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# Modern Monetarism and the Recession that Hasn't Happened, Yet

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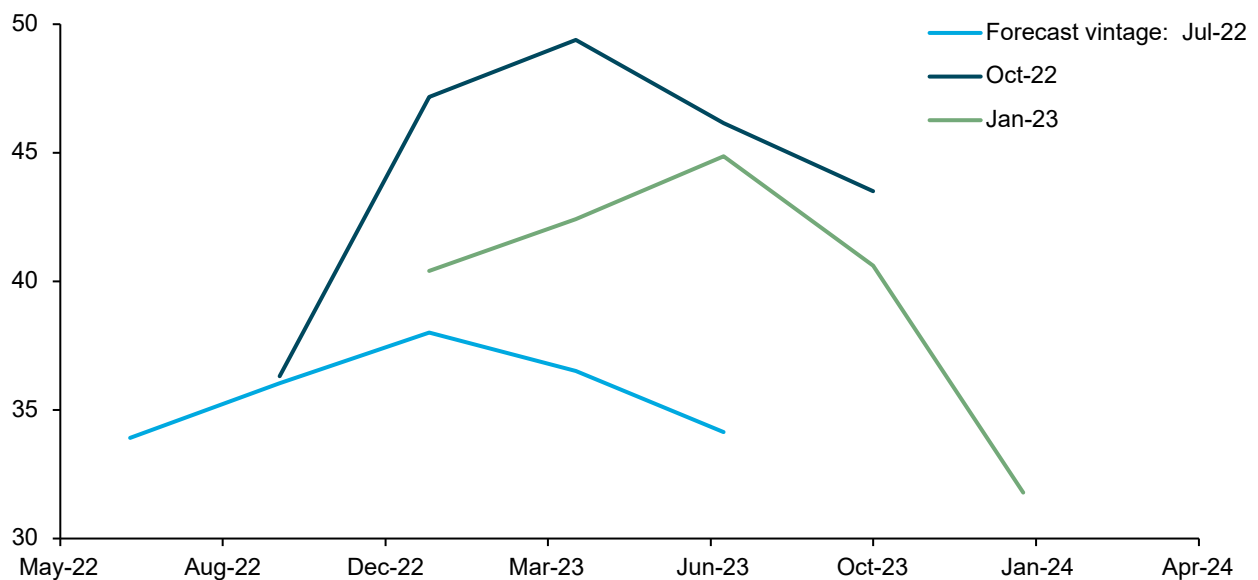
## A Puzzle

Economists have almost uniformly predicted an elevated risk of US recession for the past year, pushing out its onset in each forecast iteration as evidence piled up that the economy retained momentum. Potentially incorrect predictions by economists are not usually a reason to stop the presses. However, the logic remains compelling that recessions usually follow a period of tightening, and the Federal Reserve (Fed) has significantly and quickly tightened policy in price and quantity terms. The mistake comes from believing what the Fed said rather than following what it did.

- The price component of firming is easy to measure in the 5 percentage-point increase in the federal (fed) funds rate target since March 2022.
- The quantity component traditionally points to the contraction in reserves associated with the onset of quantitative tightening (QT) three months later.

### Survey of Professional Forecasters' Probability of Recession

Over the next five quarters, percent



Source: Federal Reserve Bank of Philadelphia, accessed 5/12/23.

## What's Wrong with this Picture?

We think the latter looks too narrowly at the Fed's provision of assets to the financial system. Reserves (the deposits of banks at the Fed) turned down immediately with QT but were met by an even-more rapid expansion of reverse repurchase agreements (RRPs), which are loans to the Fed collateralized by government securities that are auctioned daily. Both support financial transactions and leverage, so QT did not initially impose quantitative restraint. RRP's topped out approximately six months later and are now no longer offsetting reserve shrinkage. **In this regard, the Fed has just begun tightening in quantitative terms. Getting the balance-sheet concept right pushes out the timing of the recessionary impulse at least six months.**

## A Roadmap

We next document the evolution of the Fed's balance sheet and the rationale for being more inclusive about its quantitative stance. A probability model shows the six-month shift in predicting the recession that hasn't happened, yet. As the focus on quantities, not prices, has generally fallen out of favor, an analytical section summarizes the predictive power of Fed policy in more detail.

