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FINANCIAL DEPTH AND INFORMALITY:  
THE CASE OF TURKEY

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ABSTRACT

*This study focuses the relationship between informality and credit channel in Turkey. Using the social security registration criteria of the employees as a measurement of informality and ratio of total bank credits divided by total GDP as a proxy for financial depth, it is intended to clarify whether use of bank credits increases the incentives of the firms and individuals to become formal and decrease the informality level in Turkey. The data covers 2004-2014 period and analyses are carried on NUTS2 regional data. The panel data regressions with fixed and random effect are conducted and estimations include various regional control variables related with age, education, sector and firm size. The estimation results suggest that there is a strong negative relationship between the financial depth and informal employment in Turkey, even after controlling for several regional effects. This outcome draws attention to some critical implications for policymakers in terms of the importance of credit channel in the economy such as increased availability or ease of getting bank credits in the economy can promote formal employment.*

**Keywords:** Financial depth, informality, social security, fixed effects, random effects.

**Jel Codes:** E26, E51, R23.

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## FİNANSAL DERİNLİK VE KAYITDIŞILIK: TÜRKİYE ÖRNEĞİ

### ÖZ

*Bu çalışma Türkiye’de kredi kanalı ve kayıtdışılık arasındaki ilişki üzerine odaklanmaktadır. Çalışmada kayıtdışılık ölçütü olarak sosyal güvenlik sistemine kayıtlılık durumunu ve toplam banka kredilerinin GSYİH oranını da finansal derinlik ölçütü olarak ele alarak Türkiye’de banka kredileri kullanımının bireyler ve firmalar üzerinde kayıtdışılığı azaltıcı etkisinin olup olmadığını araştırılmaktadır. 2. düzey İBBS çerçevesinde 2004-2014 yıllarını kapsayan ve yaş, eğitim, sektör ve firma büyüklüğünün kontrol değişkenler olarak kullanıldığı panel veri analizlerinde sabit etki ve rassal etki modelleri yürütülmüştür. Tahmin sonuçları, belli başlı bölgesel etkiler kontrol edildiğinde dahi Türkiye’de finansal derinlik ve kayıtdışı istihdam arasında güçlü bir ters ilişki olduğunu ortaya koymaktadır. Bu sonuçlar, ekonomi genelinde banka kredileri miktarının ve kullanımına yönelik kolaylaştırıcı politika ve uygulamaların kayıtlı istihdamı arttırabileceğine ilişkin özellikle politika yapıcılar için kredi kanalının önemine ilişkin kritik çıkarımlar ortaya koymaktadır.*

**Anahtar Kelimeler:** Finansal derinlik, kayıtdışılık, sosyal güvenlik, sabit etkiler, rassal etkiler.

**Jel Kodları:** E26, E51, R23.

## INTRODUCTION

There has been a vast body of literature on the informality due to its importance, causes and effects on the welfare of individuals. The concept of informality has started to be widely used in the literature after an International Labour Organization (ILO) report on Kenya in 1972; but international recognition of the concept and incorporation into the official worldwide framework dates back to the beginning 1990s (Bangasser, 2000:2). Especially in the 15th International Conference of Labour Statisticians (ICLS) in 1993, in order to get a worldwide agreed definition of the informality and informal sector, the characteristics of the production units were put forward; however, the characterization of informal sector based only on enterprises was criticized in many areas as it was not covering the employment side at all. Shortcomings of this enterprise description led to search for a new comprehensive definition and on the 17th ICLS; characterization of informality was complemented with the informal employment side. Workers were also considered to have informal jobs if they are not working under national labour legislation, not subject to income taxation, not under social protection or some specified benefits. This definition particularly included own-account and family workers as well as employers in informal enterprises (Husmanns, 2004:5-7).

Being aware of the difficulty of having an accurate definition of informality, the literature has started to use these several definitions for different purposes. Although there seems to be one commonly agreed argument for the concept of informality, it generally means negative things as insecure workers, unfair competition, too much regulation, less productivity, deficiency in law, less payment of taxes, and working in the shadows (Perry et al., 2007:21). This kind of comprehension related with the concept is not very different in Turkey; yet its high level of persistency in Turkey makes it more important to evaluate deeply.

This paper evaluates informality in terms of credit market channel and outcomes draws attention to some critical implications for policymakers in terms of the effects of credit channel over informal employment. After a brief literature survey about the concept and main area of works related with informality in both worldwide and Turkey, a short description of historical persistence of informality in Turkey is presented. The estimation methodology with model

description and main variables for possible determinants of informality with the data sources are explained in details subsequently. The paper concludes with estimation results and several useful policy implications for decision makers.

