



To tax or not to tax? When does it matter for informality?



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ABSTRACT

Theoretical models generally always predict or assume that higher taxes lead to larger informal sectors. Empirically, however, there is considerable debate on the effect of taxes on informality. In this paper I show that whether a positive, negative or non-relation arises between tax rates and informality depends on the degree of tax enforcement and the level of credit market development in an economy. Higher enforcement implies a higher probability of detection and punishment while more credit implies better formal sector access to finance. Both are incentives to become formal. In a two-sector dynamic general equilibrium model with borrowing constraints, I show that informality rises with the tax rate up to a threshold level of tax enforcement beyond which it falls as tax increases. This enforcement threshold depends negatively on the level of credit in the economy.

1. Introduction

The purpose of this paper is to explore theoretically the effect of institutional differences on the relationship between tax and informality in a dynamic general equilibrium framework. I specifically show that the different levels of tax enforcement and financial development observed in developing versus developed economies play a crucial role in the nature of the relationship that emerges between taxation and informality. I also find that productive government expenditures do not matter in this context.

Taxation of output is viewed as a cost to operating in the formal sector. Therefore higher tax rate(s) increase the incentive to under-report income and the prevalence of informal or underground activity. Given this reasoning, theoretical models of the informal sector almost automatically assume or find a positive relationship between taxation and tax evasion (Ihrig and Moe, 2004; Busato and Chiarini, 2004; Amaral and Quintin, 2006; Prado, 2011; D'Erasmus and Boedo, 2012; Mitra, 2013; Charlot et al., 2015).

Empirically, however, there is less of a consensus on how taxes relate to informality. Several empirical studies associate higher tax rates with a smaller informal sector while others report a positive effect of taxes on informality. Schneider (2005) and La Porta and Shleifer (2008), using different estimates of the informal sector and measures of taxation, find the latter to be an important driver of the informal sector size. Dabla-Norris et al. (2008) focus mainly on developing economies and report that taxes and informality are significantly

positively correlated but stronger legal and enforcement institutions reduce the significance of taxes. In a panel analysis, similarly focusing on developing economies, Liu-Evans and Mitra (2016) find informality to be significantly positively correlated with taxes and significantly negatively correlated with different proxies for enforcement. Djankov et al. (2010) report a positive correlation between corporate tax rates and informal sector size for 85 countries, a large majority of which are developing economies. Gorodnichenko et al. (2009), study a major tax reform in Russia and find a large positive elasticity of evasion with respect to the tax rate.

Unlike the above studies, authors who look at transition and OECD economies find contrasting results. Johnson et al. (1997, 1998) conclude that tax rates are negatively correlated with the size of the informal sector. However, the simple model provided by Johnson et al. (1997), contrary to their empirical findings, implies a positive relationship between tax rates and the size of the informal sector. When Johnson et al. (1998) take into account composite indices of both tax rates and quality of tax administrations, they find that these indices are positively correlated with the size of the informal sector, thus supporting their claim that both administration of taxes and regulatory discretion play key roles in the tax–informality relationship. Friedman et al. (2000) suggest that the positive correlation between tax and informality is the result of poor institutional factors such as corruption and bureaucratic quality. They find some evidence that a higher direct tax rate reduces informal sector size but the result loses significance when they control for per capita income in order to account for the fact that richer countries have better institutions. More

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bureaucracy, greater corruption, and a weaker legal environment, on the other hand, are all associated with a larger unofficial economy even after controlling for per capita income in their sample. Similarly, [Aruoba \(2010\)](#) finds, using a much larger group of countries, that institutions play a key role in determining the effect of taxes on informality.

Thus empirical studies remain largely divided on the effect of tax on informality, although, there appears to be greater agreement in the literature on the important role of institutions. There especially seems to be a contrast in the way taxes affect informality in developed and developing economies. [Goel and Nelson \(2016\)](#), for instance, find that determinants of the shadow economy differ across developing and developed economies with the differences mainly arising from the disparate nature of institutional quality in these economies. They also find an increase in their measure of the tax rate promotes informal sector growth in developing economies while stemming it in developed economies.

In this paper I argue that tax enforcement and the level of financial market development play key roles in the nature of the tax–informality relationship that emerges in an economy. I do so in a two sector dynamic general equilibrium model with borrowing constrained formal and informal entrepreneurs. I do not, however, study how the informal sector comes into being, but given that such a sector exists, I investigate the role played by institutional differences in the tax–informality relationship.

