



# Shining a light on the shadows: Identifying robust determinants of the shadow economy<sup>☆</sup>



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## ABSTRACT

Despite the substantial body of research studying the determinants of the shadow economy in the past few decades, consensus on a set of consistent drivers of the underground sector has failed to emerge. This paper aims to synthesize the literature by identifying robust determinants of the shadow economy and addressing related modeling uncertainty. Using three different cross-national shadow measures and employing numerous determinants over hundreds of model combinations, we find that bureaucratic complexity is more significant than monetary severity in driving the shadow economy. Further, the incentives of new shadow entrepreneurs are somewhat different from established shadow operators. A one standard deviation increase in tax complexity increases the overall shadow economy by over ten percent of the mean. In contrast, a similar increase in business startup costs increases the prevalence of new informal entrepreneurs by almost more than double. Further, shadow determinants in developed and developing nations are dissimilar.

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## 1. Introduction and structure

Shadow economies are widely prevalent across the globe, although various factors drive businesses to go underground.<sup>1</sup> Underground businesses are present even in nations that are otherwise quite law abiding (e.g., Scandinavian countries – see Schneider et al., 2010; and Tanzi, 1982). Such operations enable firms to evade taxes and regulations, although they must weigh these benefits against the potential costs of detection and punishment associated with breaking the law. Examples of underground businesses include unlicensed/unauthorized businesses, or businesses keeping transactions “off the books” to evade taxes. The prevalence of the underground sector is large around the globe. For example, Schneider (2012) reports that the shadow economy averaged nearly one-third of GDP (in 2006) for a large sample

of developing and developed nations. In light of this, it is not surprising that policymakers seek effective means to counter the shadow economy to stem tax revenue leakages and to more effectively enforce laws and regulations. The policy challenge deals with both limiting entry into the shadow sector and controlling its spread. Whereas, the extant literature considers a plethora of influences on the shadow sector, yet a set of consistent influences driving the underground economy have not been consistently identified. The present research aims to fill this void by identifying robust determinants of the shadow economy and addressing related modeling uncertainty.

The theoretical literature has identified market entry costs (into the formal sector) as a significant barrier to entry of firms, inducing entrants to not enter the formal sector and to operate in the shadow (or underground) instead. Legal entry barriers (e.g., environmental regulations, licensing requirements, bureaucratic delays, etc.) have also been identified as key reasons for firms to operate underground (Gërxhani, 2004; Schneider and Enste, 2000). These theoretical arguments on drivers of underground operations are intuitive; however, empirical verifications of the underlying hypotheses have had to rely on data that are at best imperfect measures of the institutional structure and the shadow economy.

Overall, the extant empirical literature has examined numerous determinants of the shadow economy, with many determinants showing

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<sup>1</sup> Shadow economies (or black or underground markets) are defined as economic activity that is unrecorded in the official accounts.

mixed degrees of significance (see Gërkhani, 2004; Schneider and Enste, 2000).<sup>2</sup> Within the spectrum of different influences, the costs of market entry are arguably the most significant inducements to shadow entry, as they are perceived/incurred at the initial juncture when firms are contemplating entry or they have entered but are not yet fully established (e.g., signed a lease on the premises but do not yet have all the equipment, clearances, permits in place, etc.). However, the relative influence of various factors, including entry barriers, in driving the underground economy still remains unclear. This lack of consensus presents problems for the design of effective policies to check the growth of the underground sector.

A contributing factor behind these mixed results is that the literature has typically failed to consider the full spectrum of regulations (including business startup costs and procedures, property registration formalities and related costs and tax formalities and tax magnitudes), nor have alternate measures of the shadow economy been systematically considered. This can be partly explained by the fact that some of this information is relatively recent (e.g., see Dreher and Schneider, 2010; Djankov et al., 2002; Gërkhani, 2004; Schneider and Enste, 2000). In particular, the conclusion drawn regarding some factor of interest to the author may be dependent upon model specification and not robust to either (1) how the shadow economy is measured, or (2) the set of other potential shadow determinants that are controlled for in the empirical setup.

To address the underlying modeling uncertainty and identify the key drivers of the underground sector in a systematic fashion, the objective of this paper is to use a large sample of countries and several perspectives on the size of the underground economy to examine the effects of a whole range of potential economic and institutional determinants of the prevalence of this phenomenon. Our approach will add to the literature on this topic and the results will be useful in informing public policy to contain the shadow sector.