## 1. LITERATURE SURVEY

Going beyond the definitions of informality, the literature related with informal sector or informal workers has mostly concentrated on the size, effects and the underlying determinants. Asserting that the size of the informal sector is very crucial in policy making, there has been a wide literature trying to measure the level of informality using different methods. For example, while the direct approaches use well-designed surveys and samples based on voluntary responses as well as tax auditing and other compliance methods; indirect approaches typically include macroeconomic perspective and use several economic and other development indicators assumed to be related with the informal economy (Schneider and Buehn, 2016:9-11).

Another branch of the informality literature mostly concentrates on the effects of informal sector. Although some studies have pointed out that informality can possibly have some benefits for workers and firms such as avoidance of taxes or regulations and flexibility (Maloney, 2004; Perry et al., 2007), most of the studies have pointed out that it generally has a negative impact on the welfare of workers and the economy as a whole via diminished growth and productivity, effectiveness of government, poverty, inequality and other kinds of undesirable social and economic outcomes (Chong and Gradstein, 2007; LaPorta and Shleifer, 2014).

The other field of informality focuses mostly on micro and macro determinants. Micro determinants are generally evaluated based on socioeconomic and demographic factors related with workers and the features of the firms they work in. Although the level might vary among countries, almost all researches agree that employee and employer characteristics such as age, gender, education level, employment sector, profession, marital status, employment status and geographic area lived are important determinants of informal working, especially in developing countries (Gatti et al., 2014; Williams et al., 2016). Furthermore, the role of macro policies such as

tax and regulation burden (Ihrig and Moe, 2004) financial market development and the quality of the legal system (Straub, 2005; Dabla-Norris et al., 2008), cost of starting a business (Djankov et al., 2003; Antunes and Cavalcanti, 2007), the rule of law and incidence of corruption (Dougherty and Escobar, 2013; Mishra and Ray, 2013), inequality (Chong and Gradstein, 2007); trade liberalization (Goldberg and Pavcnik, 2003; Acosta and Montes-Rojas, 2014) are found to have significant effects on the level of informality as well.

Among the determinants of informality, the financial market channel, which is also focused this paper, has been an important search area for many scholars. As being one of the key elements of effective delivery of credits to the economy (Beck et al., 2000; financial markets and financial intermediaries have been strongly emphasized with its close relation to informality in many studies. Straub (2005) argues that operating formally allows firms to benefit from crucial public goods and to participate in the formal credit market which is less likely for firms operating informally. Complying with this idea, D'Erasmus and Boedo (2012) claim that operating formally helps firms to produce more efficiently and at larger scales through access to credit markets with better contracts. Moreover, Massenot and Straub (2016) claim that the trade-off between advantages of accessing to the well-functioning formal credit market and cost of entry to the formal work are closely related with an efficient credit market and lower interest rate can reduce the size of the informal sector.

Apart from the studies that focus on credit opportunities for formal firms and individuals through financial markets, the reverse relationship between informality and credit channel has been a field of interest in recent years. For instance, Massenot and Straub (2016) argue that credit access and better regulations can also increase the level of formal working through supporting the decision of firms to operating formally.

Align with this discussion; Catao et al. (2009) investigate the effect of credit access on informality in within and between firm size categories. The within channel states that access to credit necessitates compliance with employment and tax legislation; yet firms are more likely to incur such costs of working formally if bank credit is more obtainable at lower costs. The other channel (between firm size categories) points out that that if the credit is widely available at a

lower cost, this motivates firms to increase their scales and migrate to a larger firm size category, which are more formal. Moron et al. (2012) also emphasized the same channel in terms of financial deepening as it helps firms to increase their scale and therefore increase their productivity, which in turn allows firms to go formal.

Another study by Beck et al. (2014) present empirical evidence using a large data set including 102 countries and find that a financial system providing easier access to credit increases opportunity costs of tax evasion and decreases informality. Another study by Capasso and Jappelli (2013) lay out similar results affirming that development of financial sector decreases the size of the informal sector by increasing the opportunity cost to operate informally. Additionally, Gandelman and Rasteletti (2014) claim that bank credit growth may foster the level of formalization, especially in sectors that are more financially dependent.

126

İİBF Dergi  
38/2  
Aralık  
December  
2019

## 2. INFORMALITY IN TURKEY

Turkey has been experiencing a remarkable growth path for the last fifteen years up to the last few years, especially after the severe economic crisis occurred in 2001. Since then, the government has implemented various legal arrangements related with the independence of many public institutions, labour market regulations and competitiveness policies and all these regulations have contributed to the rise in the Gross Domestic Production (GDP) and per capita income. However, informality remains a central issue for welfare policies because of poor working environment that put workers' health and lives at risk apart from the matter of low income (Baslevent and Acar, 2015:77).

