The role of tax bases and collections costs in the determination of income tax rates, seigniorage and inflation

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Abstract. A growing theoretical literature on optimal taxation predicts that governments will set the tax rates on money holdings and on more traditional tax bases to minimize the deadweight losses of collecting government revenue. Under the presumption that relative collection costs and tax bases have not changed significantly over time, the empirical time-series seigniorage literature has focused on the theory's tax smoothing implication, finding only weak support. We show that changes in collections costs and tax bases played an important role in the determination of tax composition and find stronger support for tax smoothing when this is taken into account.

1. Introduction

Governments obtain revenue from a variety of sources. The most widely recognized sources include property taxes, income taxes, sales taxes, value added taxes, and tariffs. There is a growing literature that views this complex tax structure as reflecting the optimizing behavior of governments. This optimal tax literature predicts that tax rates will be smoothed over time, that tax rates will rise in response to increases in permanent government spending, and that tax rates will be higher on goods with less elastic demand, with larger tax bases, and with lower collection costs.¹

Seigniorage is an important but often unrecognized revenue source for many national governments.² For the most part, the recent empirical seigniorage literature has focused on the tax smoothing implication under the presumption that relative collection costs and tax bases have not changed significantly over time. Evidence supporting the basic implication that a maximizing government jointly smooths the inflation rate and other tax rates has been weak.

The lack of support for the maximization hypothesis is troublesome. At a fundamental level, the optimal tax models simply reflect the general principle

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that governments will not want to impose undue (deadweight) losses on their constituents. This general principle is consistent with a number of more specific assumptions about government behavior. In particular, a public choice approach that explicitly incorporated political payoffs into the analysis would also imply that, *ceteris paribus*, the government would not want to subject taxpayers to uneven (high and low) rates of taxation over time.

The objective of our paper is to provide a unified framework for reassessing the received empirical wisdom. We examine whether seigniorage and the taxation of income over time in the United States reflect changes in collection costs and tax bases in addition to the changes in permanent government spending that have drawn the attention of the optimal seigniorage literature. The distinctive feature of our empirical analysis is that it includes direct measures of variations over time in tax bases and collection costs, rather than ignoring these effects, as most of the optimal seigniorage literature has done.

The next Section outlines a model of tax composition and derives testable implications. Section 3 provides a summary review of the empirical tax composition literature that focuses on the work that has been done on seigniorage. Section 4 contains the empirical analysis, Section 5 considers alternative hypotheses, and Section 6 offers concluding remarks. Generally, the results support the hypothesis that the tax structure in the United States reflects optimizing behavior by the government.

### 2. A model of tax composition

We start with a generic model of tax composition which we modify by introducing an income tax collection cost factor. In particular, assume the government imposes taxes on two bases: output (which is taxed through an “income” tax) and money balances. The government’s revenue in period $t$ can be defined as

$$
T_t = \theta_t y_t - c(\theta_t y_t) \theta_t y_t + s_t
$$

where $\theta_t$ is the income tax rate, $y_t$ is real income, $c$ is average cost of collectiving revenue from the income tax and $s_t$ is real seigniorage. We define real seigniorage as the revenue the government collects from investing its real monetary liabilities in interest earning assets. That is, $s_t = i_t m_t$, where $i_t$ is the nominal interest rate and $m_t$ is the real stock of base money.

Equation (1) differs from the typical formulation in the optimal seigniorage literature by explicitly including a term, $c(\theta_t y_t) \theta_t y_t$, for the costs of collectiving income tax revenue. If $c' = 0$, then average costs are constant. More