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Revenue maximizing inflation ☆

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Abstract

A classic monetary policy result is that revenue maximization entails setting the inflation tax rate equal to the inverse of the interest semi-elasticity of the demand for money. The standard approach underlying "Cagan's rule" is partial equilibrium in nature, treating money demand as being given from outside the model and abstracting from the real effects of inflation. This paper reconsiders the question of the revenue maximizing inflation rate in a general equilibrium framework with a labor-leisure choice, where money is held because it reduces transactions costs. In this framework, the revenue maximizing inflation tax rate is lower than that implied by Cagan's rule.

JEL classifications: E; E4; E5; E6

Keywords: Revenue maximizing inflation; Inflation tax; Seigniorage; Cagan money demand function; Cagan's rule

1. Introduction

In his pioneering study of hyperinflation, Cagan (1956) introduces the semi-log or Cagan money demand function that has been a workhorse in monetary economics ever since. One especially useful result that Cagan establishes is that the revenue maximizing inflation rate is equal to $1/\alpha$, where α is the interest semi-elasticity of the demand for money. The "Cagan rule," as this result has come to be known, is the keystone of the literature on revenue maximizing inflation. However, Cagan's rule is partial equilibrium in nature in two important respects. First, it takes the demand for money as given from outside the model

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rather than deriving it from the underlying environment. Second, it ignores the potential impact of changes in the inflation tax rate on real variables such as output, consumption, and the real interest rate. The upshot is that one parameter, the interest semi-elasticity of the demand for money, pins down the revenue maximizing inflation tax rate. No other features of the economy and no other features of the money demand function matter.[1]

This paper broadens the approach to the revenue maximizing inflation tax rate by (i) deriving the money demand function from the consumer's optimization problem and (ii) allowing for changes in the inflation tax rate to have real effects. The model is similar to that used by Kimbrough (1986a) to study the optimality of Friedman's (1969) rule when distorting taxes must be used to raise government revenues. Consumer's face a labor-leisure choice and they hold money because it economizes on the amount of resources that must be devoted to transacting in the goods market. It is shown that, because changes in the inflation tax rate have real effects in such an economy, the revenue maximizing inflation tax rate is lower than that implied by Cagan's rule. The intuition for this result is quite simple. As with any other tax, maximizing revenues from the inflation tax requires setting the tax rate so that the marginal increase in tax revenues from increasing the tax rate is just equal to the marginal loss in revenues from the erosion of the tax base induced by the higher tax rate. In the standard approach underlying Cagan's rule, this marginal loss in revenues arises solely because money holdings per unit of consumption/output fall as higher inflation tax rates lead consumers to substitute out of money and into other assets. In the transactions costs approach adopted here there is another effect as well: As the inflation tax rate rises, consumption falls due to the combined effects of rising transactions costs and increased distortions in the labor market thus further reducing the demand for real balances. Put more succinctly; in the standard approach higher inflation reduces the tax base solely through a substitution effect whereas in the transactions cost approach there is both a substitution effect *and* a scale effect. This means that the marginal loss in revenues from increasing the inflation tax rate is higher in the transactions costs approach and, as a result, the revenue maximizing inflation tax rate is lower than that implied by Cagan's rule. Section 1 of the paper demonstrates this result for the general case. Sections 2 looks at the special case where the underlying transactions cost function gives rise to the Cagan money demand function. Qualitative results are discussed and back-of-the-envelope type calculations are presented to try and assess the quantitative significance of the results. Concluding remarks are presented in Section 3.

2. Transactions costs and revenue maximizing inflation

The representative consumer chooses time profiles for consumption, c_t, labor effort, l_t, money holdings, M_t^d,and bond holdings, b_t, to maximize lifetime utility

$$U = \sum_{t=0}^{\infty} \beta^t U[c_t - g(\ell_t)], \tag{1}$$

[1]In the general case, where the money demand function is not of the Cagan type, the partial equilibrium approach continues to imply that the revenue maximizing inflation tax rate is given by the inverse of the interest semi-elasticity of the demand for money. However, the interest semi-elasticity is no longer a constant but varies with the inflation tax rate.