There has been a large body of research in informality in Turkey and the studies generally follow the same literature in the world. Many studies concentrate on estimating the aggregate size of the informal activity by using different approaches such as tax based methods, multiple indicator multiple causes models and expenditure based approaches in Turkey (Davutyan, 2008; Savasan et al., 2016). The other search area of informality mostly focuses on the socioeconomic and demographic features of the employees' characteristics such age, gender, marital status, education level, sector of employment,

occupation, region of residence (Başlevent and Acar, 2015; Acar and Tansel, 2016) with many other labour market features such as wage differences (Baltagi et al., 2013), productivity (Taymaz, 2009) and market liberalization (Aydin et al., 2011).

The macroeconomic determinants of informality also stand as another central research area in Turkey. There are policy-based studies looking at the relation between informality and corruption, unionization, tax regulation, labour market regulation and competitiveness (Özdemir et al., 2004; Savaşan and Altundemir, 2007; Dereli, 2007), but theoretical studies and empirical research is very restricted. Among those few studies, Bulutay and Taştı (2004) investigate the relationship between different definitions of informality and several economic variables such as GDP, imports and exports. They find a weak negative relationship between the GDP growth and informality, but this relationship is not precise for different measures of informality. Overall, they conclude that the informal sector is generally related to population and employment expansion to urban areas rather than GDP growth or other aggregate determinants. Another study conducted by Elveren and Ozgur (2016) suggest that a rise in foreign trade competitiveness and income inequality increase of the level informal sector. Additionally, a recent study by Elgin and Sezgin (2017) focus on the tax enforcement level of the government and obtain that increases in the income tax result in large increases in informality; yet a reduction is less effective.

This paper aims to contribute to the related literature through investigating relationship between the credit channel and informality. In the context of the relation between the financial markets and informality, data-based empirical researches lack in Turkey. To the best of my knowledge, two of the exemptions are Dalgic (2010) Asik (2014). Among these two studies, Dalgic (2010) evaluates the relationship between the sectoral credits and informal employment for the period 2000-2008. Using the informal employment data from labour force surveys, this study finds a positive relationship between the level of sectoral formal employment and the use of bank credits for the evaluated period.

The study of Asik (2014) uses consumer credits as a proxy for effectiveness of financial services and investigates the impact of increase in consumer credits on the reduction of informality. The

results of this study point out that the financial sector expansion is significantly related with the recent decrease in informal employment in Turkey during 2008 and 2012 as well.

This paper presents new evidence and examines whether there is an empirically significant relationship between financial depth and the level of informality. Using the regional data including the period 2004-2014 in Turkey and following the idea of King and Levine (1993), the amount of private credit provided by the banking sector to the all firms and individuals is used as the key variable for proxying financial depth. "Social security registration" criteria of employees regarding their current job are used for the measurement of informality level, since it has the advantage of being less likely to be misrepresented and can be reliably tracked from household data (Catao, et al., 2009:10) and it allows to capture crucial relationships between various workers and employment features of informality (Acar and Tansel, 2016:170).

128

İİBF Dergi  
38/2  
Aralık  
December  
2019

### 3. SOME PRELIMINARY EVIDENCE

Despite the economic progress achieved in recent years, informal economy remains as one of the most important challenging issues of the current policies in term of fiscal outcomes, productivity, growth, economic and social vulnerability, social cohesion and the rule of law in Turkey (World Bank, 2010:54). As it is shown in Figure 1, the data from Turkish Statistical Institute (TurkStat) shows that economic activity in Turkey is accompanied by a significant decline in informality from around 55% in the early 2000s, yet it remains at high levels of around 30%<sup>2</sup>.

Informality in Turkey seems to be the result of a many factors. While some of them tend to be long term and generally structural, others of seem to be short term and related with the economic trends in the economy. The report by Word Bank mentioned previously, clearly states that underreporting of revenues, wages and non-registration of workers with the social security system are the most widespread forms of informality in Turkey. The report also emphasizes that

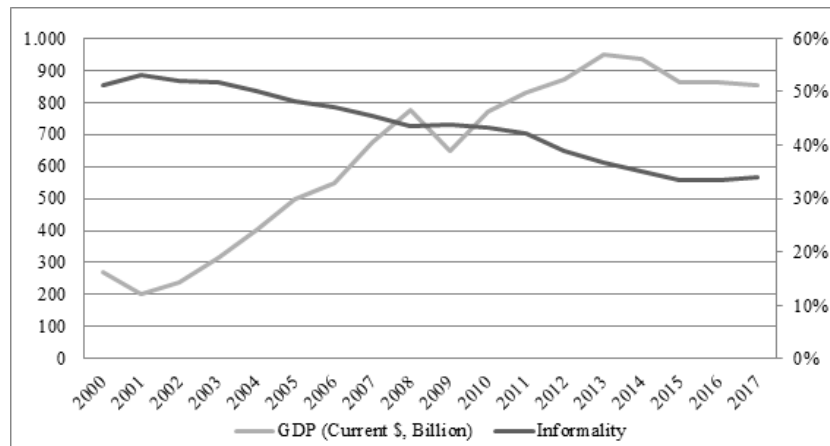
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<sup>2</sup> In Figure 1, informality is measured as the share of employed workers without social security registration in total employment.