## What Happened?

The Fed has both price and quantitative levers on the financial system. Price, the overnight fed funds rate, is known to the basis point and is the key transmission mechanism in modern economic models, in part because its effects can be traced through the yield curve and in the valuation of other assets. The quantity channel works through the liabilities that the Fed makes available to the private sector that are assets to it.

The binding constraint in determining those assets to the private sector is accounting, in that the Fed's balance sheet balances. The amount of assets the Fed holds, primarily securities, equals the liabilities it offers, primarily currency, reserves, and RRP. Currency is a slow-moving boat, driven by private sector demands for a medium of exchange and store of value. The former is about nominal economic activity in the US and the latter about demands for a "safe haven," importantly abroad where two-thirds of bank notes are held.<sup>1</sup> Reserves are the safe-haven asset to depositories by providing liquidity and allowing the multiple expansion of deposits. The Fed first made RRP available in 2003 to broaden its reach in the funding market on the concern that traditional counterparties, the primary dealers, were becoming less effective in intermediating Fed liquidity. Operationally, this means that if the financial system is dissatisfied with the amount of reserves outstanding, it can swap some for another Fed liability — RRP. The balance sheet still balances.

The availability of credit is much harder to quantify than its terms. The traditional focus has been on the assets that the Fed uniquely provides to the private sector that can support deposit expansion (reserves) and are available to spend (currency). The sum of the two appear under different names depending on perspective, despite being the same number, with

- The **monetary base** as the foundation of credit in the private sector;
- **High-powered money** as the medium of exchange in transactions; and
- **Outside money** as the monetary asset to the private sector that it can neither create nor destroy because it is set by the Fed's balance sheet.

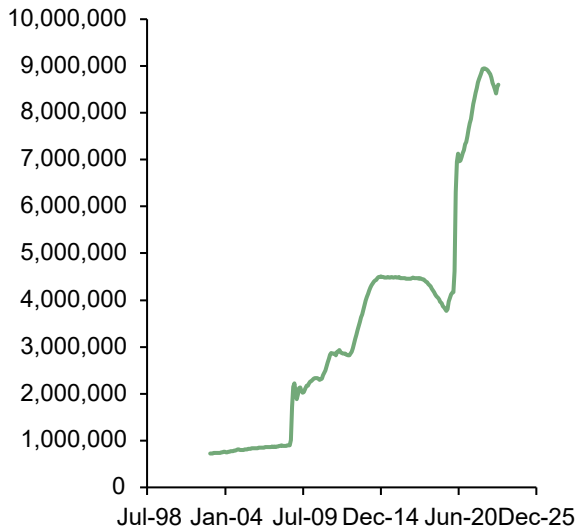
RRP, which are loans to the Fed, collateralized by government securities, and auctioned daily, satisfy all three notions. They are assets to the private sector that back outstanding private financial instruments and are set exogenously by Fed decisions on the terms of its auctions. Adding RRP to the traditional notion is what we refer to as the modern monetary base.

The difference matters. The upper panels of the chart on the following page show the evolution of both sides of the Fed's balance sheet. The lower panels plot the two measures of the base, both the levels and the recent growth rates.

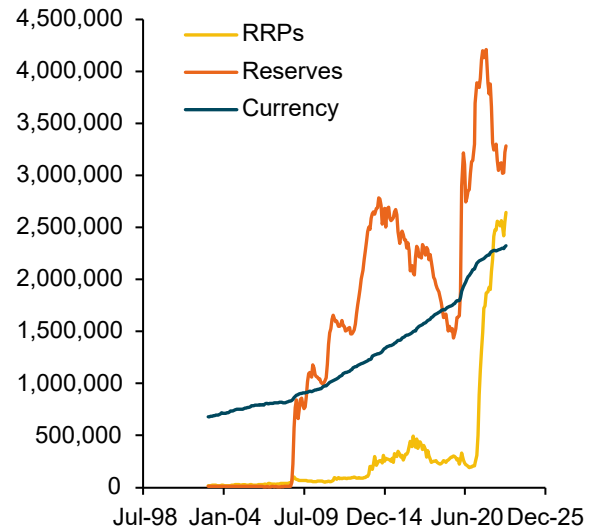
- All the serious action played out post-2008 with the addition of quantitative policy to the Fed's arsenal that sent assets skyrocketing.
- A ratchet effect is evident, in which each round of quantitative easing surpassed the prior one and the subsequent reversal is incomplete, compounding to an eightfold expansion of the Fed's footprint on finance.

