

Informality: does financial development matter?

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Abstract

Purpose – Financial development may be an alternative policy for controlling informal employment. However, there is still an ambiguous relationship between financial development and informal employment. The purpose of this paper is to examine the impact of financial development on informal employment.

Design/methodology/approach – The paper is based on both the occupational choice model and on the concept of financial development and economic growth which can produce either a positive or negative relationship between financial development and informal employment. Consequently, the author formulated empirical specifications and applied an econometric technique to examine the actual relationship.

Findings – The empirical results indicated that financial development can reduce informal employment. The author also found that the relationship between financial development and informal employment varies, depending on the level of economic growth and development.

Research limitations/implications – Even though there are many types of informal employment, this paper uses only informal self-employment as a proxy of informal employment. To implement it properly, all types of informal employment should also be examined.

Practical implications – Becoming informal employment depends on several factors; policy makers for each country should carefully examine the specific relationship between financial development and informal employment for their own country.

Social implications – The paper presents alternative choices for policy makers to control informal employment by increasing financial development, especially in developing countries. This policy also includes promoting microfinance which will contribute to both formality and increasing the strength of the community.

Originality/value – From the two possible impacts of financial development on informal employment, this paper affirms that financial development can reduce informal employment.

Keywords Public policy, Financial services, Self-employed workers, Informal economy

Paper type Research paper

1. Introduction

Informality has become a pervasive phenomenon around the world, especially in developing economies. The initial prediction by W. Arthur Lewis was that it would decrease with time, as countries became more developed (Chen, 2012). This prediction, however, has not happened; instead, informality has increased (Schneider and Enste, 2000; Betcherman, 2001). Recent data provided by Schneider *et al.* (2010), show that the weighted average size of the shadow economy (as a percentage of official GDP), from 1999 to 2007 was 17.3, 26.9, 37.0 and 13.7 percent for all 162 countries, developing countries, transition countries and The Organization for Economic Co-operation and Development countries, respectively[1]. Moreover, there has also been a continual increase in the size of the shadow economy for all groups since 1999.

Informal employment is an activity which occurs in the informal sector of the economy. The International Conference of Labour Statisticians (ICLS) in 2013 stated that those people whose main job lacks basic social or legal protection or employment benefits can be regarded as informally employed. These jobs may be found in the formal sector, informal sector or in households (William and Youssef, 2014). Informal employment can be divided into two main groups; informal self-employment (e.g. employers in informal enterprises, own account workers in informal enterprise and contributing family workers), and informal wage employment (e.g. employees of formal enterprises, casual or day laborers, temporary or part-time workers, and paid domestic workers) (Chen, 2012).



Previous research has generally concluded that informal employment can have a negative impact on an economy even though many literatures have attempted to portray it in a positive light (e.g. Blanchflower, 2000; Thurik *et al.*, 2008; Bacchetta *et al.*, 2009; Perry *et al.*, 2007). The informal economy can erode productivity and growth (Loayza, 1996; Busso *et al.*, 2012), and can also reduce government effectiveness (Johnson *et al.*, 1998; Goktuna and Dayongac, 2011). Additionally, the informal economy increases poverty income inequality and social problems (Ishengoma and Kappel, 2006; Chong and Gradstein, 2007). As a result of these negative viewpoints, reducing the informal employment is a primary policy for the International Labor Organization (ILO) and the policymakers.

Many different factors determine the growth rate of the informal employment. Literature surveys by Schneider and Enste (2000) and Kucera and Roncolato (2008) indicated that the most important and often cited factors are taxation, business regulations and other institutional factors[2]. However, the direct effect of financial reform or financial development on the informal employment has not been properly examined, although two study groups came close to the investigation[3]. One involved the study of the relationship between financial development and economic growth through indirectly entrepreneurship (King and Levine, 1993a, b; Levine, 1997). The other looked at how financial constraints affect an entrepreneur (Evans and Jovanovic, 1989; Holtz-Eakin *et al.*, 1993; Buera, 2003; Hurst and Lusardi, 2004; Paulson *et al.*, 2006).

To cover the gap, this paper integrates two different concepts, and investigates directly the effect of financial development on informal employment, which often uses self-employment as a proxy in the academic and official literature (Loayza and Rigolini, 2011). This paper formulates empirical specifications based on both the prediction of the occupational choice model of Evan and Jovanovic (1989) and the hypothesis of the paper, which is adapted from the concept of financial development and economic growth proposed by King and Levine (1993b). The Evan and Jovanovic model indicated that to become informally employed, individual decisions not only depended on a comparison of potential income from wages and salary work to self-employment, but also on the existence of liquidity constraints. They showed that an unconstrained individual is more likely to be informally employed. Apart from the prediction of the occupational choice model, this paper also hypothesizes that individuals may be encouraged to become informal employment by financial developments through the finance-growth relationship. Following this relationship, financial development may ameliorate liquidity constraints, and thus encourage individuals to become either formal entrepreneurs or informal employment. Consequently, increasing both formal entrepreneurs and informal employment leads to economic growth.

