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Informal Economy and Financial Development: The Role of Institutions

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Kayıt Dışı Ekonomi ve Finansal Gelişme: Kurumların Rolü

Abstract

This paper assesses the interactive impact of financial development and institutional quality indicators on the informal economy using data from 67 developing countries from 2002-2017. We employ the fixed-effect model with Driscoll-Kraay standard errors that are heteroscedasticity consistent and robust to the general form of cross-sectional and temporal dependence. Findings reveal that financial development and institutions are substitutes for reducing the informal economy. Financial development decreases the size of the informal economy only in the absence of efficient institutions and vice versa. Finally, the study provides several essential policy suggestions for combatting the informal economy.

Keywords : Informal Economy, Financial Development, Institutions.

JEL Classification Codes : E26, G20, O16.

Öz

Bu çalışma 67 gelişmekte olan ülkenin 2002-2017 verilerini kullanarak finansal gelişme ve kurumsal kalitenin kayıt dışı ekonomi üzerindeki interaktif etkisini araştırmaktadır. Çalışmada değişen varyans ve yatay kesit bağımlılığını dikkate alan Driscoll ve Kraay Standart Hatalar ile Sabit Etkiler tahmin yönteminden yararlanılmıştır. Bulgular, finansal gelişme ve kurumların, kayıt dışı ekonomiyi azaltmada ikame işlevi gördüğünü ortaya koymaktadır. Kurumsal kalitenin en düşük olduğu ülkelerde finansal gelişmenin kayıt dışı ekonomi üzerinde en fazla etkiye sahip olduğunu göstermektedir. Öte yandan, finansal sektörün daha az gelişmiş olduğu ülkelerde güçlü kurumlar kayıt dışı ekonomi üzerinde daha etkili olmaktadır. Son olarak, çalışma kayıt dışı ekonomiyle mücadele konusunda birkaç temel politika önerisi sunmaktadır.

Anahtar Sözcükler : Kayıt Dışı Ekonomi, Finansal Gelişme, Kurumlar.

1. Introduction

The informal economy[1] is a common feature of all economies in the world. The impacts of informality on social and economic development can be compelling and profound since scarce resources are wasted or used unproductively, national accounts do not reflect accurate figures, and public finance works against public policy (Blackburn et al., 2012: 243).

In the last two decades, researchers have discussed the phenomenon of the informal economy and used several indicators to determine the factors which drive individuals and corporates into the informal sector. Of these, one strand of the literature stresses the role of financial development on the size of the shadow economy (Bose et al., 2012; Blackburn et al., 2012; Capasso & Jappelli, 2013; Berdiev & Saunoris, 2016). Another strand of the studies addresses the importance of institutional quality on the shadow economies (Johnson et al., 1998; Friedman et al., 2000; Schneider, 2005; Guha-Khasnobis et al., 2006; Bovi & Dell'Anno, 2009; Dreher et al., 2009; Torgler & Schneider, 2009; Torgler et al., 2011; Dreher & Schneider, 2010; Teobaldelli, 2011). This paper exploits both these strands of the literature to evaluate if institutional quality has any role in moderating the effect of financial sector development on informality.

This study closely follows the works of Compton and Giedeman (2011), Blanco and Dutta (2021) and Cepparulo et al. (2016). These studies investigate if financial development and quality of institutions demonstrate substitutability in their effect on growth, poverty alleviation and domestic investment, respectively. This paper aims to expand on their work by investigating if institutions and financial development work as complements or substitutes in tackling informality.

Evaluating this relationship is essential in determining the most appropriate resource allocation between these two factors. In a policy design to combat the shadow economy, it is crucial to identify whether the constraints stem from the financial or institutional framework and act accordingly. If they work as substitutes, investing in a financial system where the institutions are inefficient will be more sensible. Likewise, improving institutions can compensate for the absence of a sound financial system to combat shadow economies. To the extent of our knowledge, this study is the first to analyse the critical relationships between the size of the shadow economy, financial development, and institutions. We contribute to the present literature on the informal economy by assessing the interactive effect of financial development and institutional quality indicators.

