Economic Modelling 57 (2016) 197–207

Contents lists available at ScienceDirect

Economic Modelling

journal homepage: www.elsevier.com/locate/ecmod

Financial development and the shadow economy: A panel VAR analysis

Aziz N. Berdiev [a,*], James W. Saunoris [b]

[a] Department of Economics, Bryant University, Smithfield, RI 02917, USA
[b] Department of Economics, Eastern Michigan University, Ypsilanti, MI 48197, USA

ARTICLE INFO

Article history:
Accepted 29 March 2016
Available online 12 May 2016

Keywords:
Shadow economy
Financial development
Panel vector autoregression

ABSTRACT

This paper examines the dynamic relationship between financial development and the shadow economy using data for 161 countries over the period 1960–2009. Specifically, we use a panel vector autoregression model to construct impulse response functions that illustrate the time path of one variable (e.g., the shadow economy) following an orthogonal shock to another variable (e.g., financial development). We find that financial development reduces the size of the shadow economy. Moreover, there is some evidence of reverse causality between these variables; namely, a shock to shadow economy inhibits financial development.

1. Introduction

The shadow economy has proved to be a major obstacle for governments in many nations, especially among developing countries where as much as 75% of production takes places underground (compared to only around 10% in developed countries) (Schneider and Enste, 2000).[1] By allowing individuals and firms to "fly under the radar" the shadow economy undermines established institutions and weakens the ability of governments to collect revenues necessary to provide public goods (see Schneider and Enste, 2000; Gërxhani, 2004). For these reasons, the causes and effects of underground activities have been a topic of extensive research (Gërxhani, 2004; Johnson et al., 1997; Schneider, 2011; Schneider and Enste, 2000; Schneider, 2005; Tanzi, 1982). A thorough understanding of the determinants of underground activity will assist policy makers in developing effective policies that combat illegal activities and promote economic growth.

The literature documents that burdensome regulations and taxes are among the main determinants of shadow development (Gërxhani, 2004; Schneider, 2005; Schneider and Enste, 2000). Countries beset by high taxes and burdensome regulations increase the incentives of operating in the informal sector. Institutions are yet another more enduring cause for informal development (Dreher et al., 2009; Friedman et al., 2000; Johnson et al., 1997; Teobaldelli, 2011; Torgler and Schneider, 2009). Sound institutions provide necessary protections against such things as corruption and seizure of private property as well as allow access to credit and enforcement of contracts. However, the existence of the shadow economy undermines established institutions and results in insufficient revenue collection by the government that lead to lower quantity and quality of public goods that might otherwise support sound institutions (e.g. rule of law).

The financial sector is one particular type of institution that is likely to affect the spread of the shadow economy (see, e.g., Blackburn et al., 2012; Bose et al., 2012; Capasso and Jappelli, 2013; Straub, 2005; Dabla-Norris et al., 2008). Specifically, the financial sector serves many important functions in an economy by providing entrepreneurs access to needed credit, and permits monitoring business transactions for taxable purposes. Consequently, financial development raises the opportunity cost of producing in the shadow economy by lowering the barriers to obtaining credit, and therefore, provides an incentive to informal entrepreneurs to transition towards legitimacy (see Blackburn et al., 2012; Capasso and Jappelli, 2013).[2] Moreover, to the extent that the government is able to use the financial sector to successfully monitor and tax transactions, the development of the financial sector lowers the occurrences of tax evasion, and thus, further mitigates the spread of the shadow economy (see Blackburn et al., 2012; Capasso and Jappelli, 2013).

Alternatively, it is possible that the existence of the shadow economy can inhibit financial development (see Gobbi and Zizza, 2007; Elgin and Uras, 2013) and, therefore, economic growth. For example, competition from the informal sector results in a misallocation of resources that potentially misdirects resources away from the financial sector. To the extent the government relies on the financial sector to collect taxes, the larger the shadow economy undermines the government's ability to collect taxes and provide public goods (regulations, rule of law, infrastructure, etc.) that would otherwise facilitate financial development. Recently, Elgin and Uras (2013) argue that the

* Corresponding author.
E-mail address: aberdiev@bryant.edu (A.N. Berdiev).

[1] The shadow economy is defined as economic activity that is unregistered in the official sector, and, therefore, is not captured by the official values of gross domestic product (GDP).

[2] Kaufmann and Kaliberda (1996) argue that the difficulty in raising funds in the capital markets leads participants in the shadow economy to focus on short-run and neglect long-term investments.

http://dx.doi.org/10.1016/j.econmod.2016.03.028
0264-9993/

development of the shadow economy increases the prevalence of tax evasion, thereby impairing the development of the financial sector.[3] Thus, accounting for the possible bidirectional relationship between the development of the financial sector and the prevalence of the shadow economy is imperative.

In this paper, we examine the relationship between the shadow economy and financial development. We contribute to this literature in the following ways: First, we account for the inherent simultaneity between financial development and the shadow economy. In particular, we use a panel vector autoregression (panel VAR) approach (Holtz-Eakin et al., 1988; Love and Zicchino, 2006), where we simultaneously estimate a system of equations which treats the variables (financial development and the shadow economy) as endogenous. As discussed above, the development of the financial sector may reduce the spread of the shadow economy, while the widespread prevalence of the shadow economy may weaken financial sector development. This endogeneity distorts the underlying link between financial development and the shadow economy, and therefore needs to be corrected to ascertain the true relationship between these variables. To this end, we use panel VAR to account for the potential bidirectional causality between development in the shadow economy and financial development.