However, financial development may not only encourage individuals to be informally employed, conversely it may also reduce informal employment. This research hypothesizes that financial development can reduce informal employment because financial development induces economic growth. Economic growth then increases employment in the formal sector. Consequently, informal workers, especially involuntary ones, may move back to the formal sector, thus resulting in lower informal employment. Therefore, there exists an ambiguous relationship between financial development and informal employment as a result of the prediction of these two concepts above, which this paper attempts to examine by consolidating two different models. Empirical specifications are formulated which include direct financial development indicators as determinants into an informal employment baseline model. Econometrics is then applied to investigate the results.

The empirical results show that while most control variables are significant and positive as expected, the impact of the financial development indicators and informal employment is negative for at least two proxies of financial development. We also found that the relationship between financial development and informality varies according to the level of economic development.

The next section explains the theoretical background and reviews the related literature. Section 4 presents the empirical specifications and describes the data. Section 5 shows the empirical results and includes a discussion. Section 6 concludes and presents the policy implications of the findings.

2. How does financial development affect informality?

The impact of financial development on informal employment can be explained through two main concepts; first the occupational choice model which is microeconomic perspective and second the finance-growth relationship which is macroeconomic perspective.

Assuming a static model the occupational choice model of Evan and Jovanovic (1989) indicated that the decision whether or not to become self-employed depended upon the comparison of the total expected net income from self-employment and wage earnings[4]. If an individual becomes a wage earner, he or she can obtain the following wage income (I_w), defined by as follow:

$$I_w = \mu \prod_{j=1}^m X_j^{\gamma_j} + rZ \quad (1)$$

where μ is a constant, X is the vector of individual characteristics, r is the interest rate and Z is the individual's beginning-of-period wealth.

Similar to the wage earner, self-employment income comes from two main sources: self-employment earnings ($Y = f(K)$) from their production function, and the return on net wealth ($r(Z-K)$). Thus, self-employment income can be written as:

$$I_{SE} = \theta K^\alpha \prod_{j=1}^m X_j^{\beta_j} + r(Z-K) \quad (2)$$

where θ is a measure of entrepreneurial ability and K is the amount of capital invested in the business, and if $Z < K$, the self-employment is a borrower. The model also assumes the maximum amount that a person can invest in the business is $Z + (\lambda-1)Z = \lambda Z$. This implies that the amount of self-employment investment depends on the initial wealth of the individual and the borrowing that is proportional $(\lambda-1)$ to his or her wealth. It also implies that the liquidity-constraint is binding if $0 \leq K \leq \lambda Z$.

To compare the total expected net income and wage earnings, the unconstrained individual needs to find the optimal capital investment (K^*) by maximizing the profit level of the capital, and then substitute this into Equation (2), resulting in the optimal level of self-employment income, I_{SE}^* (the total expected net income). If the liquidity constraint is nevertheless binding one can substitute λZ instead, and thus obtain a suboptimal level of self-employment income (I'_{SE}). By comparing these two self-employment incomes with wage earned income, if $I_{SE} > I_w$ individuals will enter self-employment. Nevertheless, individuals who face liquidity constraints, result in $I'_{SE} < I_{SE}^*$, and he or she will not enter self-employment. Conversely, the unconstrained individual chooses self-employment.

Unlike the occupational model, the concept of financial development and economic growth can either increase or lower informal employment. In Figure 1, the paper hypothesizes that financial development affects informal employment through two channels. First, financial development can reduce liquidity constraints, one of the main impediments for entering informal employment. Consequently, when liquidity constraints are removed, some individuals who require funding to set up their own small business will be encouraged to seek informal employment. This leads to an increase

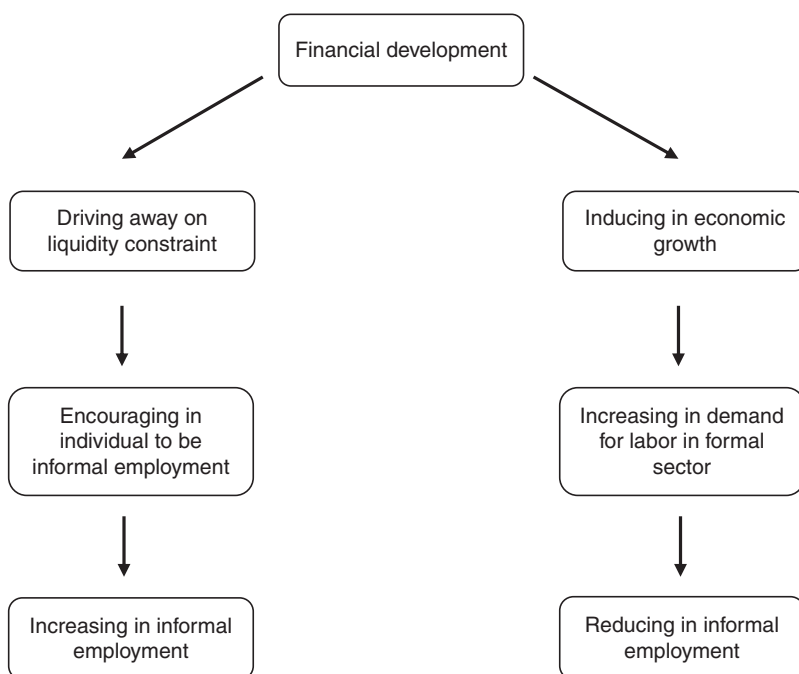


Figure 1.
The relationship between financial development and informal employment

in informal employment[5]. On the contrary, financial development may also reduce informal employment. The literature indicates that financial development contributes to economic growth. Hence, it is possible that when economic growth increases, employment in the formal sector should also increase. Consequently some workers, especially those involuntary informal workers, made redundant during economic downturn, may decide to return to formal employment. Thus, in this case financial development lowers informal employment.