### Selected Items on the Balance Sheet of the Federal Reserve

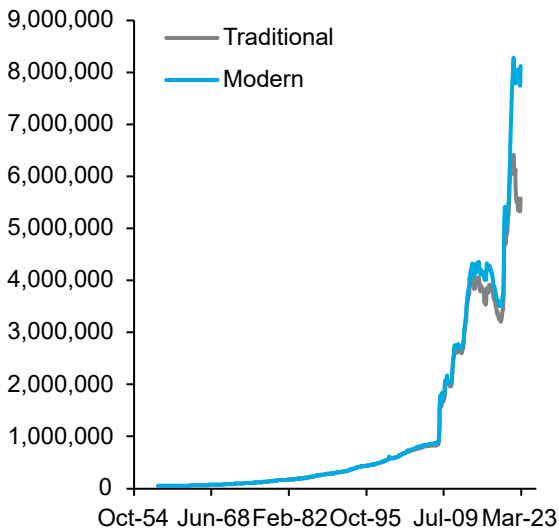
**Total Assets** Millions of Dollars



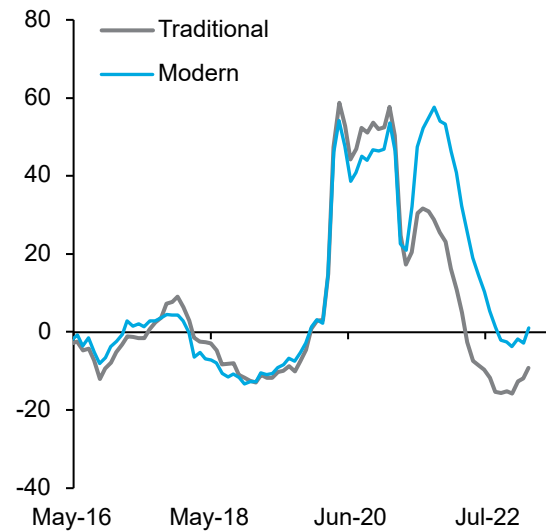
**Liabilities** Millions of Dollars



**Monetary Base** Millions of Dollars



**Twelve-month Change** Percent



Source: Federal Reserve, H4.1, accessed via FRED, 5/13/23. Firm analysis.

The RRP facility did not make a material difference in its first decade. However, as it became increasingly used, a notable wedge between the traditional and modern monetary bases opened in 2014. The latest round of quantitative tightening that began in June 2022 has already matched the first round in half the time when measured in terms of Fed assets or reserves. However, financial institutions relied on RRP, which hastened the downturn in reserves and forestalled the decline in the total.

- The traditional base contracted sharply, swinging from a 30 percent annual increase in Fall 2021 to a 15 percent decline one year later. We suspect that this captured the attention of forecasters to predict imminent recession.
- Much of the early decline in reserves, however, represents a substitution to RRP, which received an additional impetus in demand to move above \$2½ trillion in September 2022 and stay in that range subsequently.<sup>2</sup>
- As a result, the growth rate of the modern monetary base climbed for four months after the implementation of quantitative tightening, and its level remains higher now.