Lower tax enforcement implies a lower probability of being caught and punished while less developed domestic credit markets imply formal businesses have less or no access to formal sources of financing, thus lowering the incentive to be formal. Thus both lower tax enforcement and lower FD give rise to larger informal sectors and the degree and importance of these effects with respect to the informal sector's size have been addressed in the literature (see among others [Amaral and Quintin, 2006](#); [Quintin, 2008](#); [Antunes and Cavalcanti, 2007](#); [Liu-Evans and Mitra, 2016](#); [Berdiev and Saunoris, 2016](#)). In this paper, I extend the line of argument to the relationship between taxes and informality. Specifically, I show that higher taxes reduce (raise) informality when enforcement and credit market institutions are well (less) developed. I identify a critical value of tax enforcement below which taxes and informality are positively related and above which the relationship is a negative one. Taxes exert no effects on informality when enforcement is at or around its threshold value.

The reasoning behind the contrasting effects of tax on informality is as follows: As taxes are raised the cost of formal production rises with probability 1, while the informal sector's cost of production rises with the probability of being detected (and the stringency of the punishment associated with detection). Higher enforcement which is associated with better enforcement institutions gives rise to a higher probability of detection and associated penalty hence a larger increase in the expected cost of informal production with taxes. This latter implies that the informal sector expands less with taxes at higher enforcement. In other words, as enforcement increases the positive relationship between tax and informality becomes weaker until at a high enough probability of detection, taxes do not affect informality at all and beyond this level of enforcement, informality falls with taxes since the cost of hiding is too high.

Of course if formal businesses enjoy high quality access to official sources of financing then there is greater incentive for informal producers to become formal and enforcement needs to rise less to convince informal producers to switch to paying taxes. In my model, as financial development progresses formal businesses are able to borrow more against their income or output which increases the size of this sector relative to the informal sector. Additionally, the expansion of the formal sector brings about an increase in the demand for and hence the price of resources used in formal production. In our simple model economy labor is the only factor of production implying the competitive wage rate rises due to the higher formal labor demand at higher FD. At this higher cost of labor, the same increase in the tax rate causes a

smaller expansion in the size of the informal sector and enforcement needs to rise less in order to clear the bar beyond which informality becomes decreasing in the tax rate.

This paper contributes to the literature in two main ways. Firstly, unlike the large literature studying the determinants of informality this paper focuses on the determinants of the tax–informality relationship. Understanding this latter has become especially important in light of the varied empirical results in the literature. Secondly, this paper provides a simple theoretical construct which allows tax rates and informality to be related either positively, negatively or not at all depending on the level and quality of enforcement and credit market institutions. This provides a departure from the existing models of informal sector that generally predict or assume a positive relationship between tax and informality in contrast to existing empirical findings.

[Elgin \(2015\)](#) is the only exception to my knowledge – he builds a dynamic political economy model and shows that greater political stability may be associated with a negative relationship between tax and informality while less politically stable countries may exhibit a positive relationship between the two. Specifically, in his model, public capital is mainly utilized by the formal sector which implies that countries in which incumbent parties are more likely to stay in power have a higher tax burden but a smaller informal sector. The current paper provides a complementary explanation for the varied relationship observed between taxes and informality across countries by sketching out channels through which tax enforcement and financial development may play important roles. I calibrate my model to a typical emerging market economy, Brazil, and conduct numerical simulations which sketches the changing relationship between tax rate and informality for different levels of enforcement and FD while all other parameters remain constant. I extend the application of my model to other countries in the sensitivity analysis section.

The rest of the paper is structured as follows: [Section 2](#) presents an analysis of the data and some simple correlations to motivate the contrasting effects of tax on informality in developing versus developed economies before delving into the model in [Section 3](#) which presents a novel theory of interaction between (credit market and enforcement) institutions and their effects on the tax–informality relationship, [Section 5](#) discusses the results and conducts quantitative analyses, [Section 6](#) considers an extension of the model and [Section 7](#) concludes.

2. Data and motivation

This section documents the link between taxation and informality in developing and developed country groups and presents some other indicative statistics to motivate the theoretical work. I compile two separate data sets for the two country groups using data from different sources. My starting point is the informal sector's share in GDP estimated by [Schneider et al. \(2010\)](#) for developing, developed and (formerly) transition economies. I use this influential study to create my groups of developing and developed economies and their respective informal sector sizes. For the purposes of this paper I class transition economies in the developed country group for two reasons. Firstly, OECD and transition economies by themselves constitute too few data points in comparison to the developing economies group in [Schneider et al. \(2010\)](#), who report results for 25 OECD, 21 formerly transition and 88 developing economies. Secondly, due to a lack of data availability, my data source for the proxy for financial development differs across developing and developed economies, with the data for transition economies derived from the same source as the developed group of countries as discussed below. Lastly, earlier influential studies ([Friedman et al., 2000](#); [Johnson et al., 1997, 1998](#)) have similarly grouped these countries together. That said, the main results do not change when calculated for developed and transition countries separately with the latter generally mimicking the results of the OECD economies. The average informal sector size in [Schneider et al. \(2010\)](#) covers the years 1999–2007. So for the rest of my variables, after

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