By applying the two main concepts above, the impact of financial development on informal employment is ambiguous. The occupational choice model which follows a microeconomic perspective, predicts that individuals and firms who face no liquidity constraints tend to become self-employed. Thus, if liquidity constraints can be driven away through financial development, it can be implied that this can indirectly increase self-employment. Similar to the occupational choice model, the paper hypothesizes that the positive relationship between financial development and informal employment can be used to explain through the concept of financial development and economic growth. This is a macroeconomic perspective which predicts that financial development contributes to economic growth, through increasing access to financial services for individuals and firms who need funding to set up and expand their businesses. However, this research hypothesizes that, based on the concept of financial development and economic growth, the former does not only generate a positive effect on informal employment but may also generate a negative one. The negative effect of financial development and economic growth happens because once an economy expands, many firms, especially formal firms which had shutdown and downsized during an economic recession, may start up and expand their businesses again. This should lead to increased demand for formal workers, therefore reducing the numbers of informal workers, especially involuntary informal workers who desire to become formal workers.

3. Selected review of the literature

Informality and financial development are a very large topic which has generated a substantial volume of research literature. However, because this paper focuses only on economic perspectives, the reviewed literature can be divided into four main relevant groups. The first relates to literature which explains the determinants of informality. This literature indicates the most important factors as taxation, business regulations and other institutional factors. Loayza (1996) showed that tax burden, labor market restrictions and the quality of government institutions were the main determinants for the informal sector. Johnson *et al.* (1998) found strong evidence that fewer regulations correlate with reduced unofficial economy, whereas Ulyseas (2010) indicated that reducing the formal sector's entry cost significantly reduced the size of the informal sector[6].

Informality has been annexed more to finance in the second group of literature. In this group, the relationship between informality and finance is examined indirectly through the study of the impact of financial development on economic growth. The theoretical underpinnings of this group can be traced to the work of Schumpeter (1911) and Knight (1951). However, one of the most widely cited contemporary works is the study by King and Levine (1993a, b). They developed an endogenous growth model, featuring connections between the Knightian role of entrepreneurship in initiating economic activity and Schumpeter's creative destruction. Their results revealed that financial development affected entrepreneurial activities that led to productivity improvements, and thereby accelerated economic growth. Along with King and Levine (1993a, b), the relationship between financial development and economic growth has been investigated by many researchers, for example the studies of Bencivenga and Smith (1991), Beck *et al.* (2000) and Guiso *et al.* (2004)[7].

The third group, which is a microeconomic perspective, investigates directly the role of finance to informality. The pioneer work here was developed by Evan and Jovanovic (1989). The main focus of the literature is the study of the relationship between entrepreneurship and liquidity constraints, with the prediction that the propensity to become an entrepreneur is a function of personal wealth. Using their model Evan and Jovanovic (1989) found a positive relationship between wealth and entry into entrepreneurship. Holtz-Eakin *et al.* (1993) showed that the size of an inheritance had a large effect on the likelihood that an individual would become an entrepreneur. Paulson and Townsend (2004) used new data from rural and semi-urban areas of Thailand. They found that wealthier households were more likely to start a business, whereas Hvide and Moen (2007) discovered a strong positive relationship between prior wealth and business start-up size in Norway. However, Hurt and Lusardi (2004) challenged this prediction, they opinioned that there was no discernible relationship between household wealth and the probability of starting a business[8].

Of greater relevance to this study, the fourth group of literature, which is a macroeconomic perspective, directly investigated the effect of financial development on informality. Catao *et al.* (2009) investigated the relationship between finance and formalization, using data collected from a Brazilian household survey covering 394,000 individuals in 118,000 households each year, covering all sectors of economic activity. Using bank credit in the private sector over GDP, and the credit of private firms to GDP as a proxy of financial development, their results revealed that formalization rates increased with financial development, especially in sectors where firms were typically more dependent on external finance. From a data set of 41 developed and developing countries between 2001 and 2004, Lussa (2009) found that financial development which used private credit in bank deposits divided by GDP, net interest margin, stock market capitalization/GDP and stock market total value traded/stock market capitalization as a proxy, affected the entrepreneurship rate of different population groups. Financial development was unlikely, by itself, to contribute to bring male and female entrepreneurship rates closer together. Furthermore, the results suggested that the desire for entrepreneurship was most affected by financial development. By examining the argument that entrepreneurs enjoy higher utility than

employees from a lack of financial development, Bianchi (2012) built an occupational choice model and used the World Value Survey data from 1981 to 2001 to examine the relationships between financial development, entrepreneurship and job satisfaction. The results showed that this argument was not supported. On the contrary, financial development increased utility differences between the self-employed and employees. Furthermore, this effect was not explained by increased profits, but by an increase in value of non-monetary benefits, in particular job independence.