although Turkey is successful and has a clear progress in easing excessive business regulations, the on-going pension system, minimum wage limit, regulatory environment and quality of public services seem to be the main reasons of high level of persistent informality, together with the belief of the widespread corruption in business environment and inefficient bureaucracy.

**Figure 1.** The informality level and total GDP in Turkey



## 4. METHODOLOGY

### 4.1. Model

The data used in this study captures all 26 regions in Turkey for the period 2004-2014 and thus a general panel data estimation methodology, with fixed and random effects, is used to determine the relationship between the financial depth and informality. The panel data includes information about informal employment levels (dependent variable), credit to GDP ratio (proxy for financial depth) as the main independent variable under interest, with several other explanatory variables including the share educated workers, share of young workers, female employment and the share of employment in terms of firm size for each of 26 regions over time. The specific model in (1), which is also used by Neumark and Washer (1992), is estimated

for several models with fixed or random effects methodology after the Hausman test:

$$Y_{jt} = \beta_0 + \beta_1 X_{jt} + \beta_2 Z_{jt} + \alpha_t + \theta_j + \varepsilon_{jt} \quad t = 1, 2, \dots, T, j = 1, \dots, N \quad (1)$$

In the above specification,  $Y_{jt}$  is the dependent variable for region  $j$  at time  $t$  and  $\varepsilon_{jt}$  is assumed to be serially uncorrelated and orthogonal to the regressors, but that  $\alpha_t$  and  $\theta_j$  may be correlated with other regressors. The dependent variable is the informality level, which is defined as the share of workers employed informally in each region.  $X_{jt}$  stands for the ratio of credit to GDP variable, which is the main explanatory variable under interest. Both the dependent and the credit to GDP variables are expressed in percentage values, allowing the estimated coefficient  $\beta_1$  to be interpreted as an effect of percentage point change in the dependent variable as a result of a percentage point change in credit to GDP share. A set of other independent variables,  $Z_{jt}$  (expressed with the coefficient matrix  $\beta_2$ ), includes the agricultural share in total employment, share of people in employment with a university or higher degree, employment share of people between 15-19 years old and employment share of the small firms with 0-9 workers. Moreover, female workforce share in total employment and GDP growth rate for each region are also added into the regression to control for other possible effects of the informality level. The regression equation includes additional regional ( $\theta_j$ ) and time ( $\alpha_t$ ) fixed effects to control for further unobserved effects. The time dummy variable,  $\alpha_t$ , is also added into general specification because in each model, time dummies control for unobserved year specific effects and should be added into regression model if they appear to be jointly significant.

## 4.2. Determinants of Informality

### 4.2.1. Availability of Credits

The set of explanatory variables have crucial importance to determine the main elements of informality in the estimation methodology. For example, the effect of credit channel over informality has been one of the main interest areas through increased scale of production and efficiency (Massenot and Straub, 2016). Moreover, Catao et al. (2009)

points out two possible channels for the explanation of relationship between informality and credit availability. For the first channel, they argue that if the credit is widely available at a lower cost, this motivates firms to increase their scales, and migrate to a larger size (between channel effect). A similar argument is made for the “within channel”; access to credit is more likely to necessitate compliance with employment and tax legislation and thus, firms are more likely to incur such costs of working formally if bank credit is more obtainable at lower costs. Overall, the between and within channel effects of access to credit lets firms increase their scale and tendency for compliance with the legal framework, which in turn allows firms to go formal. Complying with this idea, Mishra and Ray (2013) claim that improvement in the credit conditions brought about by a reduction in credit market imperfection may also reduce informality. Additionally, Gandelman and Rasteletti (2014) support this idea and point out that bank credit growth may foster the level of formalization, especially in sectors that are more financially dependent.

#### **4.2.2. Sectoral Features**

The effects of the sectoral features are also thought to be an important determinant of informality. For example, agricultural sector, mostly operating in rural areas, can be closely related with the informal employment level in an economy. Agricultural firms generally may not prefer formal registration because the process might be too difficult and expensive for them with extra labour obligations, taxes, health and safety controls. Moreover, because the enforcement capacity of the government in rural areas is relatively low compare to urban areas; as the agriculture sector becomes more widespread, the share of informal economy is more likely to get larger (Vuletin, 2008:10). In addition, governmental authorities may not have a clear observation about how much a farmer produce and it might very difficult to show the level of untaxed production in agriculture (Chowdhury, 2007:105).