Findings reveal that financial development significantly impacts the informal economy when institutional quality is the lowest. In other words, in the absence of a sound institutional setup, financial development diminishes the negative impact of weak institutions on the formal economy. On the other hand, a higher level of institutional quality

[1] *Informal economy, informality, shadow economy or underground economy are used interchangeably.*

is more effective in combating shadow economies in countries where the size of the financial sector is small. To put it more explicitly, we find a substitution effect among these priorities. One possible explanation behind this substitution effect might be that some of the tasks associated with efficient institutions are also fulfilled by financial development to decrease informality and vice versa. For example, economic agents might prefer to operate informally due to high transaction and information costs in the presence of weak institutions. However, a well-functioning credit market can alter their preferences by reducing these costs and thus compensate for the deficiencies of inefficient institutions.

The rest of the paper is structured as follows. Section 2 presents a brief review of the literature. Section 3 describes the models and methodological issues. Section 4 introduces the variables, descriptions and data sources. Section 5 provides the empirical results and robustness checks. Lastly, section 6 is the concluding remarks.

2. Literature Review

Researchers discuss the phenomenon of the informal economy and use several indicators to identify the factors which lead individuals and corporates to operate informally. Of these, the impact of financial development and institutions on the informal economy has received considerable attention in recent academic studies.

The theoretical background for analysing the linkage between the shadow economy and financial development can be attributed to Becker's (1968) seminal paper on the economics of crime. He suggests that rational individuals will weigh the profit of illegal activities against the costs of detection and punishment. Thus, any economic agent will rationally compare the advantages of operating in the shadow economy, such as regulations and avoiding taxes and costs related to the formal economy. Following Becker's (1968) influential study, several important studies have theoretically argued the linkage between the shadow economy and financial sector development (Straub, 2005; Antunes & Cavalcanti, 2007; Dabla-Norris et al., 2008; Bose et al., 2012; Blackburn et al., 2012; Capasso & Jappelli, 2013). The studies suggest that the financial sector is a particular type of institution that may influence the shadow economy's size (Berdiev & Saunoris, 2016). When individuals or firms operate in a shadow economy, their ability to declare assets or revenues is limited, and therefore credit costs become higher. In this sense, as markets financially improve, effective intermediaries enter into the official economy, and the credit costs decrease, thus, increasing the opportunity cost of continuing informal activities and driving economic agents into the official sectors (Capasso & Jappelli, 2013: 167).

Several papers empirically contribute to the existing literature studying the linkage between financial development and the shadow economy. For instance, Bose et al. (2012) analysed the link between financial development and the size of informality for 137 countries between the years 1995-2007. They found that improvements in the banking sector reduce informality size. Berdiev and Saunoris (2016) examined the linkage between informality and financial development for 161 economies from 1960 to 2009. They

concluded that financial development and informality size are negatively correlated. Other papers have analysed this relationship within single countries (see, amongst others, Capasso & Jappelli, 2013, Beck & Hoseini, 2014, Bayar & Aytemiz, 2017). These studies conclude that financial sector development is associated with a smaller shadow economy size.

Institutional quality is viewed as another critical factor determining informality. North (1991) defines institutions as "the humanly devised constraints that structure political, economic and social interaction". A sound institutional setting reduces the asymmetric information problem, risks and transaction costs and allows easy access to credit and enforcing contracts and property rights (Canh et al., 2021: 50). Therefore, better institutional frameworks incentivise individuals and firms to operate formally. On the contrary, weaker institutional settings such as poor contract enforcement, overregulation, and an inefficient judicial system reduce economic agents' incentives to work officially. On this point, Johnson et al. (1998) suggest that the extent of regulatory and bureaucratic discretion is the primary driver of the size of the informality. Likewise, Friedman et al. (2000) analysed the relationship between the underground economy and institutions in 69 countries. They concluded that higher taxes are not the primary drivers of the informal economy. Instead, over-regulation, a weaker legal environment and more corruption are associated with a larger informal economy. Schneider (2005), Dreher et al. (2005), Guha-Khasnobis et al. (2006), Dreher et al. (2009), Dreher and Schneider (2006), Bovi and Dell'Anno (2009), Torgler and Schneider (2009), and Teobaldelli (2011) are the other studies suggesting that strong institutions are associated with a smaller shadow economy size.

Although the available empirical studies on the impact of financial development on the shadow economy are pretty rich, literature on how institutions impact the shadow economy-financial development link is scarce. Thus, this paper differs from the previous studies by evaluating the interactive effect of financial development and institutions.