In summary, even though a theoretical background exists, indicating implicitly that financial development can affect informality, a scant amount of research has been conducted to investigate the issue directly. Therefore, this direct investigation of the relationship between financial development and informality will fill this research gap.

4. Empirical methods

4.1 Empirical specifications

To implement the theory, this study needs primarily to delineate the empirical specifications. This paper is based on both the occupational choice model and the concept of finance-growth relationship. However, to investigate whether financial development affects informality, we first need to formulate a baseline model of the determinants of informality. Once the baseline model is established, then, financial development indicators can be added and examined.

As widely suggested in several previous studies, especially Schneider and Enste (2000), informality is determined by three main factors: tax, business regulations, and other institutional factors. Therefore, our baseline model can be written as the following regression equation:

$$Ise_{it} = \alpha_0 + \alpha_1 Y_{it} + \alpha_2 Fdi_{it} + \alpha_3 Gov_{it} + \alpha_4 Tax_{it} + \alpha_5 Di + \varepsilon_{it} \quad (3)$$

where the subscripts i and t represent country and time periods, respectively, Ise is informal employment and Y represents a country's per capita GDP. Fdi represents foreign direct investment. Gov is the government consumption, while Tax represents tax revenue. To control other factors, which may either be economic or institutional and may be different between developed and developing countries, we also included a dummy variable (D), which takes the value of 1 if it is a developing country, and 0 for being otherwise. Finally, ε denotes the error term.

Baseline Equation (3) then investigates the impact of financial development on informality further by adding financial development variables as follows:

$$Ise_{it} = \beta_0 + \beta_1 Y_{it} + \beta_2 Fdi_{it} + \beta_3 Gov_{it} + \beta_4 Tax_{it} + \beta_5 Di + \beta_6 FD_{it} + \mu_{it} \quad (4)$$

where FD is a vector of the financial development indicators. There are many financial development indicators which have been used in the literature[9]. This paper, however, selects four of the basic indicators: the ratio of M2 to GDP[10], the ratio of private domestic credit to GDP, the ratio of savings to GDP and the ratio of market capitalization to GDP. We expect that using these indicators will lead to a robust result.

Since there may be different contexts of informality for each economy, the paper also checks the robustness of the impact of financial development on informality, including the interaction term between each financial development indicator and per capita GDP. This robust check is presented as the following equation:

$$Ise_{it} = \delta_0 + \delta_1 Y_{it} + \delta_2 Fdi_{it} + \delta_3 Gov_{it} + \delta_4 Tax_{it} + \delta_5 Di + \delta_6 FD_{it} + \delta_7 FD_{it} \otimes Y_{it} + \zeta_{it} \quad (5)$$

where \otimes is the Kronecker product which generates the interaction term.

4.2 Data and sample collection

Two main data sources were used for this paper. The ILO provided self-employment data, and all of the explanatory variable data were obtained from the World Bank. Cross-country panel data were implemented in this empirical work. Using cross-country panel data have some advantages over cross-country and time-series data, however this type of data can result in difficult decision making on sample selection, especially when used for different groups of variables collected over different time periods. We had to accept a trade-off between time periods, country samples and the variables in the model. If we had used data covering a long time period, a large number of countries would have been omitted due to incomplete data for some of the variables. Also, if we had not used a proxy variable for some variables, especially institutional factors, then both time dimension and country samples would have been incomplete, as most institutional variables have a short data time period. Therefore, to solve these problems, we adopted the following procedures for sample selection. First, the study selected self-employment data by eliminating countries with a significant amount of consecutive missing time series data from the self-employment database. Secondly, we selected financial development indicators which matched most of the previously selected country data from the first step. Consequently, the selected financial development indicator data closely matched the selected countries from 1990. Finally, after obtaining the number of country samples and the number of time periods from steps 1 and 2, we selected a proxy for the institutional factors which gave consistent data with the previously selected countries and time periods. The three main institutional factors used in the model, foreign direct investment, the government consumption and tax revenue are a result of this final step. Thus, as a result of these procedures, we selected 59 countries for the period, 1990-2012, as the data set.