#### **4.2.3. Education Level**

The association between education level and informality is on the core of many studies as well. Montes et al. (2016) state that the relation between formal employment and education is designed by supply and demand relationship in the labour market and with more

sophisticated and relatively scarce skills, more educated people are more likely to find formal jobs compare to less educated individuals. It is because more educated individuals might have greater personal networks helping them to get formal jobs easier or else people with higher education can choose and afford to remain unemployed for longer periods instead of working informally. On the other side, individuals with less levels of education might work in easily reachable informal sector which usually does not require high levels of skills.

132

İİBF Dergi  
38/2  
Aralık  
December  
2019

From the demand side, because education is a signal for better skills and higher level of productivity, formal firms are more prone to hire individuals with more education (Spence, 1973). That is because completion of a school or a diploma might have a positive effect on employers that a worker candidate has probably enough or at least minimum skills for having a formal wage agreement. In sum, literature has a common consensus on that individuals with relatively more education are more likely to be hired by formal firms and have more chance to work formally.

#### 4.2.4. Age Level

It has been also suggested by several studies that the age of the individual can be an important feature informal employment. Perry et al. (2007) state that informal sector might be an access point for formal sector to the majority of young workers and even a chance to work for the older workers who are at the end of their work life. Similarly, Gatti et al. (2014) argue that for most of the young people, informal work is seen a way to acquire necessary qualifications and young people mostly enter the informal firms at the beginning of their work life; then move into the formal firms or remain in the informal sector. As they accumulate experience and human capital and became middle aged, they are more likely to be found in the formal sector.

Approving this idea, Bosch and Maloney (2010) reveal that young people see informal sector as a transition opportunity to the formal sector by means of providing them necessary skills on their future employment. On the other side, firms might prefer to employ informal young workers as well. If the legal regulations are weak and opportunity cost of informality is low, firms might prefer these new entrants to the labour force with not permanent contracts and less

social rights and protection. For example, Brown et al. (2002) point out that in many industries in Mexico, firms prefer to hire young teenagers (especially young girls) since they can tolerate the low wages and are less likely to complain about unfair working conditions.

#### **4.2.5. Size of Firm**

From the firm size perspective, informal working is most likely to be seen as a small size business phenomenon. Perry et al. (2007) argue that the formal registration of a firm puts an extra input cost in the production facilities which small size firms are generally reluctant. Mel et al. (2013) also draw attention to the issue that being informal is a rational choice especially for small size firms and being informal may help less productive and informal firms to compete with formal ones. Moreover, Mishra and Ray (2013) claim that the visibility of the firms and probability of being detected by legal authorities generally increases with the firm size and this makes firms prefer to stay small to prevent from penalties

#### **4.2.6. Gender Issues**

The gender of worker is another area of interest in terms of informality for several studies. Many studies emphasize that the informal employment of women seems to be closely related with the socially attributed gender role of women. For instance, Perry et al. (2007) argue that employment features of women are closely related with the pressure to balance work life, family and child care and thus many women might give up higher salaries and prefer the flexible informal works. For example Maloney (2004) states the informal employment can also be a relatively desirable alternative for poor women who should carry out home responsibilities and need to work as well. Moreover, Chen (2001) emphasizes that women are easily able to find informal works in areas such as child care, home based works or works in agriculture.

#### **4.2.7. Economic Growth**

The effect of GDP growth on informality is generally discussed in term of economic growth and growth is usually associated with a

diminishing pattern in the informal employment. It is because firms are more likely to offer workers improved wages and social protection rights in a fast-growing economy and workers might be less likely to accept informal employment in an environment with increased formal job opportunities (Heintz and Pollin, 2003:16). On the other hand, there are some discussions showing that informal employment can be persistent in many economies, especially if the overall growth process is mostly determined by the sectors which are more likely to be informal (Arias and Escudero, 2007:9).

134

İİBF Dergi  
38/2  
Aralık  
December  
2019

### 4.3. Data Sources

#### 4.3.1 Informal Employment

The dependent variable in the regression analyses is the informality level in each region and this paper uses employment-based “social protection” measure of informality. This definition and measurement of informality is useful and has the advantage of being easily derived from household data. Moreover, it is also advantageous because it is highly correlated with the formality status of a firm as unregistered firms cannot enrol their workers in social security (Catao et al., 2009:5-6). Thus, this measure has a useful dimension to capture the partial informality of the firms which do not comply with the full legal regulations. The regional data related with informal employment is obtained from the Turkish Statistical Institute (TurkStat) and informal employment shares of 26 regions are calculated for the period of 2004-2014. The regional data does not date back before 2004 in Turkey, since the requirement of classification for statistical territorial regions according to European Union (EU) standards has been implemented from 2002 onwards and the regional statistics for these 26 regions have been collected since 2004.