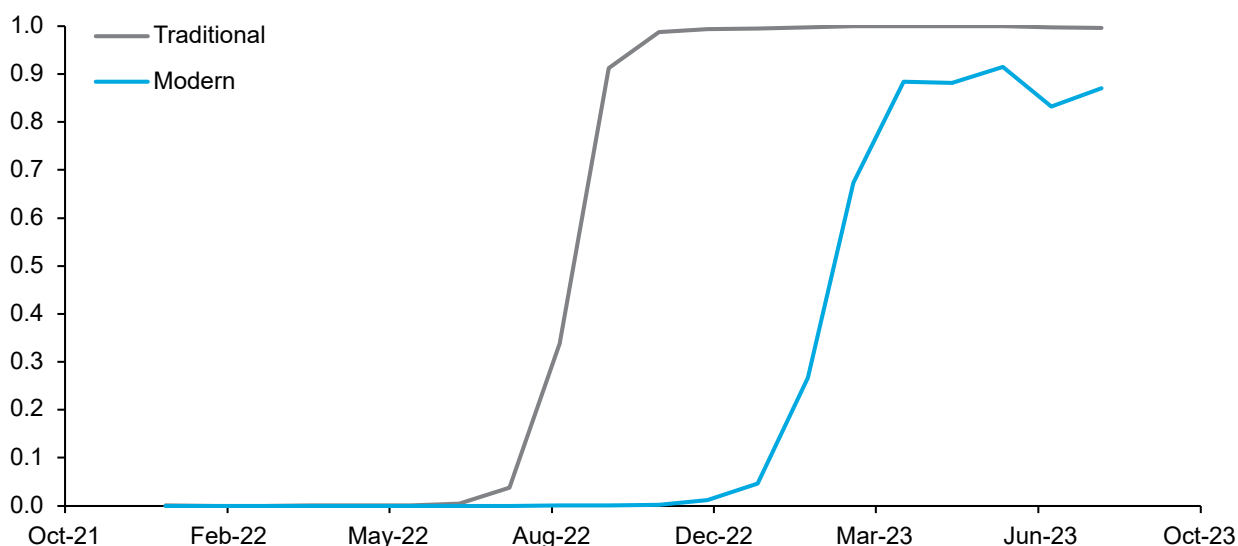
Many Fed officials admit they were late in implementing quantitative tightening. Yet by the modern measure, they have not begun because the outside money available to lever in finance is as large as in the middle of last year. Whatever is working through the quantity channel thus far owes to deceleration, not decline, in the modern monetary base.

### Putting it Together

Forecasts based on the traditional monetary base turned negative too soon as the blunting role of RRPs was overlooked to produce the serial errors of economists. To quantify the effect, we estimated a probability model predicting recessions using the six-month lag of the twelve-month change in the base with monthly data from July 1960 to August 2008. We stopped the estimation period before the waves of quantitative action created swings in the monetary base that were outsized relative to the rest of history. The following chart outlines the consequences of missing the change in the Fed’s balance-sheet machinations, plotting predicted probabilities of recession using the traditional and modern monetary bases. Focusing on the traditional base produces a prediction of recession that has not manifested, much like the succession of errors in the Survey of Professional Forecasters (SPF). Using the modern base as the predictor advises more patience.

#### Predicting Recession with the Monetary Base

Using twelve-month growth rate, six months earlier, percent



Source: Predictions from a logit model from 1960 to 2008 using the twelve-month growth of the base, six months earlier. Data from Federal Reserve and the NBER, accessed via FRED 5/12/23. Firm analysis.

## What We Make of This

While the Fed has sharply constricted the growth of the modern base available to the financial system to lever credit, it did not act as quickly as anticipated because RRP provided a safety valve to extract more assets from it. Some discomfort from the private sector's massive reliance on those auctions has crept into the official conversation (as shown in the minutes of the Federal Open Market Committee (FOMC)). The modern base has probably peaked, and the deceleration since October represents a significant change in nonprice policy accommodation. Recession is likely to follow, but not until later this year or early next.

## Why Care About the Monetary Base?

The attention paid to policy quantities has shrunk to the point where specificity is needed to explain what we mean by the base and how it helps predict business-cycle turning points.

In their documentary support of the data underlying *The Monetary History of the US*, Friedman and Schwartz critically examine attempts to define money from first principles.<sup>3</sup> They somewhat grudgingly accept the propositions that only high-powered money "...is a strictly exogenous variable in the sense that the amount outstanding cannot be altered by transactions by the public and banks other than the central bank (or monetary authority)"<sup>4</sup> and "...are assets to their holders and in no meaningful sense debts to anyone".<sup>5</sup> That is, high-powered money, also known as the monetary base and outside money, is exogenous and part of the net wealth of the private sector.<sup>6</sup> In current circumstance, this includes three liabilities of the Fed — currency, reserves, and RRP.

Friedman and Schwartz are suspicious of a purely theoretical approach to defining money, preferring a choice "...on grounds of usefulness in organizing our knowledge of economic relationships."<sup>7</sup> Following that route, we assess the ability of the monetary base to predict recessions.

