

Inflation and monetary policy: Where have we come from and where are we going?

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Statistics

Things in the news

The news is full of prices: Housing prices are falling, fuel prices are rising. Are we in the midst of inflation or deflation? Will there be a recession? Can we expect useful things from the Federal Reserve? The flood of new phrases about the economy—subprime, lockdown, bubbles, liquidity, inflation targeting, moral hazard—what do they mean? In this talk I will shed some light on these and other macroeconomic ideas.

Where have we come from?

The GDP of the U.S. economy was 13.8 trillion dollars in 2007. (Source: CIA World Factbook website.) That's somewhere between a fifth and a fourth of world GDP.

In per capita terms, that's about \$45,800 per person.

The U.S. economy has grown at about 3.0% per year in real terms over the last 20 years. The growth rate of the world economy is much faster: 5.2%. Elementary economic theory tells us that this should not be surprising: the poor get richer faster than the rich get richer.

(By comparison, Canadian 2007 GDP was 1.27 trillion dollars, \$38,400 per capita, with a 2.7% growth rate in 2007.)

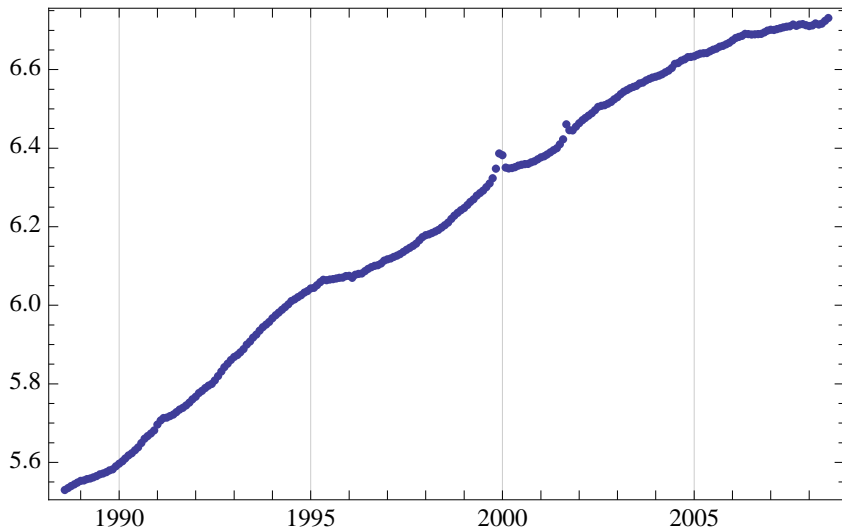
The standard deviation of U.S. growth is about 3.2%.

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Monetary policy in the last two decades

Let's look at the last 20 years of the monetary base (monthly values). As with most of the data I will discuss, I obtained this from the Federal Reserve Bank of Saint Louis website.

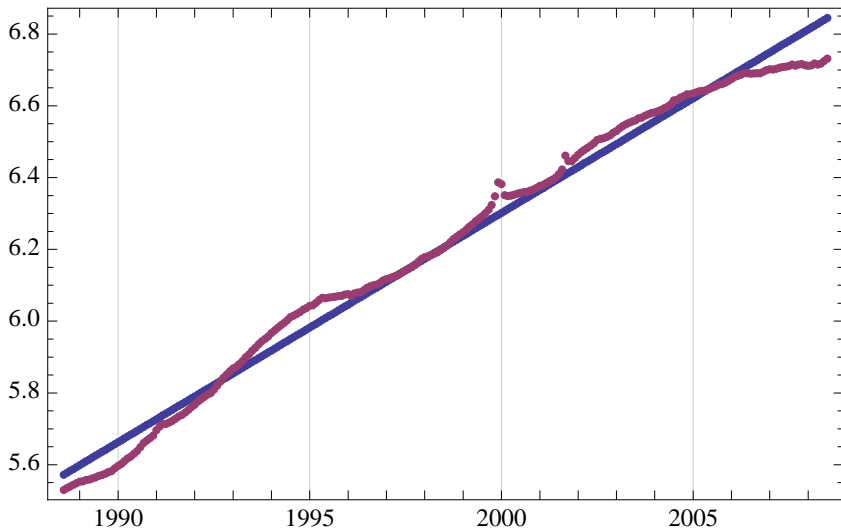
Log of Monetary Base, 1988–2008



Trend growth rates

Over the last 20 years the monetary base has grown by about 6.58%.