#### 4.3.2. Bank Credits

The stock of credit amount in terms of dollar for each province is acquired from the database of the Banks Association of Turkey and the provincial data is aggregated in compliance with the regional classification. This variable includes total credits from banks to private sector, including consumer credits. It important to note that the credit data stands for to the total credits that are approved by the banks

located in the specified regions; not for the credits that are used in those regions.

This might be a bit debatable because it might be that the real receiver or the use of credit is in fact placed in somewhere else but the approval of the credits is in another place and data does not make this distinction. Yet, rescaling the total credits through dividing the total regional credits over regional GDP and using this measure as the proxy for financial depth makes our analysis more apprehensible. That is, if bank credits are high in terms of volume in a region, it is natural to expect that the region has a high level of GDP as well which makes our rescaling acceptable to use as a proxy for regional financial depth. Moreover, Small&Medium Enterprises (SMEs) comprise of most of the 99,8% of total firms in 2014 (TurkStat, 2016) and these firms are expected to be more region-oriented compare to the larger firms. Additionally, the total credits include the consumer credits which make around 30-35% of the total credits during the period evaluated (Demirezen, 2015:72) and these consumers credits are also more likely to be used in the approved region.

It is also important to note that it is not possible to evaluate the relationship between the level of informality and firms credits only, because regional breakdown of this data is not available. Nevertheless, as it is emphasized in Dunn (1996) in terms of small firms and micro finance perspective, a strict division of credits between productive or private use is often may not be possible due to the familiarity of the household and enterprise budgets. That is, consumer credits can also be used by micro firms and SMEs in production facilities, especially for short term purposes. Moreover, consumer loans might have positive externalities on decreasing informality for Turkey because an increase in credit availability can result in the formalization of transactions and employment procedures (Asik, 2014:18). Thus, the total amount credits to both firms and individuals more likely to capture wider possible dynamics related with informality.

#### **4.3.2. Regional GDP**

The main interested explanatory variable, credit to GDP, is calculated by dividing the total regional credits over GDP for each region and all related data is obtained from TurkStat. Regional GDP data in terms of

dollar is not readily available for the period 2004-2008 in the TurkStat database and to provide consistency for the whole period, per capita GDP for each region (which is available for the whole period) is used to calculate the total GDP. The average population of each year is multiplied by per capita GDP for each region to get the total GDP for the individual regions. Additionally, GDP growth variables for regions are measured using these values of total GDP.

#### 4.3.2. Other Variables

The raw data for regional employment in terms of firm size, education levels and age groups are also obtained from TurkStat and the shares of these variables are calculated for each region and year. All variables, apart from employment share of the firms with 0-9 workers, cover the period 2004 and 2014. The data for employment share of the firms with 0-9 workers covers only the period 2004-2013 because the small size classification of the firms in terms of number of workers in the data base changes to "10 or less workers" from 2014 onwards, which makes the data incompatible with the previous years.

#### 4.4. Estimation Methodology

For the estimation methodology, several fixed and random effects models are used to evaluate the relationship between our explanatory variables and the dependent variable. In the estimation methodology, the random effects are used to estimate each model and the Breusch-Pagan Langrange Multiplier (LM) test is applied to decide between random effects model and pooled ordinary least squares (OLS) models. In all models the results suggest that there are significant panel effects and simple pooled OLS regression is not valid for the estimations. All models with different explanatory variables are estimated using fixed effects and random effects models and Hausman test is used to decide between these models. Time dummies are added to all models as they are jointly significant. Additionally, all models are corrected for serial correlation and for the disturbances that are not identically distributed over the panels.



## 5. FINDINGS

In the Table 1, several models capturing the interested variables presented. The overall results show us that credit to GDP ratio and share of high educated people with a university degree (or more) in total employment has significant effects on the reduction in informality in Turkey. The positive effect of credit variable on formal employment is in line with the results of Catao (2009) for Brazil, Moron et al. (2012) for Peru and Gandelman and Rasteletti (2012) for Uruguay. Moreover, this positive effect also complies with the results Dalgic (2010) and Asik (2014) for Turkey. The findings also show that agricultural employment share, together with the share of young workers and share of small size enterprises are important determinants for the high level of informality. Specifically, the prevalence of high level of informality in agriculture is parallel to findings of many previous researches for Turkey (Baslevant and Acar, 2015; Acar and Tansel, 2016).

