A quantitative theory of tax evasion☆

José Joaquín López[a]

Department of Economics, Fogelman College of Business & Economics, University of Memphis, 3675 Central Ave., Memphis, TN 38152, United States

ARTICLE INFO

ABSTRACT

I present a simple, unified approach to study the tax evasion practices often observed in developing countries. I develop a general equilibrium model where heterogeneous establishments optimally select themselves into informality, tax compliance, and formal tax evasion. Informal firms evade taxes by staying small, while larger, formal firms can engage in costly tax evasion. In equilibrium, tax revenues rely on medium-sized firms, which are scarce. In a calibration exercise using data from Mexico, I find that reducing the returns to tax evasion by formal firms increases tax revenues by up to 68%. However, economies where such returns are too high face a trade-off between tax collection and aggregate efficiency, as cracking down on formal tax-evading firms pushes some firms into informality. Last, as the economy develops, the informal sector shrinks, while the tax-evading sector expands, thus limiting potential collection. If lower informality is a byproduct of development, and not vice versa, a solid tax base can be achieved by fiscal authorities effectively by focusing on formal tax evasion.

1. Introduction

Tax evasion is pervasive in developing countries. Many firms choose to join the informal sector, remaining small and avoiding taxes altogether, whereas others are able to reduce their tax burden through lawyers, accountants, and bribes or other forms of corruption. While there are numerous studies that model informality and its aggregate effects, the rent-seeking activities undertaken by many formal firms are largely ignored in modern theories of production and firm heterogeneity.

Tax evasion and tax avoidance have always existed: from wealthy Romans in the third century burying their jewelry to avoid the luxury tax, to eighteen-century English homeowners who bricked up their fireplaces to escape notice from the hearth tax collector (Slemrod, 2007, on Webber and Wildavsky, 1986), to Apple's multi-billion dollar accounts in offshore tax havens.[1] Even in the modern-day U.S., Slemrod (2007) cites an IRS estimate of 17% for the noncompliance rate of the

---

[1] See "Apple's Web of Tax Shelters Saved It Billions, Panel Finds," *The New York Times*, May 20, 2013.

corporate income tax in 2001. The World Bank (2015b) estimates that 54% of companies across 135 developing countries do not report all income tax to authorities, while Artavanis et al. (2015) report a not-so-small figure of 36% for Europe.

Evidently, these tax-evading activities are not costless—the wealthy Romans and the English homeowners spent some of their valuable time digging and laying bricks, while Apple undoubtedly hires many skilled accountants and lawyers to devise and execute their tax-minimizing strategies. Also implied in these anecdotes is the notion that higher stakes usually command higher efforts, as hiding personal jewelry certainly requires less resources than avoiding a multi-billion dollar tax bill. The idea that larger, more productive firms find it more attractive to engage in "defensive" rent seeking is also recognized by Tullock (1992).

In this paper, I propose a simple theory of how agents optimally choose the tax-evading efforts just described as a function of their productivity, market prices, and the institutional environment. Specifically, I consider an environment where formal firms can reduce their fiscal burden by spending resources—either legally or illegally. This formulation is not particular to developing countries, and can be thought of as a quantitative framework to think about the ideas first posed by Krueger (1974). The degree of rent seeking observed in the model economy depends on the stringency of the tax system, as well as on the returns to firms' tax-evading efforts. The theory predicts that larger, more productive firms spend more resources in tax-avoiding/evading activities, and thus face a lower tax burden.

I apply the theory to the specific case of business income taxes, and show how the mixture of formal tax-evading, formal tax-compliant, and informal firms is determined in equilibrium. To this end, I consider a general equilibrium environment where individuals with idiosyncratic managerial abilities face the choice of becoming formal entrepreneurs, informal entrepreneurs, or workers. Informal entrepreneurs avoid paying taxes by staying small, while formal entrepreneurs have the choice of complying with the tax code, or spending resources to reduce their fiscal outlay. The coexistence of small informal firms that do not pay taxes and large formal tax-evading firms results in an effective tax schedule that relies on medium-sized firms. This result links the evidence on the "missing middle" of the distribution of firm sizes in developing countries to a low capacity of the state to generate tax revenues—which is another common feature of many developing countries.

I then study the aggregate effects reducing the returns to the tax-evading efforts undertaken by formal firms. I show that the effects depend on whether there are formal tax-compliant firms operating before any policy changes. Specifically, if there are no formal tax-compliant firms operating, reducing the effectiveness of tax evasion by formal firms pushes previously formal firms into informality, increasing the size of the informal sector, reducing TFP, capital, and output. However, in economies where the returns to tax evasion are not too high, reducing such returns increases the share of tax compliant firms, increasing tax revenues without distorting the allocation of capital and labor.

I calibrate the model to the Mexican economy—where informal firms employ 34% of workers, and tax evasion by formal firms is estimated at 37% of tax collection. I then perform a numerical exploration of the effects of the returns to tax evasion and the statutory tax rate. I find that reducing formal tax evasion increases tax revenues as a percentage of GDP by up to 68%. Further, the Laffer curve with respect to the statutory tax rate generated by the model suggests that Mexico's recent income tax rates have been near the revenue-maximizing value, and thus the state's capacity to raise revenues is unlikely to improve via further changes to these rates.

Finally, I explore the effects of economic development on the equilibrium mixture of firms, tax revenues, as well as the amount of tax evasion in the economy. As the economy grows, the informal sector shrinks, and eventually disappears. However, the share of formal, tax-evading firms continues to grow with the economy, limiting the state's capacity to raise tax revenues even as the economy prospers. These results suggests that, to the extent that lower informality is a byproduct of development, and not vice versa, a solid tax base can be achieved by fiscal authorities more effectively by targeting formal, tax-evading firms.

Clearly, there are other aspects of formal tax evasion and tax avoidance that deserve attention. The feature of tax evasion often highlighted in the literature is the probability of being caught by the tax authorities, which usually comes with a punishment, as in the seminal work of Allingham and Sandmo (1972). In this paper, I focus on a largely unexplored dimension of firm-level tax evasion and tax avoidance, namely, that they are costly activities optimally chosen by firms, much like any other productive input, and that they are the result of the institutional environment, such as loop holes in the tax code, and limits to the state's capacity to enforce it. My treatment of tax avoidance and tax evasion is similar to Mayshar (1991), and Slemrod (2001), who study the partial equilibrium decision of a utility-maximizing individual taxpayer with access to a "tax technology" that allows him to exert labor effort to reduce his tax burden. Acemoglu (2005) and Piketty et al. (2014) also consider economies where tax sheltering is costly, although their focus is on a different set of issues.

My treatment of informality borrows heavily from Fortin et al. (1997), and Leal-Ordóñez (2014), who study the aggregate effects of informality due to incomplete tax enforcement at the extensive margin. In those models, however, formal status implies full compliance, and all formal firms pay the statutory tax rate. One of the contributions of my work is to complement their analysis by considering the effects of incomplete tax compliance at the intensive margin, which is the result of the tax-evading efforts undertaken by formal firms, and to study how both margins interact in equilibrium.[2] By embedding it into a general equilibrium environment with heterogenous firms, this unified approach also contributes to the existing literature on tax evasion using representative agent models, such as Chen and Been-Lon (2003). Moreover, my model gen-

---

[2] In the same spirit, Ulyssea (2014) considers an economy where firms can be informal either by not registering their business, or by hiring workers "off the books.". Even though I consider ways in which firms avoid taxes different than outsourcing of employees, to the extent that outsourcing is a costly activity that brings the firm some tax benefits, Ulyssea's core idea is implicit in my formulation.