Trend and Actual Log of Monetary Base

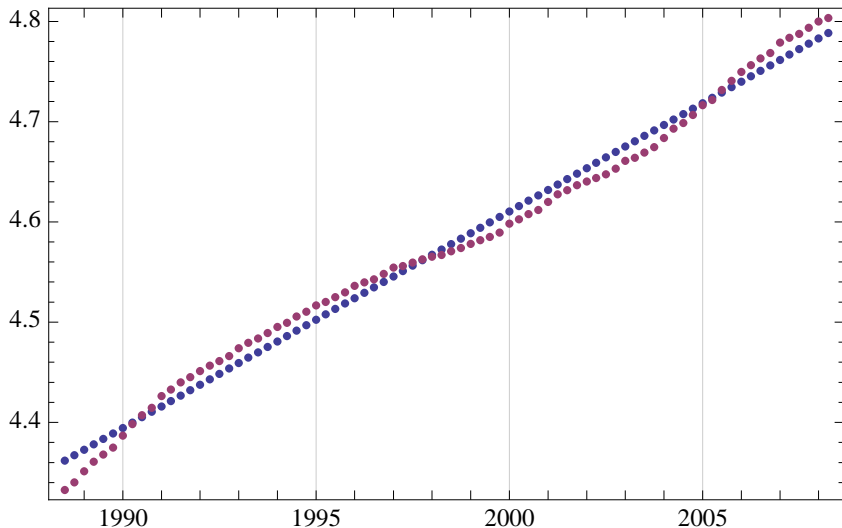


Trend growth rates

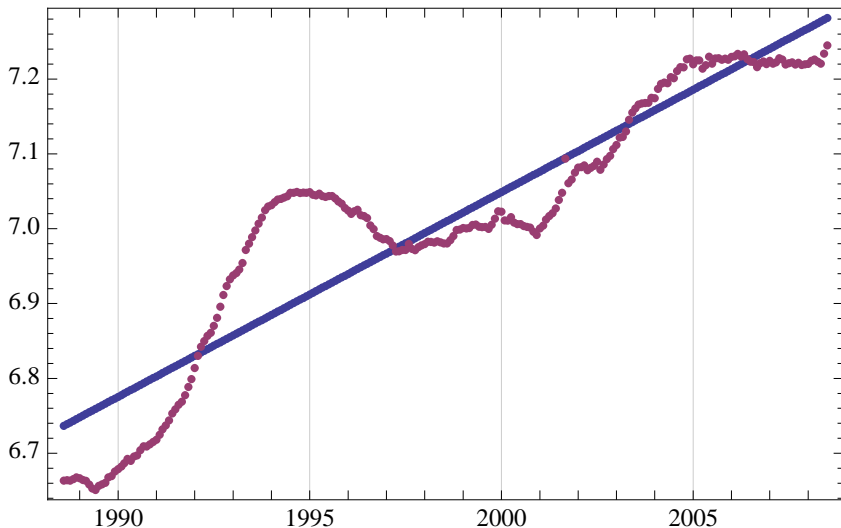
The average inflation rate over this same period should be about $6.58 - 3.0 = 3.58\%$.

The estimate for the trend growth rate of the price level for the last 20 years, using the same methods, is 2.18%.

Trend and Actual Log of Price Level



Trend and Actual Log of M1



The estimated growth rate for $M1$ of 2.77%.

The residuals from the monetary base trend are about 10% below the trend; the residuals from the M1 trend are currently about 5% below the trend.

