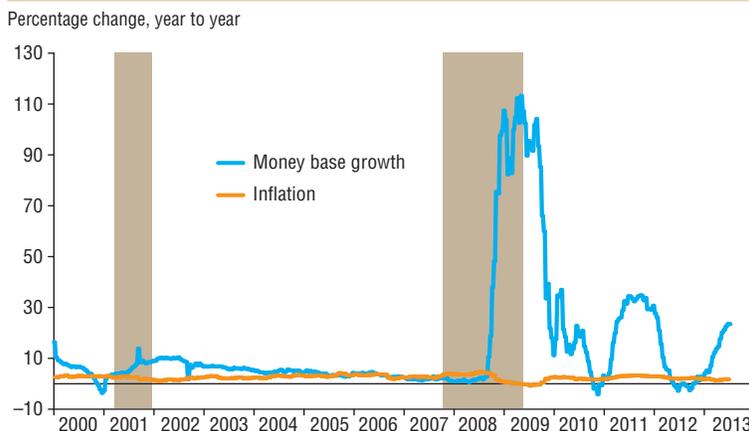
Fiscal Theory of Price Level

The fiscal theory of the price level, pioneered by, among others, Christopher Sims, the cowinner of the 2011 Nobel Memorial Prize in economics, holds that the conventional monetarist interpretation of inflation misses the mark. Instead, fiscal policy is as significant as, and sometimes more important than, monetary policy in determining the price level and, therefore, the dynamics of inflation. For example, the end of the interwar German hyperinflation coincided with the introduction of a bold fiscal measure—a new currency backed by real estate.

The fiscal theory of the price level further implies that primary surpluses—that is, the value of government surpluses before debt-interest payments—are also a key determinant of the price level and thus of inflation.

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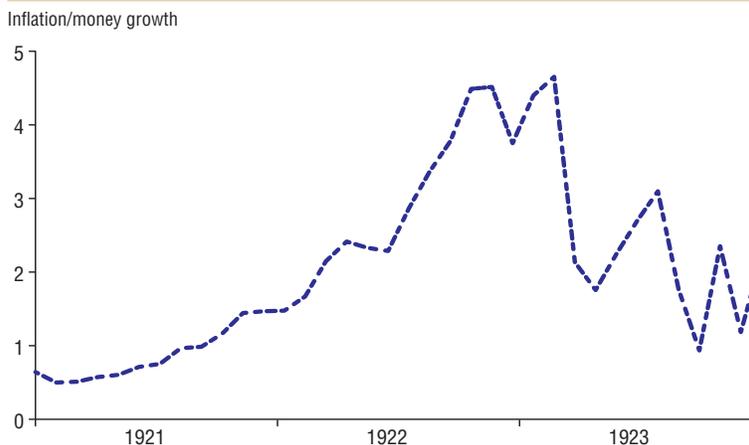
Chart 1 Rapid Money Growth Since 2008 Hasn't Yielded Higher Inflation



NOTE: Shaded bars indicate recessions.

SOURCES: Federal Reserve Bank of St. Louis; Bureau of Economic Analysis; NBER; Haver Analytics.

Chart 2 Inflation Consistently Above Money Growth During 1921–23 German Hyperinflation



NOTE: The inflation/money growth ratio results from dividing the monthly inflation rate plus one by the monthly money base growth rate plus one.

SOURCE: *The Economics of Inflation*, by Costantino Bresciani-Turroni, Appendix of Tables, Table III and Table V, Northampton, England: Augustus Kelley Publishers, 1937.

Inflation as a Fiscal Phenomenon

As a first step to understanding why excessive money growth may not drive speculative hyperinflation, consider the motivation for households and businesses to hold money. Why would they stay with cash when they could instead hold bonds and securities that, unlike money, pay interest?

One reason is that money facilitates transactions in ways that alternative means of payment cannot. If households carried less money, more output (or effort) would

be needed to acquire goods and services, leaving less output available for consumption. This is why households and firms avoid carrying around too little money relative to consumption.