This paper closely follows the works of Compton and Giedeman (2011), Blanco and Dutta (2021) and Cepparulo et al. (2016). Compton and Giedeman (2011) investigate whether the relationship between financial development and growth depends on institutional quality. They suggest that financial development's beneficial effect on economic growth diminishes where institutions work better. They interpret this as evidence that financial development and institutional quality are substitutes in the growth process. Following a similar approach, Cepparulo et al. (2016) suggest that the pro-poor impact of credit market development is smaller where institutional quality is higher and stronger when institutions function ineffectively, meaning that institutions and financial development work as substitutes in the poverty alleviation process. Blanco and Dutta (2021) analyse the interaction effect of financial development and institutions on gross domestic investment. They find a substitution effect among financial development and institutions, meaning that credit market development is more effective on informality in countries with poor institutions.

This paper aims to expand on their work by investigating whether institutional quality interacts with the relationship between financial development and the size of the shadow economy. Evaluating whether institutional quality influences the impact of financial development on the shadow economy is crucial for policymakers because especially developing countries that face resource constraints can allocate available resources to improve their financial system and/or institutions. Therefore, we intend to answer the following questions. First, are the financial development, and the institutional quality complements in combatting informality? If yes, policymakers will invest in both the financial system and institutions. Second, are the financial development and the institutional quality substitutes? If yes, investing in a financial system where the institutions are inefficient will be more sensible. Likewise, improving institutions can make up for the absence of a sound financial system to decrease informality.

3. Methodological Framework

This paper examines how institutional quality affects the financial development-informal economy relationship. Based on the above arguments, the baseline model is as follows:

$$IE_{it}=\text{f}(FD_{it}, INS_{it}, CONTROL_{it}) \quad (1)$$

IE_{it} denotes the size of the informal economy as per cent of GDP for country i at year t, FD_{it} is the financial development measures as per cent of GDP for country i at year t, and INS_{it}[2] is the level of institutional quality for country i at year t. From equation 1, we adopt the standard specification of the cross-country equation. Thus, the specific model is as stated:

$$IE_{it} = \beta_0 + \beta_1 FD_{it} + \beta_2 INS_{it} + \beta_4 CONTROL_{it} + \mu_{it} + \varepsilon_{it} \quad (2)$$

μ refers to country-specific effects, and ε is the error term. Since this paper explores institutional quality's role in the shadow economy-financial development relationship, we add an interaction term. Therefore, equation 2 is re-written as:

$$IE_{it} = \beta_0 + \beta_1 FD_{it} + \beta_2 INS_{it} + \beta_3 FD * INS_{it} + \beta_4 CONTROL_{it} + \mu_{it} + \varepsilon_{it} \quad (3)$$

Where $FD * INS$ is the interactive term of financial development and institutional quality indicators.

The coefficients β_0, β_1, β_2, β_3, and β_4 denote the parameters to be estimated. In this paper, the coefficients of interest are β_1, β_2 and β_3. β_1 and β_2 capture the direct impact of FD and INS variables on the shadow economy, respectively. β_3 refers to the interactive term of *FD* and *INS*. This interactive term allows us to assess how the institutional quality in a country influences the impact of financial development on the shadow economy size. The direction and significance of β_3 reveal whether financial development and institutions are

[2] *INS represents six different institutional quality indicators. Details are in the data section.*

complements or substitutes in combatting shadow economies. A statistically significant and negative sign for β_3 gives evidence that finance and institutions are complements meaning that a sound institutional framework coupled with financial development reduces shadow economy. On the contrary, a statistically significant positive sign for β_3 provides suggestive evidence that financial development decreases the informal economy size in the presence of weak institutions, and vice versa, meaning that finance and institutional quality act as substitutes. If β_3 is not statistically significant, the institutional quality does not have a moderating role in this relationship.

A methodological problem arises with the appropriate estimator. As OLS can produce biased results due to unobserved heterogeneity, two types of models, fixed effects and random effects, can be used to obtain consistent results. Hausman Test is employed to distinguish between fixed effects and random effects (Hausman, 1978) and confirms the presence of fixed effects in all the models.

