# Inflation, human capital and Tobin's q

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## ARTICLE INFO

## ABSTRACT

A strong US postwar low frequency negative correlation exists between inflation and Tobin's q. To explain this, a production-based monetary asset pricing model is formulated with a rising marginal cost of investment, cash-in-advance and human capital based endogenous growth. Higher money supply growth causes higher inflation, lower output growth, and a lower q in the long run. The baseline model simulates well correlations of the US inflation rate and Tobin's q at each frequency of high, business cycle, low, and the "medium term." It also performs well in correlations and volatilities compared to related exogenous growth versions.

## 1. Introduction

Danthine and Donaldson (1986), Labadie (1989) and Giovannini and Labadie (1991) use monetary general equilibrium endowment economies to take up the challenge of explaining the negative association between firm value and inflation.[1] The importance of such work is that while there is an emerging literature that shows how monetary policy, for example, affects the stock market through sticky wages and inflation targeting (Christiano et al., 2008), less is known of the longer run effect of inflation taxes on the stock market. Here we extend such work to explain the following evidence on low frequency correlation between firm value and inflation.

Fig. 1 illustrates the US quarterly postwar negative correlation between the inflation rate and Tobin's q, one measure of firm value. Fig. 2 brings out the low frequency aspect of this data's negative correlation using a Christiano and Fitzgerald (2003) band pass filter with a 32–100 window. Fig. 3 shows a similar UK low frequency negative correlation.[2] Figs. 1 and 2 have a US quarterly sample period of 1960:1–2007:4; their negative correlation is particularly pronounced starting in the late 1960s when inflation began a long trend upwards. Tobin's q bottoms out around the early 1980s when inflation peaks.

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[1] Fama (1981) begins his study by stating "There is much evidence that common stock returns and inflation have been negatively related during the post-1953 period."

[2] The raw US data for q used in Figs. 1 and 2 come from the Smithers & Co (http://www.smithers.co.uk/) and the inflation rate is based on implicit price deflator; a very similar negative correlation also results using Hall's (2001) Tobin's q estimates. Fig. 3 UK quarterly CPI data are from the Office of National Statistics; Tobin's q data are from the Bank of England, in which the methodology for computing q is described in Price and Schleicher (2005). Note that the low frequency filters here lose the first and last three years of data.
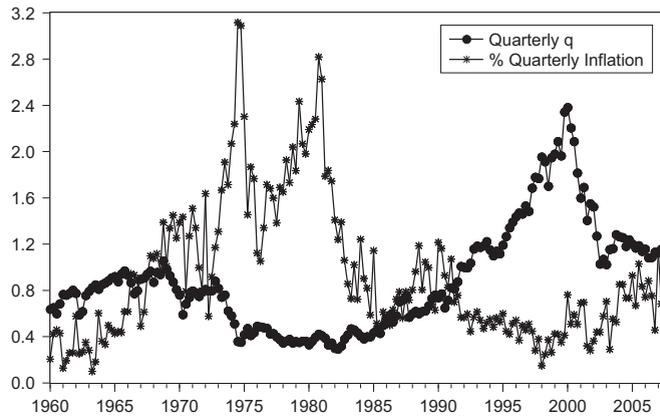
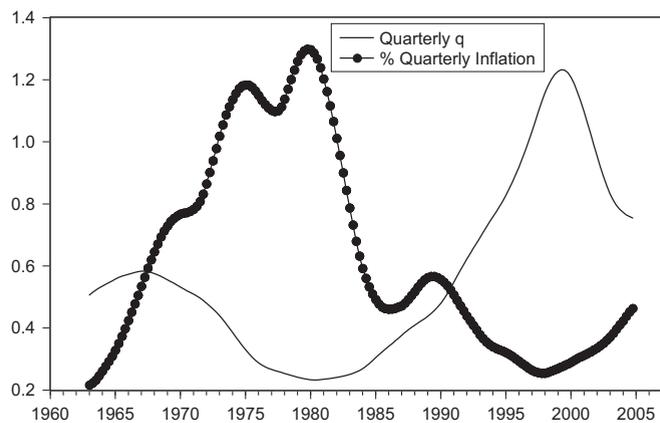**Fig. 1.** US *q* and Inflation: 1960Q1–2007Q4.



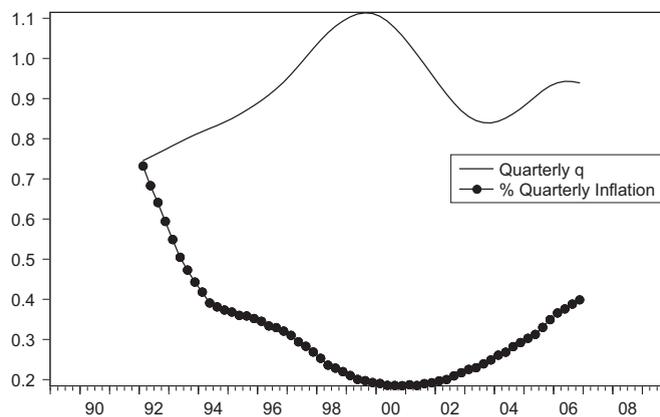**Fig. 2.** Low frequency *q*-inflation relationship: US.



**Fig. 3.** Low frequency *q*-inflation relationship: UK.

The subsequent rise of *q* coincides with an era of further disinflation and high economic growth. Then *q* reaches an all time high around 2000 shortly after inflation falls to its low around 1%. Since then *q* has fallen and inflation has risen. Fig. 3 has a quarterly sample period of 1989:1–2009:4. The US and UK correlation coefficients are −0.73 and −0.72 respectively which are statistically significant at the 1% level.

Comin and Gertler (2006) identify low frequency oscillations for several US macroeconomic aggregates, although not Tobin's *q* and inflation, using a filter with a periodicity of 32–200 quarters. Given 47 years of data in our US sample, the low frequency is defined with a window of 32–100 quarters, instead of 32–200 quarters, using a Christiano–Fitzgerald (2003)