Key contributions to the literature include:

- studying the relative influences of a broad range of economic determinants and entry barriers on the prevalence of the shadow economy;
- understanding how the conclusions drawn by the empirical analysis are dependent upon how the shadow economy is measured. Given the difficulties with accurately measuring the shadow economy (see Frey and Weck-Hannemann, 1984; Kirchgässner, 2016; Restrepo-Echavarría, 2015; Schneider, 2012; Schneider and Buehn, 2013), three alternate measures of its cross-national prevalence are used in this analysis to assess robustness of findings.<sup>3</sup> The three shadow economy measures are uniquely compared in the present work;
- analyzing the effects of economic prosperity on the prevalence of the underground economy. This is potentially important in light of the qualitative differences in the nature of the shadow economy across developed and developing nations; and
- to address underlying modeling uncertainty where the choice of determinants may be subject to researchers' (conscious or unconscious) bias, this paper employs a new approach to model robustness employing a novel econometric technique involving hundreds of model combinations to determine the statistical and economic robustness of shadow determinants across different shadow measures and model specifications.<sup>4</sup> The estimation technique enables us to address

modeling uncertainty as well as sampling variability considerations. This is important as the proper model specification is rarely known and the framework employed here permits an analysis of what assumptions regarding model control variables, if any, are key to obtaining the result for the coefficient of interest in terms of statistical significance. The modeling uncertainty aspect has been largely ignored by economists and the present work applies it, likely for the first time, to the literature on shadow economy. Beyond this, the framework can also be used for model influence analysis; that is, in gaining insights as to which control variables, if any, have a large influence on the size of the parameter estimate for the variable of interest (see Young and Kroeger (2015) for details).

Results, based on a unique robustness analysis of hundreds of model combinations, show that business startup and property registration costs, and startup procedures significantly contribute to the relative importance of the shadow economy within the context of the overall economy. In regard to taxes, we find that it is tax code complexity, rather than the tax rates or the overall level of taxation per se, that drive businesses to operate in the shadow. In other influences, greater economic prosperity turns out to be a robust check against shadow movements, although there are some noteworthy differences in other drivers of the shadow sector across developed and developing nations. Procedural simplicity turns out to be a robust path to control the growth of the shadow sector. With regard to the measurement of the shadow economy, the incentives of new shadow entrepreneurs to operate underground are somewhat different than those of other, established, shadow operators. This is partly because new operators are weighing relative costs of formal market entry against going underground and are discounting tax burdens that are farther down the road.

The structure of rest of the paper is as follows. Section 2 discusses the related literature and outlines the hypotheses; Section 3 outlines the data employed; empirical methods are in Section 4; followed by results and discussion in Section 5; and conclusions and limitations of this research are in Section 6.

## 2. Literature review and hypotheses

The extant literature on the incentives of firms and individuals to operate underground is grounded partly in the economics of crime, where considerations of breaking the law by going underground are subject to a cost-benefit accounting (see Becker, 1968; also see Friedman et al., 2000; Gërkhani, 2004; and Schneider and Enste, 2000), and partly in the desire to avoid "excessive" government regulations and taxes (see Alm, 1988; Neck et al., 2012). Shadow operations enable unqualified entities, due either to a lack of ability (e.g., electricians without formal training) or due to a lack of government permissions and licenses (unlicensed taxis, etc.), entry into the market. Such enterprises also can avoid direct market entry costs (licensing fees) or indirect costs, such as not paying for training (see Djankov et al., 2002).<sup>5</sup> The overall state of an economy might also have a significant bearing on the incentives to operate underground. For instance, the level of economic prosperity, the prevalence of democracy, and the rate of inflation are likely to be relevant (see Alm and Embaye, 2013; Autio and Fu, 2015; Gërkhani, 2004; Schneider, 2011). Other things being the same, the underground sector would likely increase with higher inflation (as higher inflation rates increase discount rates and can also be seen as indicators of economic uncertainty), and go down with increased prosperity (due to greater opportunities in the formal sector with more prosperity and strengthened monitoring of illegal activities in wealthier nations) and greater

<sup>2</sup> Another strand of the literature studies the effects of the shadow economy – see, Colombo et al., 2016; Elgin and Uras, 2013; and more broadly, Schneider and Enste, 2000.

<sup>3</sup> Of the three measures of the shadow economy we consider (see Table 1), *Shadow1* and *Shadow2* are more comparable to each other, both with regard to each measuring the economy-wide prevalence of the underground sector and in the coverage of countries. On the other hand, *Shadow3* has about half the countries of the other two measures (see the Appendix for a list of countries). We include *Shadow3* in the analysis as it provides a qualitatively different look at the shadow sector – namely, the entry of firms into the underground sector.

<sup>4</sup> This approach can be seen in the spirit of Leamer (1983); Sala-i-Martin (1997) and, more recently, Paldam (2015).

<sup>5</sup> More broadly, the entry barriers can be seen as capturing institutional or government quality (see Knack and Keefer, 1995; and La Porta et al., 1999).

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