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Money, habits and growth

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Abstract

The money-in-utility model is re-considered with habits and endogenous growth. An increase in the inflation rate requires a fall in the steady state habits relative to capital, if initially the nominal interest rate is positive. If habits exhibit adjacent complementarity, immediately after the increase in the inflation rate savings and investment fall, reducing the growth rate. However, the long-run growth rate is not affected by the policy change. The long-run level of capital would be lower than it would have been had there been no increase in the inflation rate. These predictions are supported by our empirical evidence, and also reconcile some recent empirical evidence on inflation and growth.

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1. Introduction

Following Tobin's (1965) pioneering paper, the relationship between money and growth has become a classic topic in monetary economics. A main question in this literature has been the extent to which a permanent increase in the growth rate of money, and hence long-run inflation, can affect the level of output or its growth rate

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and other real variables such as capital. Tobin's aggregative model predicted that an increase in money growth by reducing the rate of return on money leads households to substitute capital for money in their portfolios, which then increases steady state capital and output.

Sidrauski (1967) was the first to consider the issue in an optimizing model with neoclassical growth, money and time separable preferences. In his setting, an increase in the rate of growth of money-in-utility will have no effect on the steady state capital stock or the steady state level of consumption; that is, money is superneutral. The reason for this result is that in the neoclassical growth model with time separable preferences the steady state is characterized by the equality of the rate of time preference to the marginal productivity of capital. This condition dictates the level of capital that must be maintained in the steady state, regardless of the rate of growth of money.[1]

Stockman (1981) introduced money into the model through cash in advance (CIA) constraints. He showed that there would be long-run superneutrality if only consumption expenditures are subject to a CIA constraint. If investment is also subject to a CIA constraint then steady state capital will fall when the growth rate of money rises. Building on the work of Stockman, De Gregorio (1993) and Jones and Manuelli (1995) developed endogenous growth models[2] with CIA constraints in order to justify theoretically a negative correlation between inflation and growth in the *long run*. In De Gregorio there are CIA constraints on investment as well as on consumption. Inflation reduces long-run growth because it acts as a tax on investment. In Jones and Manuelli, there are CIA constraints on consumption alone, but there is labor/leisure choice. Inflation reduces long-run growth by leading to a substitution of leisure for consumption.

The empirical literature concerned with the effects of inflation on growth and the capital stock has been as ambiguous as the theoretical literature. In the 1990s there was an upsurge of interest in empirical studies of growth, starting with the works of Barro (1991), and Mankiw et al. (1992). Most of the empirical studies concerned with the effects of inflation on growth used cross-section or panel (pooled time series and cross-section) data for several countries and found a significant negative effect of inflation on growth; see, for example, De Gregorio (1992, 1993), Fischer (1993) and Barro (1995).

Fisher and Seater (1993) studied the long-run relationship between growth and inflation by analyzing the time series properties of the two variables in a log-linear bivariate ARIMA framework. They identified a permanent change in each variable with the statistical concept of a unit root in non-stationary time series analysis, and were able to define precisely the long-run effect of inflation on growth. Applying this methodology to post-war annual data for 58 countries, Bullard and Keating (1995)

[1] Fischer (1979) worked out the full dynamics of Sidrauski's model. He showed that after a change in the rate of growth of money there will be some dynamics before a new steady state is reached. The reason was that for the money markets to clear the nominal interest rate would have to adjust continuously in order to maintain equality of the marginal rate of substitution between consumption and real balances to the return on money.

[2] See, e.g., Romer (1986), Lucas (1988) and Rebelo (1991).