

The Quantity Theory and Inflation since the GFC

Since the recent Great Financial Crisis (GFC) central banks massively and permanently expanded their balance sheets and lowered short-term interest rates. Suppose in 2010 an economist would have been asked what she expects average inflation to be in the next ten years, given that interest rates stay low and monetary policy expansive. Most likely she would have expected inflation to increase, at least in the medium term. Either because of some quantity theory reasoning that persistent increases in the supply of money will ultimately translate into increases in the price level or because of some New Keynesian reasoning that decreases in the interest rates should increase inflation by stimulating real activity. However, as we know with hindsight this is not what happened during this period. Average inflation has remained low and stable despite the monetary expansion. In many countries inflation was below the long-run inflation targets around 2%. Table 1 shows the annual average growth rate of CPI-inflation π , the average short-term nominal interest rate i (1-Month LIBOR rate) and the average annual growth rate of the monetary base M0 γ for the US, the Eurozone and Switzerland 2008–2020.

| | π | i | γ |
|----|-------|------|----------|
| US | 1.7% | 0.8% | 13% |
| EU | 1.4% | 0.4% | 10% |
| CH | -0.1% | 0.4% | 17.8% |

Table 1: Average yearly inflation, money market rates and M0 growth 2008–2020

These facts thus challenge the current theories of inflation and of the monetary transmission mechanism. And if actual inflation rates systematically fall short of the adopted target around 2% this poses a credibility problem for central banks about their ability to control inflation.

Recent research responded in different ways. In the New Keynesian framework Uribe (2020) has stressed the distinction between transitory and permanent monetary policy shocks. He argues that while a transitory decrease in the nominal interest rate is accompanied by increases in output and inflation, a decrease in the nominal interest rate that is expected to be permanent actually lowers inflation.¹ Others like Cochrane (2017) want to explain the development of inflation by including fiscal policies.

¹See also Schmitt-Grohé and Uribe (2017)) for a model where decreases in the nominal interest rate are accompanied with decreases in the inflation rate only and the economy converges to a deflationary “liquidity trap” equilibrium.

In the proposed project I want to take a complementary approach. Suppose γ is the trend growth rate of M1, g_Y is the growth rate of potential real GDP and g_i is the trend growth rate of the nominal interest rate i . Looking at 13 OECD countries from 1960 to 2005 Gao et al. (2020) show that a simple quantity-theoretic model of the form

$$\pi = \gamma - g_Y + 0.5g_i \quad (1)$$

explains medium-term inflation π extremely well.² But only for periods where nominal interest rates lie substantially above zero, which is the case in their sample for all countries except Japan in the 1990s. For periods where the nominal interest rate is close to or even below zero the predictions for π are typically too high. If the interest rate is more or less stuck at zero and the growth rate of monetary aggregates is high (and real growth is low), predicted inflation will be too high. Thus the model fails to explain the behaviour of money demand at low or even negative interest rates.

The goal of the project is to improve this. The mechanism I have in mind is the following: When the nominal interest rate is zero or even negative, money and less liquid nominal bonds are perfect substitutes. In fact, if $i < 0$ money might even dominate bonds in terms of return because the nominal return on money is typically fixed at a lower bound of zero. In such a situation money is not only used as a medium of exchange but also as a store of value. But the growth rate of monetary aggregates like M1 is misleading. Part of the demand for M1 comes from the increased attractiveness of money as a store of value which is not inflationary in terms of the CPI.

I want to build a model which takes this mechanism into account and analyze inflation in advanced economies since the Great Financial Crisis (and possibly in Japan in the 1990s). Either I build on Gao et al. (2020) and work in a cash-in-advance setting or I follow New Monetarist models like Williamson (2012) which could be used to analyze such “liquidity trap” situations. I also want to include fiscal factors and a fiscal authority into the analysis. My hope is that such a model offers a convincing explanation of what happened to medium-term inflation in the past ten years, which is theoretically well founded and empirically valid. The research should also offer guidance to central banks how to control medium-term inflation.

²(1) is obtained by taking logs and computing the difference over two consecutive periods of a simple quantity-theoretic relation of the form $PY = Mv(i)$ where PY is nominal GDP, M is a monetary aggregate (probably M1) and $v(i)$ is the velocity. In Gao et al. (2020) $v(i)$ is just \sqrt{i} . They extract the trend component of the time series using the HP-filter.

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