In panel data analysis, cross-sectional dependence is another major problem that needs to be considered since other countries' behaviour may alter the behaviour of a single country. Traditional panel data estimation methods often rely upon the assumption of cross-sectional independence, but the presence of cross-sectional dependence may render the estimated results unreliable. Employing the Pesaran (2004) test for cross-sectional dependence, the null hypothesis of cross-sectional independence is rejected for all the models estimated in this study[3]. Therefore, the models have estimated with Driscoll and Kraay's (1998) standard errors that are heteroscedasticity consistent and robust to the general form of cross-sectional and temporal dependence (Hoechle, 2007).

4. Data

This study uses annual panel data from 2002-2017 from 67 developing countries for empirical analysis[4]. The sample size is determined primarily by the availability of data for the financial development and institutional quality variables[5]. Table 1 shows the variables, description and sources.

[3] *Hausman and Pesaran (2004) CD test results are available upon requests. They are not reported for saving space.*

[4] *Algeria, Argentina, Bangladesh, Belize, Benin, Bhutan, Botswana, Brazil, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Central African Republic, Chad, Chile, China, Colombia, Congo, Dem. Rep., Congo, Rep., Cote d'Ivoire, Croatia, Ecuador, Egypt, Arab Rep., El Salvador, Fiji, Gabon, Ghana, Guatemala, Guinea-Bissau, Haiti, Honduras, Hungary, India, Jamaica, Jordan, Kenya, Kuwait, Kyrgyz Republic, Madagascar, Malaysia, Mali, Mauritius, Mexico, Mongolia, Nepal, Nicaragua, Niger, Nigeria, Oman, Pakistan, Paraguay, Peru, Philippines, Poland, Qatar, Romania, Russian Federation, Rwanda, Saudi Arabia, Senegal, South Africa, Sri Lanka, Tanzania, Togo, Tunisia, Vietnam.*

[5] *The sample is limited to the period for 2002-2017 as consequence of the annual availability of WGI database from 2002 onwards.*

Table: 1
Variables Used in the Analysis

Variable	Description	Source
Informal Economy (IE)	Shadow economy size (% of GDP)	Medina and Schneider (2019)
Financial Development (FD1)	Domestic credit to the private sector (% of GDP)	The Global Financial Development Database
Financial Development (FD2)	Liquid liabilities (% of GDP)	The Global Financial Development Database
Financial Development (FD3)	Deposit money banks' assets (% of GDP)	The Global Financial Development Database
Control of Corruption (CC)	Control of corruption index (ranges from approximately -2.5 (weak) to 2.5 (high)	WGI
Government Effectiveness (GOVE)	Government effectiveness index (ranges from approximately -2.5 (weak) to 2.5 (high)	WGI
Political Stability and Absence of Violence (PSV)	Political stability and absence of violence index (ranges from approximately -2.5 (weak) to 2.5 (high)	WGI
Regulatory Quality (RQ)	Regulatory quality index (ranges from approximately -2.5 (weak) to 2.5 (high)	WGI
Rule of Law (RL)	The rule of law index (ranges from approximately -2.5 (weak) to 2.5 (high)	WGI
Voice and Accountability (VA)	Voice and accountability index (ranges from approximately -2.5 (weak) to 2.5 (high)	WGI
Government Expenditure (GE)	Government final consumption expenditure (% of GDP)	WDI
Trade Openness (TO)	Trade (% of GDP)	WDI
Growth (G)	GDP per capita growth (annual %)	WDI

The size of the informal economy (IE) as a share of GDP is the dependent variable, sourced from the study by Medina and Schneider (2019). The authors used the Multiple Indicators Multiple Causes (MIMIC) modelling approach to estimate the shadow economy size. Our main independent variables are financial development and institutional quality indicators. The study uses domestic credit to the private sector as a share of GDP (FD1), the most commonly used proxy to represent financial development in the related literature. For robustness checks, this paper utilises two measures of financial development widely used in the literature: liquid liabilities (FD1) and deposit money bank assets (FD2), both as a percentage of GDP. Financial development indicators are drawn from the Global Financial Development Database of the World Bank.

The institutional quality indicators are sourced from the WGI database. This study uses all the indicators of institutions provided by the WGI database, namely, control of corruption (CC), government effectiveness (GE), regulatory quality (RQ), the rule of law (RL), political stability and absence of violence/terrorism (PSV) and voice and accountability (VA). Estimates of each indicator range from approximately -2.5 (weak) to 2.5 (strong). Dreher et al. (2009), Torgler and Schneider (2009), Schneider (2010) and Abdih and Medina (2013) argue that institutional quality is one of the main determinants of the size of the informal economy.