The estimation results also point out that high level of education in formal employment is consistent with the findings Baslevant and Acar (2015) and Acar and Tansel (2016) for the Turkish job market who find that informality declines as the education level increases. Additionally, the level of informality seems to be more widespread among young employees compared to the older workers in Turkey and this result confirms the findings of Heper and Sayarı (2012) and Acar and Tansel (2016), who give clear evidence about that the issue of working informally is very common among younger workers in Turkey.

Table 1. Panel regressions with fixed effects and random effects(\*)

VARIABLES	Model(1)	Model(2)	Model(3)	Model(4)	Model(5)	Model(6)
<b>Financial depth</b>	-0.305***	-0.257***	-0.251***	-0.252***	-0.241***	-0.241***
	(0.086)	(0.084)	(0.077)	(0.0831)	(0.0863)	(0.0742)
<b>Share of agriculture</b>	0.505***	0.492***	0.286***	0,0844	-	0.248**
	(0.061)	(0.059)	(0.072)	(0.146)	-	(0.0941)
<b>Share of university degree or more</b>	-0.671***	-0.553***	-0.320***	-0.420**	-0.442***	-0.341**
	(0.142)	(0.123)	(0.112)	(0.153)	(0.142)	(0.130)
<b>Share of workers in age group 15-19</b>		0.705**	0.744***	0.503*	0.496*	0.891***
		(0.239)	(0.208)	(0.282)	(0.271)	(0.224)
<b>Share of workers employed in firms of 0-9 workers size</b>			0.490***	0.518***	0.578***	0.542***
			(0.073)	(0.102)	(0.101)	(0.115)
<b>Share of female workers</b>				0,399	0.466**	-
				(0.303)	(0.213)	-
<b>GDP growth rate</b>						0,0379
						(0.0734)
<b>Constant</b>	0.470***	0.409***	0.113**	0,0941	0,0668	0,0817
	(0.042)	(0.039)	(0.048)	(0.0587)	(0.0591)	(0.0697)
<b>Model</b>	Random Effects	Fixed Effects	Fixed Effects	Fixed Effects	Fixed Effects	Fixed Effects
<b>Time Dummies</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Observations</b>	286	286	260	260	260	234
<b>Overall R-squared</b>	0,750	0,791	0,740	0,802	0,800	0,769
<b>Number of region</b>	26	26	26	26	26	26

(\*) Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

The estimation results also highlight that high level of informality in small firms is very common issue in Turkey as compared to large firms and this is align with some of previous studies (Başkaya and Hulagu; 2011; Acar and Tansel, 2016).

The coefficient of GDP growth in Model (6) does not appear to be statistically significant and this result is similar to the findings of

Bulutay and Taştı (2004) who argue that the informal sector in Turkey is more likely to be an issue related with population and employment expansion rather than income growth. That is, in a fast-growing economy, it might be the case that many of the people might be the new entrants to the workforce and they are more likely to start to work informally as many informal workers may find opportunities for transition to formal works so that effect of growth is not certain.

The share of female employment has a statistically insignificant coefficient in Model (4) together with the coefficient representing the agriculture share. Nevertheless, the coefficients of other variables are still significant. The main reason for this change seems to be that the female and agriculture share variables are somehow correlated to each other. The regression results end up with an increase in the R-squared but the coefficients of these two variables become insignificant. In order to check this issue further, the female share variable is used instead of agriculture share in employment in Model (5). Although the significance levels of the coefficients of all variables change slightly, they still appear to be significant, at least in 10% level. Therefore, it seems more convenient to use agriculture or female share in employment in the estimations alone, preferably agricultural share.

## CONCLUSION

Informality is a prevalent issue not only in developing countries but also in many developed countries and policymakers give a special importance due to its effects on welfare of the individuals. Decreasing informal employment and informality is not very easy, because informality itself is not a clear-cut phenomenon. This paper contributes to the potential link between informality and financial depth in Turkey, by means of total credits given by the banking sector to the firms and individuals. The estimation results show that there is a strong relationship between the financial depth and informal employment in Turkey for the period evaluated, together with most of the control variables are significant with the expected sign.

The link between financial depth and formal working is important because there might be some other implicit benefits of availability of credits other than the easing the financial constraints, increasing the scale of production, productivity and employment. The results point

out that increased supply of bank credits with better conditions to the economy can also have positive effects in increasing the share of formal employment; thus more secure jobs and better health benefits to the employees as well as more income tax to government. This point gives significant insights to the policymakers for the importance of government-supported-credit programs and microcredit opportunities to private sector and households, especially under a good-working financial system. Sustainability of a regulated and an efficient financial system can foster to increase the availability of credits to the market which in turn may result in decrease in informality.