There is a cottage industry in recession indicators, but most contributions, such as Stock and Watson (1993) and Estrella and Mishkin (1998), rely on market signals like risk spreads or the slope of the yield curve.<sup>8</sup> The monetary base is a quantity-based policy instrument, thus it is natural to compare its predictive power to a price-based one — the fed funds rate. Data on the base are available monthly starting in 1959, a period of decided drift in nominal magnitudes. The implicit deflator for personal income rose almost seven-fold from January 1959 to March 2023.<sup>9</sup> Accordingly, we divide the base by the personal income price deflator to get the real base and consider the fed funds rate both in nominal and real terms by subtracting the backward-looking twelve-month change in the deflator from the former to get the latter.<sup>10</sup>

As is standard, we use a logistic specification to respect the natural bounds of zero and one in probability forecasts. The probability of recession in a month as called by the National Bureau of Economic Research (NBER) is alternatively assumed to depend on the twelve-month change of the real base six-months earlier or the level of the funds rate six-months earlier, with the explanatory variable lagged because we seek a leading indicator of recession. The estimation period is from July 1960, given the transformation of the data available, to August 2008, before quantitative action by the Fed introduced order-of-magnitude variation in the base. This cut-off also avoids when the nominal and real fed funds rates were mostly inert as the former sat at its zero lower bound.



Since the coefficients of the logistic function are unintuitive, the following table summarizes two measures of the goodness of fit for the four models: a constant, which serves as a comparator and provides the unconditional probability of recession, and the three policy instruments. By comparing the top row to the next three, we can infer that the inclusion of a policy instrument is statistically significant. Of those three, the model using the real base produces the largest likelihood (once exponentiated). The second column gives the Brier score, which sums the squared probability prediction errors. In this case, the specification with the nominal funds rate has the smallest squared errors.

### Goodness of Fit of the Estimated Models

Logistics models of the probability of recession, estimated from July 1960 to August 2008

Using the Explanators:	Log of the Likelihood Function	Brier Score
<b>Constant Only</b>	-234.2	69.6
<b>Real Monetary Base</b> 12-month change, 6 months earlier	-184.4	59.2
<b>Nominal Funds Rate</b> Level, 6 months earlier	-190.9	55.9
<b>Real Funds Rate</b> Level, 6 months earlier	-216.2	64.5

Note: The log-likelihood function sums (the log of) the predicted probability, given the parameters, of the realized event (recession or not) over the sample. The parameters are chosen to maximize it (or minimize the absolute value in this case). The log-likelihood function can be used informally to compare the goodness of fit of various models and in formal tests of which variables to include. The Brier score is the sum of squared prediction errors, thereby giving an increasing penalty to prediction errors. Source: Bureau of Economic Analysis (inflation), Federal Reserve, H4.1 (base) and H.15 (funds rate), and NBER (recession indicator), accessed via FRED, 5/13/23. Firm analysis.

Intuition for this result may be derived from the old-fashioned arithmetic of counting the signals of the various models, where a signal is defined as an observation when the predicted probability is greater than the unconditional probability. As in the upper panel of the table on the following page, in the sample period, the base predicts an elevated risk of recession about 30 percent of the time, more than the nominal funds rate and much less than the real funds rate. This is also double the unconditional probability of recession shown in the sample which is 14 percent. However, those signals from the base appear more reliably in recession, by a 15-percentage point margin relative to the price instrument, implying a bigger share of correct signals in the higher overall number of signals. The Brier score, which squares all errors, penalizes the base for its excess signalling despite its relative success in doing so.

## A Signals Approach

Is the conditional prediction greater than the unconditional one?

	Real Base	Fed Funds Rate			Number of Months
	Modern	Traditional	Nominal	Real	
<b>July 1960 to August 2008</b>					
<b>Total Signals</b>					<b>Total</b>
Number	179	181	164	236	578
Share (%)	31.0	31.3	28.4	40.8	
<b>Correct Signals</b>					<b>In Recession</b>
Number	69	69	57	52	81
Share of recessions (%)	85.2	85.2	70.4	64.2	
Share of signals (%)	38.5	38.1	34.8	22.0	
<b>July 1960 to March 2023</b>					
<b>Total Signals</b>					<b>Total</b>
Number	247	256	164	236	753
Share (%)	32.8	34.0	21.8	31.3	
<b>Correct Signals</b>					<b>In Recession</b>
Number	77	77	57	52	93
Share of recessions (%)	82.8	82.8	61.3	55.9	
Share of signals (%)	31.2	30.1	34.8	22.0	

Note: A signal is recorded when a model's prediction is greater than the unconditional probability of recession (14.1%) in the sample, July 1960 to August 2008. Source: Bureau of Economic Analysis (inflation), Federal Reserve, H4.1 (base) and H.15 (funds rate), and NBER (recession indicator), accessed via FRED, 5/13/23. Firm analysis.