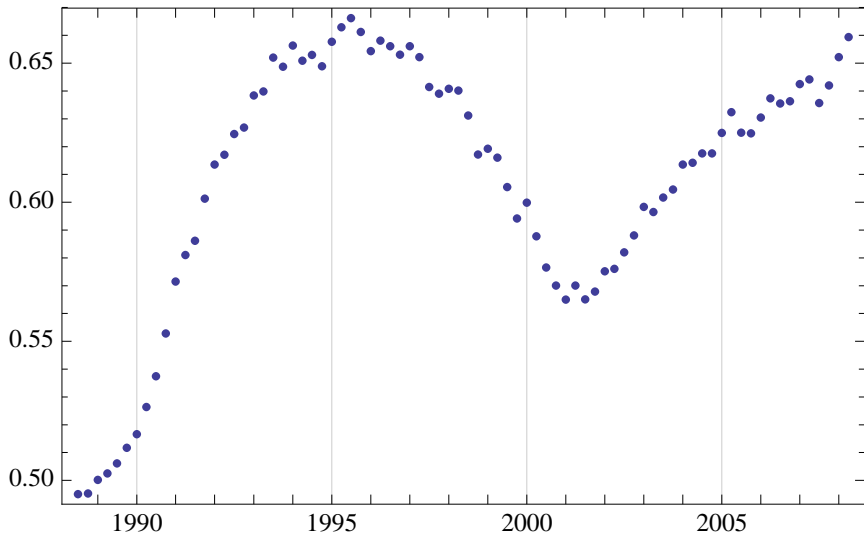
The consequences of this will be extreme: the banking crisis we are in will not dampen out, it will *intensify*.

Permanent and temporary

Permanent and temporary

How can we tell?

Ratio of National Debt to GDP 1988–2008



Japan: 196%; Norway: 75%. Canada's: 68%.

Moral hazard

The only moral hazard is brought on by Federal Reserve behavior itself.

It is the unpredictability of the central bank's behavior that leads to moral hazard in the first place.

Similarities with the Great Depression.

The main lesson is that the central bank should create an environment of predictability.

The insurance value of recessions

What are the benefits of stabilizing the fluctuations of the postwar U.S. economy?

Material in this section drawn directly from research by Robert Lucas of the University of Chicago.

The standard deviation of the logarithm of consumption around the trend in the U.S. data, 1947-2001 (note that the time period is different from the one I have been using up to now), is .032. Because the calculation is in logarithms, that translates to 3.2%.

The next step is to write down the discounted utility value of consumption.

$$E \left[\sum_{t=0}^{\infty} \left(\frac{1}{1+\rho} \right)^t \frac{c_t^{1-\gamma}}{1-\gamma} \right]$$

The notation is as follows:

- c_t : consumption
- ρ : subjective rate of time discount
- γ : aversion to risk

The risk aversion coefficient, as it is known, should be on the order of 1.0 to 4.0 using various direct studies of risk aversion and estimates of it using macro models. We'll stick with the high-end value, 4.0.

The consumption stream can be modeled as follows:

$$c_t = A e^{\mu t} e^{-\frac{\sigma^2}{2} t} e_t$$

where A is a constant, μ is the growth rate, σ^2 is the variance, and e_t is the random term (the logarithm of e_t is normally distributed) that will be removed by good policy.

Taking the expectation of c_t yields $E[e^{-\frac{\sigma^2}{2} t} e_t] = 1$; the constant $e^{-\frac{\sigma^2}{2} t}$ has been artfully chosen so that the expected value of consumption is its trend, that is $E[c_t] = e^{\mu t}$.

Now suppose that we offer the people in the economy the following question: how much additional consumption would be needed to make people just as happy as they would be if all volatility were eliminated from the economy?

If all risk were eliminated, utility would then be

$$\sum_{t=0}^{\infty} \left(\frac{1}{1+\rho} \right)^t \frac{(Ae^{\mu t})^{1-\gamma}}{1-\gamma}$$

(Notice the absence of the expectation operator because the objective is no longer stochastic), i.e., just consume along the trend without risk.

Equivalently, we could proportionately increase consumption, but leave it risky:

$$E \left[\sum_{t=0}^{\infty} \left(\frac{1}{1+\rho} \right)^t \frac{((1+\lambda)c_t)^{1-\gamma}}{1-\gamma} \right]$$

Setting these two expressions equal, we can figure out what fraction λ of additional risky consumption would be needed to make the risky consumption process equivalent to riskless consumption.

When you do the algebra, you get approximately .001.

In other words, the average consumer would pay an insurance premium of one tenth of one percent of his consumption to eliminate aggregate risk, even if he is very risk-averse.

Conclusion: Improving on macro policy in today's environment has only tiny gains.

Concluding remarks