140

İİBF Dergi  
38/2  
Aralık  
December  
2019

Apart from the financial depth, it is also vital to lay out the importance of the links between informality and education, age level of the employment; firm structure and sectoral features. In the regressions, all the control variables are resulted with significant coefficients. The share of young people, which mostly includes the new entrants to the workforce seem to be the largest contributor to the level of informality in the period evaluated in Turkey. This feature of the young workforce should be deeply taken into consideration by policy makers in terms of the effectiveness of the education system. The close relationship between small firms and informality seems to be important issue and compliance with regulations of these firms seem to be one of the main matters to be solved for the legal authorities. Additionally, effective policies to provide better working conditions and social security for the agricultural workers seem to be an urgent incidence for policy makers to be handled.

The results suggested by this study put some important debates on informality issue but the findings need to be evaluated with more empirical and theoretical research. Different measurements of informality might be used to test the validity of estimations results. Additionally, this study evaluates only the formal credits by banks; but there might be other ways of financial sources of firms and households such as informal credits or financial supports and promotions directly from other institutions. Further research on these areas should contribute to get a more comprehensive understanding of informality and effective recommendations for policy makers.

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143

İİBF Dergi  
38/2  
Aralık  
December  
2019

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145

İİBF Dergi  
38/2  
Aralık  
December  
2019

## ÖZET

Kayıtdışı ekonomi, özellikle toplumların refahı açısından ele alındığında gelişmekte olan ülkeler yanında gelişmiş ülkelerde de karar vericiler açısından son derece önemli bir husus olarak ele alınmaktadır. Kayıtdışı ekonomi ve kayıtdışı istihdamın azaltılması, ülkemizde de öncelikli politikalar arasında yer almakla birlikte, kayıtdışılık kavramının çok boyutlu olması sebebiyle uygulanacak politikaların iyi bir şekilde ele alınması ve değerlendirilmesi gerekmektedir.

Özellikle 2000'li yılların başından itibaren finansal istikrarın sağlanmasına yönelik uygulamaya konulan politikalar ile birlikte Türkiye'nin önemli bir büyüme ivmesi yakaladığı görülmektedir. Bu dönemde yaşanan kredi genişlemesi finansal açıdan sonuçlara kaynaklık etmekle birlikte aynı dönemde kayıtdışı istihdamın da %60'lardan %35'lere kadar gerilediği görülmektedir. Bu çalışma da, bu gelişmeleri göz önünde bulundurarak Türkiye'de kayıtdışı istihdam ve finansal derinlik arasındaki potansiyel bağlantıları ele almaktadır. Çalışma, 2. Düzey İstatistiki Bölge Birimleri Sınıflandırması (İBBS2) çerçevesinde ele alınan bölgesel verilerle oluşturulan panel veri seti yardımıyla yürütülmüş olup, sabit etkiler ve rassal etkiler özelinde yapılan analizler bireylerin sosyal güvenlik kurumuna kayıtlı olma durumunu ile piyasaya bankacılık sektörü kredileri arasındaki arasında pozitif bir bağlantı olduğunu ortaya koymaktadır.

Analiz sonuçlarının ortaya koyduğu kayıtdışılık ve finansal derinlik arasındaki ilişki, özellikle piyasadaki kredi olanaklarının bireyleri ve işletmeleri finansal açıdan destekleme, üretimi ve üretkenliği artırma, istihdam yaratma gibi etkilerinin yanında kayıtlı istihdamı dolaylı olarak artırabilmesi bağlamında önemli bir noktaya vurgu yapmaktadır. Çalışma, piyasadaki kredi olanaklarının ve bu çerçevede finansal derinliğin artmasının kayıtlı istihdamı artırarak bireylere daha güvenli ve sağlıklı bir iş ortamı yaratmasının yanı sıra vergi gelirlerinde artış sağlama potansiyelini de ortaya koymaktadır.

Temel olarak finansal derinlik ve kayıtdışı istihdam arasındaki ilişkiyi ele alan çalışma, özellikle kayıtdışı istihdam ile bireylerin eğitim düzeyi, bulunduğu yaş grubu, çalıştığı firma ölçeği ve faaliyet gösterdiği sektörler bağlamında da önemli sonuçlar ortaya koymaktadır. Özellikle çalışma çağının başında yer alan genç nüfusun yüksek kayıtdışılık düzeyleri, küçük ölçekli firmaların kayıtdışı olarak faaliyet göstermesinin yaygın olması, tarım sektöründe çalışan bireylerin çoğunlukla sosyal güvenceden yoksun olması gibi hususlar, çalışma kapsamında ortaya çıkan ve politika yapımcıların ele alması gereken başlıca konular arasında yer almaktadır.