Adding the fifteen years out of sample widens the performance gap in favor of the base. Over that period, the modern base differed more materially from the traditional base and reduced the number of excess signals. Ultimately, the monetary base is a useful policy indicator of recession, provided it is measured correctly.



**Vincent Reinhart**

Chief Economist &amp; Macro Strategist

Vincent is the firm's Chief Economist and Macro Strategist. In this role, he is responsible for developing views on the global economy and making relative value recommendations across global bond markets, currencies and sectors.

Previously, Vincent served as the Chief US Economist and a managing director at Morgan Stanley. For the prior four years, he was a resident scholar at the American Enterprise Institute (AEI). Vincent also worked in several roles at the Federal Reserve over 24 years, including Director of the Division of Monetary Affairs and Secretary and Economist of the Federal Open Market Committee (FOMC). His responsibilities at the Federal Reserve included directing research and analysis of monetary policy strategies and the conduct of policy through open market operations, discount window lending and reserve requirements. Prior to these roles, he was the principal liaison with the domestic desk at the Federal Reserve Bank of New York and was responsible for preparing a document outlining policy alternatives for each FOMC meeting. He was Deputy Director in the Division of International Finance and Associate Economist of the FOMC and spent five years at the Federal Reserve Bank of New York in both the domestic and international research departments.

His academic publications primarily concern the conduct of policy and issues related to the monetary transmission mechanism as well as an analysis of alternative auction techniques and Treasury debt management. After an undergraduate training at Fordham University, he received graduate degrees in economics at Columbia University.

## Endnotes

- <sup>1</sup> An additional demand that appears lower on Fed talking points comes from illegal activity, the perpetrators of which prize the anonymity of currency.
- <sup>2</sup> As a result, RRP's took the place of currency as the second largest Fed liability.
- <sup>3</sup> Friedman, M. and Schwartz, A.J., 1963. A monetary history of the United States, 1867-1960 (Vol. 14). Princeton University Press., and Friedman, M. and Schwartz, A.J., 1970. Monetary statistics of the United States: Estimates, sources, methods (No. 20). New York: National Bureau of Economic Research.
- <sup>4</sup> Friedman, M. and Schwartz, A.J., 1963. A monetary history of the United States, 1867-1960 (Vol. 14), 124.
- <sup>5</sup> Friedman, M. and Schwartz, A.J., 1963. A monetary history of the United States, 1867-1960 (Vol. 14), 110.
- <sup>6</sup> Whether reserves are part of the public's net wealth depends on the internalization of future taxes by households, as runs from Metzler to Mundell to Obstfeld. See Metzler, L.A., 1951. Wealth, saving, and the rate of interest. *Journal of Political Economy*, 59(2), pp.93-116, Mundell, R., 1963. Inflation and real interest. *Journal of political economy*, 71(3), pp.280-283, and Obstfeld, M., 1981. Inflation, Real Interest, and the Determinacy of Equilibrium in an Optimizing Framework (No. w0723). National Bureau of Economic Research.
- <sup>7</sup> Friedman, M. and Schwartz, A.J., 1963. A monetary history of the United States, 1867-1960 (Vol. 14), 137.
- <sup>8</sup> Stock, J.H. and Watson, M.W., 1993. A Procedure for Predicting Recessions with Leading Indicators: Econometric Issues and Recent Experience. NBER Chapters, pp.95-156, and Estrella, A. and Mishkin, F.S., 1998. Predicting US recessions: Financial variables as leading indicators. *Review of Economics and Statistics*, 80(1), pp.45-61.
- <sup>9</sup> Why an implicit deflator? We elsewhere examine the relationship of the monetary base with nominal and real personal income, so it is best to keep in that space in defining the price level. The choice of price index is immaterial.
- <sup>10</sup> As Estrella and Mishkin (1998) point out, the choice is important. The real, not the nominal, base has explanatory power.

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