Conversely, there are reasons households and firms will not want to hold too much money. First, there is opportunity cost—that is, the earnings that are forgone by holding cash instead of interest-bearing securities. Second, inflation may induce households to minimize money holdings because rising prices reduce purchasing

power and, therefore, the relative advantage of cash as a means of payment.³

Finally, households and businesses are assumed to be intelligent and forward-looking. Seeking to maximize their welfare, they take into consideration these opposing forces when deciding how much to consume in any given period and how much money to carry from one period to the next.

In equilibrium, the nominal interest rate and prices adjust in each period to guarantee that the demand for money equals the money supply, and that the desired level of consumption equals output minus the associated transaction costs. That is, the optimizing behavior of households and businesses along with market prices jointly determine consumption, nominal money holdings and, therefore, inflation and real money balances.

Speculative Hyperinflation

An interesting aspect of economic models with these features is that they give rise to hyperinflation quite easily, *even if money supply is kept constant*.⁴ The reason: Nothing in the internal logic of these models anchors the evolution of inflation. As a result, the dynamics of inflation are entirely determined by household expectations.

If they anticipate the inflation rate to fluctuate around zero, this is exactly what will happen, seemingly validating the predictions of the monetarist tradition when the money supply growth rate is zero as well.

By the same token, if households anticipate ever-rising inflation, they will try to get rid of their money balances and exchange them for goods. The resulting increase in the demand for goods accelerates inflation even further, which in turn gives households further incentive to reduce money holdings in exchange for whatever goods they can buy as the value of money rapidly declines. This self-fulfilling expectation feeds into itself, driving real (inflation-adjusted) money balances all the way down to zero.

This hyperinflationary process cannot be categorized as “monetary” in the usual sense, because that would have required an equally explosive expansion of money supply, which was kept constant. Although not initially obvious, hyperinflation is fiscal

in nature because it can only happen if the fiscal authority—the central government—remains on the sidelines.

An *active* stance could have been accomplished by the fiscal authority committing to redeem the stock of money for a certain minimum amount of goods and services—setting a level at which the government will retire the money stock from circulation.

It follows that self-fulfilling, speculative hyperinflation can only happen in economies in which the fiscal authority is not in position to make such a commitment. That could be the case, for example, if inflation rises faster than the real value of tax revenue. The amount of goods the government could offer in exchange for the money stock keeps shrinking; the money stock is implicitly backed by fewer and fewer goods.

German hyperinflation ended when an active fiscal policy replaced a passive one and guaranteed that the government would always be in position to collect a positive amount of revenue, independently of the inflation rate.

To mimic the historical hyperinflation in Germany, a model is constructed that assumes a tax policy in which the real revenues collected by government decline as the price level rises.⁵ Real money balances also fall as the price level rises because the money supply is kept constant throughout the analysis to make clear the nonmon-

etary nature of speculative hyperinflation.

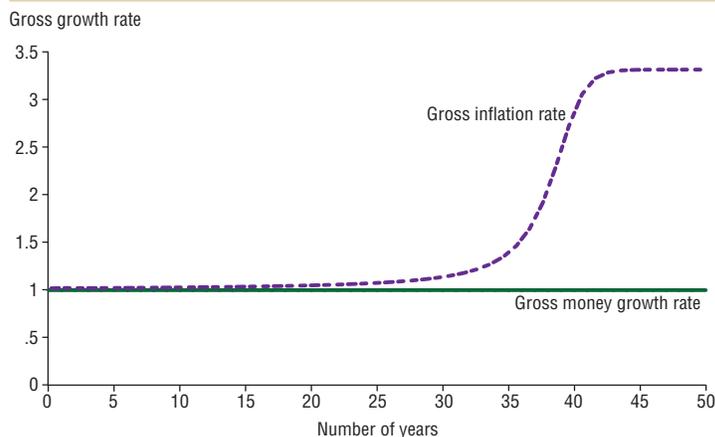
The results of the simulation in terms of inflation are shown in Chart 3. The solid line shows the level of the constant money supply. The dotted line, showing inflation over time, is reminiscent of its trajectory during the German hyperinflation depicted in Chart 2.⁶

The inflation path in Chart 3 suggests that speculative hyperinflation, like the German episode, won’t occur if the fiscal authority stands ready to do something to stop it. If the fiscal authority commits to keeping prices below a given upper bound, it could successfully convince the private sector that runaway inflation won’t occur. Such a commitment implies that the government can raise the required revenue through taxes or the sale of state-owned assets.