Self-employment, the dependent variable, is the most used proxy for informal employment in the academic and official literature, even though it is an incomplete proxy (Loayza and Rigolini, 2011). It is measured as the percentage of self-employed workers to the total active labor force. All explanatory variables are divided into two main groups, financial development indicators and GDP per capita as well as other control variables. Four indicators were selected as representative of financial development; these are basic indicators used widely in the literature. The paper uses several indicators because it can also lead to a robust result. The financial development indicators chosen were the ratio of M2 to GDP, the ratio of private domestic credit to GDP, the ratio of savings to GDP and the ratio of market capitalization to GDP. GDP per capita, as well as three main institutional factors which consist of foreign direct investment, government consumption and tax revenue, were included primarily in the baseline equation. Foreign direct investment was selected as a proxy for business flexibility. Business flexibility is measured as the percentage of foreign direct investment in GDP. The ratio of government consumption to GDP represented the degree of government participation in the economy. The size of this variable can thus also be affected by the degree of informality (Loayza and Rigolini, 2011). Tax revenue is measured by the percentage of government tax revenue to GDP. Tax revenue is also one of the main proxies of institutional factors that determine self-employment because tax burden is one of the reasons for becoming self-employed.

Table I shows the descriptive statistics for all of the variables used in the empirical part of this study. The sample consists of both developed and developing countries, so there is a large difference between the data maximum and minimum values. Self-employment can reach 71.6 percent of the labor force at times in some developing countries. Conversely, it can be as low as 2.9 percent in some developed countries. These stylized facts are also presented in Figure 2, which represents the simple relationships between self-employment and GDP per capita, separating developed countries (0) and developing countries (1). Self-employment is mostly found in developing countries. Table II shows a simple

Table I.

Descriptive statistics

Variables	Mean	SD	Min.	Max.
Self-employment	26.035	15.565	2.900	71.600
GDP per capita	18,222.870	17,159.850	524.924	87,716.730
Foreign direct investment	3.770	5.972	-55.065	74.710
Government consumption	16.637	5.236	2.975	36.259
Tax revenue	24.966	11.770	5.400	59.373
M2	79.196	73.143	6.823	669.880
Domestic credit	88.727	61.456	8.075	347.338
Savings	21.721	7.080	0.011	52.737
Market capitalization	52.133	51.611	0.004	328.876

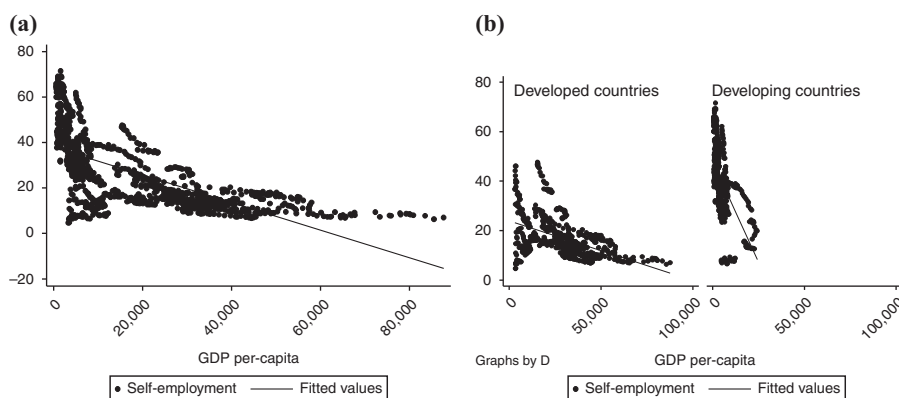


Figure 2. Self-employment and GDP per-capita

correlation among the main variables. All the main explanatory variables show a negative significant relationship with self-employment, consistent with Figure 2. However, a different relationship exists between self-employment and explanatory variables in developed and developing countries. Maybe, it would have been better to test the relationship by also paying attention to the differences between countries according to the empirical specification shown in Equation (5).

5. Econometric analysis and discussion

As explained earlier in the empirical method section, the investigation of the impact of financial development began with an examination of the baseline specification. Column 1 of Table III details this specification. Results show that government consumption, one of the three main institution factors, is significant at the 1 percent level with a negative sign. This evidence indicates that the higher the government spending, then the lower the self-employment. Previous studies literature showed evidence for this, for example, Bental *et al.* (1985), Rei and Bhattacharya (2008), Hazans (2011) and Loayza and Rigolini (2011). Franks (1991) indicated that to finance higher government spending, the government has to increase taxes. Consequently, increasing taxes should reduce private demand for informal products, resulting in lower self-employment. From Figure 2 and Table II, GDP per capita has a negative impact on self-employment at the 1 percent significant level. This is consistent with several previous studies (Blau, 1937; Johnson *et al.*, 1998; Moloney, 2001; Bacchetta *et al.*, 2009; and Loayza and Rigolini, 2011). The coefficient on the dummy variable is also positive

Table II.
Simple correlation
matrix

	Self-employment	GDP per capita	Foreign direct investment	Government consumption	Tax revenue	M2	Domestic credit	Savings	Market capitalization
Self-employment	1								
GDP per capita	-0.679***	1							
Foreign direct investment	-0.147***	0.211***	1						
Government consumption	-0.632***	0.489***	0.039	1					
Tax revenue	-0.586***	0.734***	0.052*	0.671***	1				
M2	-0.335***	0.627***	0.325***	0.160***	0.381***	1			
Domestic credit	-0.423***	0.626***	0.095***	0.320***	0.479***	0.647***	1		
Savings	-0.120***	0.172***	0.087***	-0.202***	-0.025	0.173***	0.102***	1	
Market capitalization	-0.361***	0.516***	0.239***	0.036	0.250***	0.447***	0.460***	0.401***	1

