



# Monetary policy, taxes, and the business cycle<sup>☆</sup>

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## Abstract

This paper analyzes the interaction of inflation with the tax code and its contribution to aggregate fluctuations. We find significant effects operating through the tax on realized nominal capital gains. A tax on nominal bond income magnifies these effects. Our innovation is to combine monetary policy shocks with non-indexed taxes in a model where the central bank implements policy using an interest rate rule. Monetary policy had important effects on the behavior of the business cycle before 1980 because policymakers did not exert effective control over inflation. Monetary policy reform around 1980 led to better control, and with more stable inflation, the effect of the interaction between monetary policy and the nominal capital gains tax has become negligible.

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## 1. Introduction

Does the interaction of inflation and the tax code contribute considerably to aggregate fluctuations? There is a large body of work showing that the steady-state welfare effects of moderate inflation are large when nominal capital gains are taxed. These include the partial equilibrium analyses of Fischer (1981), Feldstein (1997), and Cohen et al. (1999).<sup>1</sup> The literature also includes the steady-state analysis of general equilibrium models in Abel (1997), Leung and Zhang (2000), and Bullard and Russell (2004). In general equilibrium, the welfare costs arise because, for any given capital income tax rate, an increase in the inflation rate raises the real pre-tax rate of return to capital and lowers the after-tax return. The lower after-tax return causes a decline in the capital stock and a reduction in labor productivity. These analyses are about steady states and only suggestive about the cyclical impacts. This paper examines the dynamic implications for the interaction between inflation and the capital gains tax.

We specify a dynamic, stochastic, general equilibrium model that combines monetary policy shocks with taxes on nominal capital gains in a setting where the central bank implements policy using an interest rate rule. The use of an interest rate rule makes inflation highly persistent, leading to persistent changes in the expected marginal tax rate on real capital gains. We find that monetary policy had important effects on the behavior of the business cycle before 1980 because the Fed did not respond aggressively to inflation shocks that were highly persistent. Monetary policy reform around 1980 led to lower and more stable inflation. A more credible commitment to price stability and a more aggressive response to inflation shocks has led to less persistent inflation dynamics and effectively eliminated the cyclical effects of the interaction between monetary policy and the nominal capital gains tax.

Inflation persistence induces changes in expected tax rates. Dittmar et al. (2005) show that inflation persistence is common in models where the central bank uses an interest rate rule. When the central bank is using an interest rate rule, a persistent shock to the inflation trend appears as a shock to the inflation target. It leads to a persistent deviation of inflation from the steady state and, in the presence of a nominal tax on capital gains, causes a persistent change in the effective marginal tax rate on capital. Thus, a positive shock to the inflation objective distorts the consumption/saving decision and may have a long-lasting effect on capital accumulation.<sup>2</sup>

The next section describes the model with taxes on realized nominal capital gains as well as on income from labor, capital, and bonds. We then consider the model dynamics, showing how inflation affects the business cycle through the tax on

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<sup>1</sup>For empirical estimates of the burden of capital gain tax using panel data, see Poterba (1987) and Auerbach (1988). For survey of the tax policy issues and recent evidence, see Auerbach (2004).

<sup>2</sup>Altig and Carlstrom (1991) use an overlapping-generations model with nominal prices (but without money explicitly included) to show that the lack of perfect indexation for inflation in the tax code could have a large cyclical effect in principle. They find, however, that their model could not account for the magnitude of cyclical variation in hours worked and that it predicts a large decline in the capital stock in the 1980s that never materialized. We find that one crucial assumption in Altig and Carlstrom—the relatively low value assumed for inflation persistence—is likely to be important for these findings.

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