If households and business believe that such a fiscal policy will indeed be implemented if necessary, they will never expect inflation to spiral out of control. Thus, fiscal policy, not monetary policy, is ultimately responsible for the resulting price stabilization.⁷

The end of German hyperinflation is evidence this insight from the fiscal theory of the price level is more than just theoretical speculation. The particular fiscal measure that ended the German hyperinflation was the introduction on Nov. 15, 1923, of the *Rentenmark*, a currency backed by real estate revenues. The government’s

Chart 3 | Inflation Persistently Above Money Growth in a Simulation



NOTE: The gross inflation (money growth) rate is one plus the inflation (money growth) rate.
SOURCE: Authors’ calculations.

ability to raise revenues from the real estate market, by their very nature indexed to inflation, successfully broke the link between mutually reinforcing lower fiscal revenues—implying higher fiscal deficits—and rising price levels.

This fiscal policy regime change successfully restored confidence in the German currency and almost immediately brought inflation down to normal levels by international standards.⁸

Fiscal Policy and Inflation

The fiscal theory of the price level argues that what's true about hyperinflation is valid more generally: Fiscal policy can prevent inflation from rising or falling too much by backing all outstanding nominal government liabilities—interest bearing or not—with a stable level of expected future primary government surpluses. By formally incorporating fiscal policy in the analysis of price-level dynamics, the fiscal theory of the price level is better equipped than the conventional monetarist approach to explain why the recent large expansion of the money supply in the U.S. has not caused higher inflation.

The theory implies that the quantitative easing programs, which created money to purchase mortgage-backed securities from the public, *preserved* price stability because that money is backed by the returns from real estate investments. Similarly, Germany restored price stability after its interwar hyperinflation with its real-estate-backed currency.

Likewise, any money created to purchase government debt from the public at market prices is backed by the same

primary surpluses that the public already expected would service that debt. As long as the expected primary surpluses backing existing government liabilities haven't changed, there is no reason for the price level to change either.⁹

Aspects of the U.S. tax code provide further insight into the logic of the fiscal theory of the price level. For example, capital gains taxes cover all the nominal increase in asset value, even if that increase is entirely induced by inflation. As a result, a surge in inflation leaves the government with more, not less, fiscal revenue in real terms from this particular source of taxation and, therefore, in better position to redeem the currency for some minimum amount of goods and services.

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Notes

¹ *The Economics of Inflation*, by Costantino Bresciani-Turroni, Northampton, England: Augustus M. Kelley Publishers, 1937; English translation.

² The quote comes from "The Counter-Revolution in Monetary Theory," by Milton Friedman, the first Wincott Memorial Lecture, University of London, Sept. 16, 1970. The argument that challenges this view is in "A Simple Model for Study of the Determination of the Price Level and the Interaction of Monetary and Fiscal Policy," by Christopher A. Sims, *Economic Theory*, vol. 4, no. 3, 1994, pp. 381–99.

³ It is assumed that not all output will be absorbed by transaction costs when the economy operates without money. This is a critical assumption because it limits the damage of driving real money balances to zero and doing

all business instead with alternative, less convenient means of payment.

⁴ This assumption rules out the possibility of inflation arising from monetization of fiscal deficits.

⁵ The underlying model is taken from Sims 1994. See note 3.

⁶ The model-generated path of inflation leads to a sharp reduction in consumption.

⁷ Rigorous arguments of this can be found in "Ruling Out Speculative Hyperinflation: The Role of the Government," by Juan Pablo Nicolini, *Journal of Economic Dynamics and Control*, vol. 20, no. 5, 1996, pp. 791–809.

⁸ The new currency gained wide acceptance because, in principle, it could be exchanged for mortgages on private sector real estate. The measure may have been successful for its value as a signal of the fiscal authority's ability to raise revenues and, thus, to garner the goods and services required to honor its commitment to retire the new currency from circulation on the expected terms. See note 2, Fischer, p. 67.

⁹ By contrast, the purchase of newly issued government debt directly from the fiscal authority at face value—that is, monetization of the fiscal deficit—would be inflationary because it would be equivalent to the government issuing new debt not backed by a corresponding increase in primary surpluses.

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