Notes: ***, **, * Significant at 10, 5 and 1 percent levels, respectively

	Model specifications								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>Dependent variable: self-employment</i>									
GDP per capita	-3.3e-04*** (7.8e-05)	-3.0e-04*** (1.0e-04)	-3.e-04*** (8.9e-05)	-2.8e-04*** (7.3e-05)	-2.5e-04*** (7.8e-05)	-3.7e-04*** (1.0e-04)	-5.4e-4*** (1.4e-04)	-3.8e04*** (1.7e-04)	-4.0e-04*** (9.8e-5)
Foreign direct investment	-0.089 (0.109)	-0.086 (0.108)	-0.095 (0.106)	-0.090 (0.095)	-0.057 (0.095)	-0.119 (0.106)	-0.118 (0.098)	-0.083 (0.101)	-0.074 (0.095)
Government consumption	-0.924*** (0.331)	-0.859** (0.338)	-0.907*** (0.339)	-1.072*** (0.331)	-0.988*** (0.313)	-0.851** (0.335)	-0.885*** (0.332)	-1.064*** (0.337)	-0.936*** (0.314)
Tax revenue	0.142 (0.128)	0.114 (0.137)	0.140 (0.135)	0.111 (0.121)	0.121 (0.126)	0.156 (0.138)	0.216 (0.141)	0.113 (0.121)	0.172 (0.129)
Developing country dummy	10.281*** (3.657)	11.373*** (3.650)	10.430*** (3.681)	9.923*** (3.432)	10.531*** (3.499)	10.699*** (3.593)	9.641*** (3.597)	9.864*** (3.418)	10.079*** (3.430)
M2	-	0.001 (0.014)	-	-	-	-0.037 (0.030)	-	-	-
Domestic credit	-	-	0.013 (0.014)	-	-	-	-0.063* (0.036)	-	-
Savings	-	-	-	-0.302** (0.128)	-	-	-	-0.383* (0.036)	-0.086*** (0.026)
Market capitalization	-	-	-	-	-0.041** (0.017)	-	-	-	-
M2 × GDP per capita	-	-	-	-	-	6.81e-07* (3.96e-07)	-	-	-
Domestic credit × GDP per capita	-	-	-	-	-	-	1.96e-06* (9.93e-07)	-	-
Savings × GDP per capita	-	-	-	-	-	-	-	4.04e-06 (5.94e-06)	-
Market capitalization × GDP per capita	-	-	-	-	-	-	-	-	1.68e-06** (6.42e-07)
Constant	40.483*** (5.666)	38.843*** (5.626)	40.804*** (5.609)	49.499*** (7.189)	42.470*** (5.337)	40.915*** (5.574)	43.481*** (5.547)	51.028*** (7.411)	43.434*** (5.209)
No. of observations	1,114	1,048	1,099	1,108	1,099	1,048	1,081	1,108	1,081
R ²	0.640	0.645	0.638	0.657	0.652	0.653	0.648	0.659	0.664

Notes: Robust (country) clustered standard error in the parentheses. ***, **, * Significant at 10, 5 and 1 percent levels, respectively

Does financial development matter?

Table III. Informality, institution, and financial development: pool OLS

and statistically significant at the 1 percent level. This result is consistent with Figure 1, which shows that informality is also a prevalent phenomenon in developing economies.

Columns 2-5 of Table III investigate the relationship between financial development and self-employment. Three previous significant control variables are still significant with the same sign. Savings and market capitalization are significant at the 5 percent level, with a negative sign, even though M2 and private domestic credit show insignificance in Columns 2 and 3, respectively. Empirical results indicate that our estimation result is inconsistent with the occupational choice model and the first channel of the finance-growth relationship, but consistent with the second channel. The Evan and Jovanovic (1989) model and the first channel of the finance-growth relationship implies that financial development should negate liquidity constraints, and encourage individuals to enter informal employment. Previous results however show that financial development reduces self-employment [11]. There are at least two plausible explanations for this. First, there is a difference between the characteristics of entrepreneurship and self-employment (see Fields, 2013). An entrepreneurship may be either formal or informal, but self-employment is often used as a proxy of informal employment (Mandelman and Montes-Rojas, 2009; Loayza and Rigolini, 2011; Mohapatra *et al.*, 2007; Packard, 2007). Being self-employed may be either involuntary, as suggested by the dualistic model (Harris and Todaro, 1970) or voluntary, as indicated by an alternative model (Blanchflower and Oswald, 1998; Maloney, 1999; Straub, 2005). Individuals may choose to enter informal work because of a desire for independence, less responsibility and a cost-benefit analysis. Straub (2005) and Massenet and Straub (2011) indicated that the decision whether to become a formal or informal worker depends on the trade-off between the costs of entry and the benefits from accessing the formal credit market. They also concluded that better regulations and access to credit lead to increased formality. This implies that financial development reduces self-employment. This view is also supported by Catao *et al.* (2009) who found that there is a significantly faster increase in the formalization rate as a result of increasing financial strength.