We include three control variables previously used as potential drivers of the informal economy. Government spending (GS) as a per cent of GDP (GS) is a crucial factor in the decision to participate in the official economy or operate in the official economy (Schneider & Enste, 2000; Dell'Anno, 2010; Goel & Nelson, 2016; Dell'Anno et al., 2018). Higher government spending might distort the allocation of resources, crowd out private investment and lead to (potentially) higher levels of corrupt activities and therefore imply a larger informal economy size.

Trade openness (TO), defined as the ratio of the sum of export and import as a percentage of GDP, is another potential factor that gauges the impact of international trade on the shadow economy. Trade openness is expected to decrease informality by improving productivity and reallocating resources (Esaku, 2021).

Finally, we include GDP per capita growth (G) due to its close relation to the shadow economy. Elgin and Oztunali (2014) suggest that a higher growth rate would attract economic agents to the official economy. Hassan and Schneider (2016) and Schneider (2011) are other authors who find that the size of the informality diminishes with an increase in GDP growth. On the contrary, Zaman and Goschin, 2015; Wu and Schneider (2019) find the opposite; therefore, the effect of growth on informality is inconclusive and mixed.

Table 2 illustrates the summary statistics for all variables used in the analysis. It is observable that the variation in the size of the informal economy is considerable across countries. To illustrate, while Nigeria has the largest informal economy as a share of GDP (61.4), China has the smallest informal economy (11). We can also see the variation in financial development indicators. Guinea-Bissau and the Democratic Republic of the Congo have the least-developed financial systems, and China and South Africa are the most financially developed countries. On the average of the institutional quality indicators, Chile and Hungary have the highest institutional quality level.

Tablo: 2
Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
SE	1072	32.59	10.727	11	61.4
FD1	1072	37.079	30.332	0	160.125
FD2	1072	46.343	30.532	3.085	207.79
FD3	1072	44.4	31.602	.438	181.78
CC	1072	-.421	.633	-1.722	1.592
GE	1072	-.351	.658	-2.078	1.275
PS	1072	-.427	.859	-2.81	1.283
RQ	1072	-.253	.621	-1.684	1.539
RL	1072	-.421	.649	-1.817	1.433
VA	1072	-.347	.707	-1.907	1.293
TO	1072	74.612	34.263	20.723	210.374
G	1072	2.438	3.774	-36.557	28.676
GS	1072	13.951	4.608	.952	30.003

Note: Autor's calculation.

Table 3 displays the correlation matrix between variables in the dataset. The table reveals that all financial development, institutional indicators and control variables except growth rate are negatively and significantly[6] correlated with the shadow economy. Moreover, the independent variables do not strongly correlate with each other, which solves the multicollinearity problem apart from the financial development and institutional quality indicators; thus, we will include them in separate regressions.

[6] *P values are not reported due to saving space.*

Tablo: 3
Matrix of Correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) SE	1.00												
(2) FD1	-0.69	1.00											
(3) FD2	-0.42	0.44	1.00										
(4) FD3	-0.70	0.92	0.48	1.00									
(5) CC	-0.78	0.74	0.43	0.73	1.00								
(6) GE	-0.79	0.77	0.44	0.77	0.95	1.00							
(7) RQ	-0.74	0.74	0.43	0.73	0.92	0.95	1.00						
(8) RL	-0.81	0.76	0.44	0.76	0.96	0.96	0.94	1.00					
(9) PS	-0.64	0.56	0.35	0.55	0.77	0.76	0.74	0.79	1.00				
(10) VA	-0.54	0.58	0.31	0.55	0.77	0.78	0.81	0.80	0.65	1.00			
(11) GS	-0.54	0.41	0.13	0.44	0.58	0.56	0.54	0.58	0.48	0.50	1.00		
(12) TO	-0.31	0.28	0.59	0.35	0.36	0.37	0.39	0.35	0.42	0.14	0.00	1.00	
(13) G	0.03	-0.08	-0.02	-0.08	-0.07	-0.04	-0.06	-0.07	-0.03	-0.08	-0.26	0.07	1.00

Note: Autor's calculation.

