A quantitative analysis of inflation as a tax on the underground economy ☆

Tatyana A. Koreshkova[a,b,c]

[a]*Department of Economics, Concordia University, 1455 de Maisonneuve Blvd. W., Montreal, Quebec, Canada H3G 1M8*
[b]*Institute for Policy Analysis, University of Toronto, 140 St. George St., Toronto, Ontario, Canada M5S 3G6*
[c]*Department of Economics, Oberlin College, Oberlin, OH 44074, USA*

Abstract

Inflation rates are more dispersed and are persistently higher in developing countries. This paper quantifies the importance of the public-finance motive for inflation in the presence of a tax-evading sector, the underground economy. The approach is motivated by the observation that the underground economy is especially large in poor countries. The analysis builds on a general equilibrium monetary model with two production sectors, where income in one of the sectors cannot be taxed. A benevolent government finances its budget using an optimal combination of the income tax rate and the inflation rate. The model is first calibrated to the U.S. economy and is then used for a cross-country simulation. The resulting relationships between the size of an underground economy, inflation rate, income tax rate and the share of seigniorage in the government revenue rationalize the cross-country data quantitatively well.
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1. Introduction

The pervasiveness of inflation over the last half century has drawn extensive research on the costs and benefits of inflation. While the focus of the quantitative general equilibrium analysis of inflation, to date, has remained on developed countries (with an emphasis on the cost of inflation),[1] it is poor countries that are notorious for high rates of inflation. In an attempt to understand why inflation is much higher in poor than in rich countries, the empirical and theoretical literature has identified a number of factors such as inequality, political instability, lack of openness, high turnover of central bank governors and the costs of public finance.[2] This paper undertakes a quantitative investigation of the public-finance motive for inflation. Using a calibrated general equilibrium model, this study shows that, in the presence of a large underground economy, even a benevolent government may find it optimal to choose a high inflation rate, of a magnitude comparable to that observed in many developing countries.

The public-finance rationale behind inflation was recognized by Bailey (1956) and Phelps (1973). They argued that when a government finances its expenditures using distortionary taxes, optimal policy requires equalizing the marginal social losses from alternative tax instruments. A positive nominal interest rate acts as a tax on cash purchases. Thus, according to Bailey and Phelps, a positive consumption or income tax would imply a positive nominal interest rate and, provided the latter is high enough, positive seigniorage revenue. However, in general, this argument in favor of inflation fails if a government cannot tax-discriminate between cash and credit purchases of a consumption good. The reason lies in the optimal taxation principle: commodities that enter consumer preferences symmetrically should be taxed at the same rate (see Lucas and Stokey, 1983; Lucas, 1990). While a labor income tax applies to all goods symmetrically, a positive nominal interest rate imposes an asymmetric tax on cash purchases vis-à-vis goods acquired on credit, violating the optimality principle. Thus the optimal policy requires a zero nominal interest rate, or the Friedman rule.[3] In alternative models of money, the Friedman rule is not necessarily optimal as, for instance, in the model by Guidotti and Végh (1993) where money is an intermediate good which reduces transaction time. The authors find that if the transaction technology does not exhibit constant returns to scale, it is optimal to resort to an inflation tax to finance government spending. However, quantitative analysis has failed to deliver optimal inflation rates of a practical significance (Mulligan and Sala-I-Martin, 1997).

Nevertheless, following the same line of argument, the Friedman rule is not optimal if a part of income, or equivalently, a subset of goods, evades taxes, as is the case in the presence of an underground economy. The following simple example lays out the intuition. Suppose cash is only used to purchase goods in the underground economy while purchases in the rest of the economy are made with credit. Then a consumption or income tax would only affect credit transactions. Uniform commodity taxation can be achieved by imposing, in addition, a positive inflation tax. In a more complicated world, where cash and credit are used for transactions inside as well as outside of the underground economy, there is a

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[1]See, for example, Cooley and Hansen (1991), Dotsey and Ireland (1996) and Aiyagari et al. (1998).

[2]See, for example, Albanesi (2006), Cukierman et al. (1992a), Romer (1993) and Cukierman et al. (1992b).

[3]For conditions necessary for the Friedman rule to be optimal see, for example, Chari et al. (1996), Chari and Kehoe (1999) and Correia and Teles (1999).