Second, as indicated in the second channel of the finance-growth relationship in Figure 3, self-employment may also be taken up involuntarily work. Some workers may have once been formally salaried, but lost their job due to economic downturn. Financial development may thus reduce this category of self-employment by means of the finance-growth relationship. Much of the literature about the relationship between financial development and economic growth shows that financial development increases economic growth (Levine, 1997). Therefore, it is possible that when the economy recovers from a recession as a result increased of financial development, employment in the formal sector also increases, and this eventually leads to lower self-employment.

There is a difference between self-employment in developed and developing countries also. In developed countries, self-employment is regarded as creative and dynamic, whereas it is seen as stagnant and unproductive in developing countries (Mandelman and Montes-Rojas, 2009). The impact of financial development on self-employment may thus be different in these two economies. In Columns 6-9 of Table III, this hypothesis is presented by interacting financial development indicators with GDP per capita. However, once the interaction terms are controlled, the coefficients of M2 and savings become negative and statistically significant in Columns 6 and 7, respectively. Savings and market capitalization are still significant with a negative sign, similar to previous specifications. These results therefore affirm the robustness of this relationship. As expected, the coefficient of all interaction terms is positively significant. The results, thus, also imply that the impact of financial development on self-employment depends on the level of economic development. This impact is lower when a country has a higher GDP per capita. The response of self-employment to financial development begins with high impact, but reduces as the size of the GDP per capita increases. Previous evidence is consistent with the results from this study that countries with high GDP per capita tend to have lower self-employment.

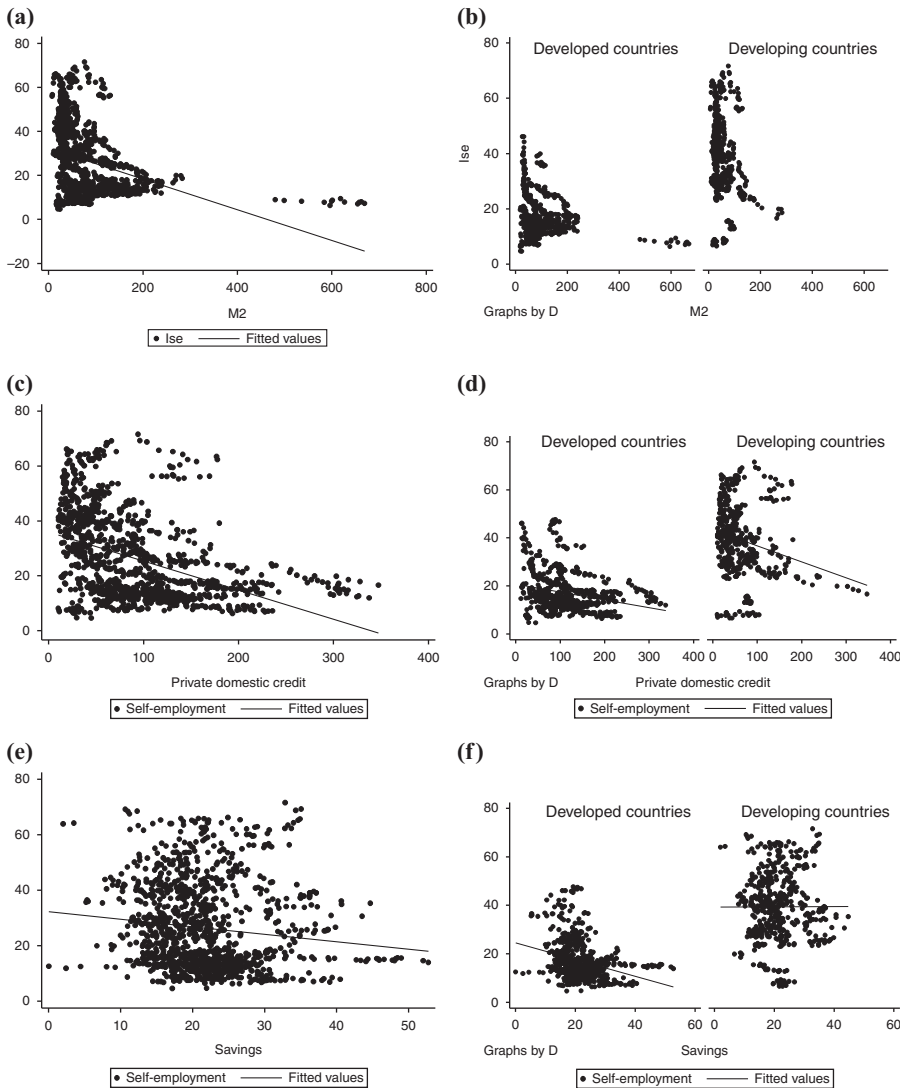


Figure 3. Self-employment and selected financial development indicators

6. Conclusions

Informal employment is a pervasive phenomenon around the world, which policymakers need to control, as it has a negative impact on an economy. Reducing informal employment however is not easy, because informality is complicated. Using a data set of 59 countries from around the world for the period 1990-2012, this paper examined the implementation of financial development as an alternative instrument for controlling informality. The occupational choice model and the finance-growth relationship indicated that the impact of financial development on informal employment may be either positive or negative. To ensure that financial development can be implemented as an alternative instrument to reduce informal employment, the relationship between financial development and informal employment was investigated.