Tablo: 4
Estimation Results

Dependent Variable: Informal Economy (IE)						
	1	2	3	4	5	6
FD1	-0.127*** (0.019)	-0.132*** (0.022)	-0.132*** (0.023)	-0.119*** (0.022)	-0.129*** (0.022)	-0.143*** (0.020)
CC	-2.000*** (0.586)					
GE		-1.239** (0.529)				
RQ			-3.107*** (0.747)			
RL				-4.250*** (0.431)		
PS					-1.889*** (0.325)	
VA						0.209 (0.546)
GS	0.438*** (0.051)	0.445*** (0.046)	0.447*** (0.046)	0.430*** (0.046)	0.438*** (0.041)	0.439*** (0.053)
TO	-0.038*** (0.009)	-0.036*** (0.010)	-0.036*** (0.010)	-0.040*** (.009)	-0.040*** (0.010)	-0.037*** (0.009)
G	-0.063 (0.036)	-0.063 (0.037)	-0.058 (0.040)	-0.056 (.037)	-0.057 (0.036)	-0.067* (0.037)
FD1* CC	0.027* (0.014)					
FD1* GE		0.026* (0.013)				
FD1* RQ			0.023** (0.010)			
FD1* RL				0.052*** (0.017)		
FD1* PS					0.032 (0.022)	
FD1* VA						-0.021*** (0.004)
Countries	67	67	67	67	67	67
Observations	1072	1072	1072	1072	1072	1072
Adjusted R2	0.26	0.26	0.27	0.29	0.27	0.26
F-statistic	604.93	138.95	100.35	176.19	145.27	86.02
Prob > F	0.00	0.00	0.00	0.00	0.00	0.00

*Note: Driscoll-Kraay robust standard errors are in parentheses. ***, **, * are significant levels at 1%, 5%, and 10%, respectively. Informal economy (IE) is the dependent variable. FD1 is domestic credit to the private sector. The interaction refers to the interaction term between FD1 and institutional variables.*

5. Empirical Results

Table 4 presents the analysis findings using six indicators of the institutions. In regression 1, corruption control (CC); in regression 2, government effectiveness (GE); in regression 3, regulatory quality (RQ); in regression 4, the rule of law (RL); in regression 5, political stability and absence of violence (PS) and finally, in regression 6, voice and accountability (VA) are used as the measure for institutional quality.

As expected, β_1(the coefficient of *FD*) is negative and statistically different from zero at the 1% level in all the models indicating that financial development decreases informality. This finding is consistent with Berdiev and Saunoris (2016), who highlighted the importance of financial development in reducing the size of the shadow economy. Therefore, financial development incentives economic agents to operate in the official economy and take advantage of easy access to credit.

Meanwhile, the coefficients for institutional quality indicators are negative and significant in all the models except for VA. That is to say that better institutions are associated with a smaller size of informality. Therefore, the development of institutional frameworks leads firms and individuals to operate formally.

The results for the control variables are in line with our expectations. The sign for the government spending is positive and significant at the 1% level in all the models implying that a larger government increases informality. More government spending, possibly resulting in higher taxes, could crowd out investment, distort resource allocation, and lead to a much larger shadow economy.

Trade openness reveals a negative and statistically significant impact at the 1% level in all the models, as would be expected. This finding suggests that higher trade openness leads to a smaller informal economy. This result is in line with the findings of Schneider et al. (2010). Finally, the growth of GDP per capita negatively affects the size of the informality even though the coefficient is insignificant at conventional levels almost in the models except for model 6. Thus, we do not observe clear evidence for the impact of growth on the informal economy.

To evaluate the overall influence of financial development on informality, we focus on the interactive terms between institutional indicators and financial development. The positive coefficients of the interaction term imply that institutions and financial development each have the maximum impact on the size of the shadow economy when the other variable is at its lowest level. We can observe that almost all the coefficients of the interaction terms are positive and statistically different from zero, regardless of the proxy for institutions except for VA. These findings show a significant substitution effect between these variables. Specifically, financial development has the largest impact on shadow economy operations when institutional quality is the lowest. In other words, in the absence of a sound institutional setup, financial development should diminish the negative impact of institutions on the

formal economy and vice-versa. On the other hand, better institutions might mitigate the negative effect of the low levels of financial development on informality. This substitution effect could be because some of the tasks associated with efficient institutions are also fulfilled by improvements in credit markets to decrease the shadow economy's size and vice versa. For example, economic agents might prefer to operate informally due to high transaction and information costs in the presence of inefficient institutions. However, a well-functioning credit market can alter their preferences by reducing these costs and thus compensate for inefficient institutions' deficiencies.