Second, we study the dynamic relationship between financial development and the shadow economy. Clearly, the relationship between the spread of the shadow economy and the development of the financial sector is a process that takes place over time, thereby necessitating a dynamic rather than static framework.[4] Consequently, any study focusing on the steady-state or long-run relationship between these two variables is capable of providing only partial understanding of this complex relationship. In contrast, our dynamic analysis enables us to capture the adjustment in financial development and the shadow economy transpiring over time. Specifically, the output of the panel VAR model enables us to construct impulse response functions that illustrate the time path of one variable (e.g., the shadow economy) following an orthogonal shock to another variable (e.g., financial development). We therefore observe the whole dynamic process from the initial shock to the long-run steady-state of the variable.

Lastly, we account for heterogeneity relating to the level of financial development and its effects on the development of the shadow economy. For example, a less developed financial sector is more likely to be abused by underground participants (e.g., in securing loans or hiding funds), whereas a more established financial sector is in a better position to innovate and offer more customized financial products (e.g., money market mutual funds and collateralized debt obligations) that raise the opportunity cost of producing in the informal sector. Moreover, advancements in official financial development bring about superior alternatives to informal financial products that encourages, for example, informal entrepreneurs to legitimize. Indeed, countries with low levels of financial development experience a "shortage of loanable funds, lack of competition, high degree of financial repression and limited abilities of lenders to collect and process information" as argued by Bose et al. (2012: 621). Likewise, Love and Zicchino (2006) emphasize that entrepreneurs experience distinct levels of financial limitations in countries with low financial development as compared to high financial development. We therefore distinguish between high financial development and low financial development countries in our empirical analysis.

Due to the multidimensional aspects associated with financial development, we follow Elgin and Uras (2013) and employ multiple measures to capture different aspects of financial development. To ensure robustness, we employ a principal component analysis and combine the three measures of financial development into one variable. Moreover, the use of a new measure for the shadow economy by Elgin and Öztunali (2012) provide time-series data from 1950 to 2009, which is conducive to studying developmental aspects that unfold over decades.[5]

Our empirical analysis reveals significant dynamics underlying the relationship between the size of the shadow economy and the degree of financial development. In particular, the impulse responses illustrate that the development of the financial sector reduces the spread of the shadow economy. This observed relationship is robust across three measures of financial development, alternate causal ordering of the variables in the system, and after accounting for institutional quality. In addition, there is some evidence of reverse causality between these variables — i.e. a shock to the shadow economy impedes the development of financial sector. The negative response from shadow economy to a shock in financial development is evident only among countries with low financial development.

The paper proceeds as follows: Section 2 describes the relationship between financial development and the shadow economy; Section 3 describes the data; Section 4 details the empirical methodology; Section 5 discusses the baseline results and provides several robustness analyses; and the final section offers concluding remarks.

2. Financial development and the shadow economy

Theoretically, the relationship between financial development and the shadow economy is grounded in Becker's (1968) influential study on the economics of crime. Becker (1968) argues that rational individuals assess the benefits from illegal actions against the costs of detection and punishment. In this line, rational entrepreneurs evaluate the benefits of operating informally (e.g., avoiding burdensome taxes and regulations) against the direct costs (e.g., financial costs connected to apprehension) and opportunity costs (e.g., forgone access to official sector institutions).

The literature argues that the financial system is one specific form of institution that influences the relative costs and benefits of participating in the informal sector, which, in turn, impacts the prevalence of the shadow economy (see, e.g., Straub, 2005; Dabla-Norris et al., 2008; Blackburn et al., 2012; Bose et al., 2012; Capasso and Jappelli, 2013). For example, the development of the financial sector effectively increases the opportunity costs of operating in the informal sector by decreasing the barriers to attaining capital, which in turn, encourages firms to move to the formal sector where they can make productive investments (see Capasso and Jappelli, 2013). Several important contributions in the literature have theoretically explained the linkages between financial institutions and the shadow economy.

To begin, Straub (2005) develops a theoretical model where entrepreneurs weigh the benefits and costs of operating in the official and informal economy. Specifically, the benefit from producing in the official economy is the use of public resources (e.g., access to financial institutions). Straub (2005) argues that financial institutions allow entrepreneurs and firms greater access to capital to make productive investments. Nevertheless, entrepreneurs experience considerable costs (e.g., registration fees) if they select to participate in the official economy (Straub, 2005). Thus, the model suggests that entrepreneurs have to supply a "minimum level of initial assets" as collateral to access the financial system and acquire the needed capital to make productive investments. However, entrepreneurs who are incapable to pledge this minimum level of initial capital continue to operate in the shadow sector as "the combination of costly registration costs and credit rationing makes the formal credit market unattractive to them (Straub, 2005: 310)". These entrepreneurs therefore attain capital in the shadow sector where the cost of capital is also higher. Consequently, Straub

[3] Gobbi and Zizza (2007) also explain that the prevalence of the shadow economy hinders the financial sector.

[4] For example, Birinci (2013) and Berdiev et al. (2015) find significant dynamics underlying the relationship between the shadow economy and its determinants using data for 12 OECD countries and 50 US states, respectively.

[5] Because of data availability for the financial development variables, the empirical analysis is based upon panel data for 161 countries over the period 1960–2009.