Empirical results revealed that while most of the control variables were significant with the expected sign, the relationship between the financial development indicators and self-employment was negative. Specifically, savings and market capitalization had a significant negative impact on self-employment, a result not found for M2 or domestic credit. However, once the model was extended, including the interaction terms between financial development indicators and GDP per capita, all financial development variables had a negative impact on self-employment. The relationship between financial development and self-employment varied against the level of economic development and the impact of financial development on self-employment was lower when a country had a higher GDP per capita.

Some suggestions may be useful for policymakers. First, apart from improving institutional factors as indicated by several authors, we found that financial development may be an alternative policy for controlling informal employment. Policymakers, especially in developing countries with a high proportion of informal employment in the labor force could implement financial development to reduce informal employment. Financial development not only reduces informal employment, but also increases the strength of a community. This can occur if the government promotes microfinance groups in each community. Second, the decision to become informally employed is complicated. Informal employment may be either voluntary or involuntary. The decision depends on several factors: tax avoidance, the desire for independence, less responsibility, and cost-benefit analysis. Therefore, even though empirical results indicated that the policymakers can implement financial development for reducing informal employment, this may not achieve voluntary informal employment. Finally, there are different impacts of financial development on informal employment depending on the level of economic development. Policymakers for each economy with a target for informal employment control should implement this together with financial development. Empirical results show that the impact of financial development on informal employment is lower when a country has a higher GDP per capita. Financial development tends to be successful for reducing informal employment in developing countries but not in developed ones. Therefore, if formalization is a primary policy for policymakers in developing countries, financial development is one of the instruments that should be implemented.

There are some interesting implications for future research as a result of this paper which indicated that financial development may decrease informal employment at country level, but maybe not at an individual level. An increase in the accession to financial services as a result of financial development may not decrease informal employment when using the individual data for each country. This is because an individual's decision to become informally employed does not only depend on financial factors, but also on economics, society, laws and culture. Therefore, to ensure that financial development reduces informal employment as indicated in this paper, governments should examine this relationship, using the individual data from each country.

Notes

1. The informal economy has been described in various ways, such as shadow economy, unofficial economy, underground economy, hidden economy and black economy (Rei and Bhattacharya, 2008). Workers that work in the informal economy may be called self-employed, own-paid workers, etc.
2. There are four dominant schools of thought which attempt to explain what causes informal employment. These are the dualist school, the structuralist school, the legalist school, and the voluntarist school. The dualists argue that informal employment is driven away from the modern economy, while the structuralists contend that it results from reducing input and labor costs to increase the competitiveness of large firms. The legalists maintain that informal employment results from microentrepreneurs who try to avoid the costs and time of having formal enterprises, while the voluntarists argue that informal employment results from entrepreneurs who choose to run informal enterprises voluntarily, because of the net benefits (Chen, 2012).

3. Financial development is defined as the factors, policies, and institutions that lead to effective financial intermediation and markets, as well as deep and broad access to capital and financial services (World Economic Forum, 2012).
4. Evan and Jovanovic (1989) did not mention informal employment. However, using simple logic states that if self-employment is accepted as a proxy for informal employment in several studies published in many well-known economic journals, the prediction about self-employment in Evan and Jovanovic (1989) should apply to informal employment in this paper.
5. This hypothesis is similar to the prediction of the occupational choice model. Nevertheless, the occupational choice model is not used to directly examine the impact of financial development on informal employment. The occupational choice model only indicates why unconstrained individuals choose self-employment. On the contrary, there are no specific models which present the impact of financial development on informal employment. The finance-growth model only predicts that financial development contributes to economic growth through increasing access to financial services for individuals and firms (either formal or informal), who need funding to set up and expand their business. The finance-growth model does not indicate specifically whether those individuals and firms engaged in informal employment. Therefore, the occupational choice model will confirm that the prediction of the finance-growth model, which predicts that individual and firms will set up and expand their business when they can access to financial services, is also true for the case of informal employment.
6. For more information read the literature survey on informality in Schneider and Enste (2000) and Kucera and Roncolato (2008).
7. A comprehensive survey is provided by Levine (1997), and updated by Zhuang *et al.* (2009).
8. For other literature on this topic refer to Xu (1998), Buera (2003), Guiso *et al.* (2004), Paulson *et al.* (2006), Aghion *et al.* (2007) and Fairlie and Krashinsky (2012).
9. These financial development indicators are discussed by Levine (1997) and The World Bank and International Monetary Fund (2005).
10. M2 is a broader money classification, and one of the money supply definitions. M2 includes mainly cash and checking deposits, saving deposits, and time deposits.
11. Not only Evan and Jovanovic (1989), but most literature based on this model refers to self-employment as a representative of entrepreneurship, see also Dunn and Holtz-Eakin (1996), Adachi (2009) and Fairlie and Krashinsky (2012).

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