Tablo: 5
Estimation Results with Alternative Financial Development Measure (Liquid Liabilities)

Dependent Variable: Informal Economy (IE)						
	1	2	3	4	5	6
FD2	-.0131*** (0.025)	-.136*** (0.028)	-0.137 *** (0.029)	-0.118*** (0.025)	-0.130*** (0.024)	-0.171*** (0.033)
CC	-2.382*** (0.543)					
GE		-3.09*** (0.818)				
RQ			-5.018*** (0.982)			
RL				-5.501*** (0.560)		
PS					-2.825*** (0.532)	
VA						1.342** (0.618)
GS	0.437*** (0.053)	0.446*** (0.046)	0.465*** (0.046)	0.428*** (0.051)	0.441*** (0.046)	0.446*** (0.054)
TO	-0.039*** (0.013)	-0.039*** (0.013)	-0.038*** (0.013)	-0.043*** (0.012)	-0.047*** (0.014)	-0.038*** (0.013)
G	-0.049 (0.035)	-0.046 (0.037)	-0.041 (0.039)	-0.042 (0.035)	-0.044 (0.034)	-0.058 (0.036)
FD2* CC	0.033*** (0.010)					
FD2* GE		0.055*** (0.007)				
FD2* RQ			0.045*** (0.010)			
FD2* RL				0.068*** (0.014)		
FD2* PS					0.051** (0.022)	
FD2* VA						-0.041*** (0.012)
Countries	67	67	67	67	67	67
Observations	1072	1072	1072	1072	1072	1072
Adjusted R2	0.27	0.28	0.29	0.30	0.29	0.27
F-statistic	77.58	131.57	190.88	184.94	124.07	69.43
Prob > F	0.00	0.00	0.00	0.00	0.00	0.00

*Note: Driscoll-Kraay robust standard errors are in parentheses. ***, **, * are significant levels at 1%, 5%, and 10%, respectively. Informal economy (IE) is the dependent variable. FD2 is liquid liabilities (% of GDP). The interactions refer to the interaction term between FD2 and institutional variables.*

The estimations were conducted with two alternative financial development measures for robustness checks: liquid liabilities (FD1) and deposit money bank assets (FD2) as financial development indicators. The results of these estimations are presented in Tables 5 and 6. These tables are organised in the same way as the previous tables. It can be

observed that our results are robust to using different indicators of financial development and conform to our benchmark findings. Financial development is more effective in tackling informal economies in countries with low institutional quality. Similarly, efficient institutions are more effective in decreasing informality size, whereas the financial sector is inefficient. Therefore, they act as substitutes.

Tablo: 6
Estimation Results with Alternative Financial Development Measure (Deposit Money Banks' Assets)

Dependent Variable: Informal Economy (IE)						
	1	2	3	4	5	6
FD3	-0.109*** (0.019)	-0.116*** (0.020)	-0.113*** (0.021)	-0.105*** (0.020)	-0.115*** (0.021)	-0.133*** (0.019)
CC	-2.491*** (0.710)					
GE		-2.294*** (0 653)				
RQ			-3.798*** (1.042)			
RL				-4.830*** (0.552)		
PS					-2.892*** (0.459)	
VA						0.834 (0.557)
GS	0.493*** (0.058)	0.452*** (0.052)	0.445*** (0.051)	0.436*** (0.053)	0.445*** (0.048)	0.441*** (0.059)
TO	-0.048*** (0.008)	-0.048*** (0.009)	-0.047*** (0.009)	-0.051*** (0.008)	-0.055*** (0.009)	-0.047*** (0.009)
G	-0.061 (0.036)	-0.056 (0.038)	-0.053 (0.040)	-0.052 (0.037)	-0.051 (0.034)	-0.069* (0.038)
FD3* CC	0.038*** (0.011)					
FD3* GE		0.044*** (0.009)				
FD3* RQ			0.033** (0.011)			
FD3* RL				0.060*** (0.014)		
FD3* PS					0.049** (0.018)	
FD3* VA						-0.029*** (0.007)
Countries	67	67	67	67	67	67
Observations	1072	1072	1072	1072	1072	1072
Adjusted R2	0.28	0.28	0.28	0.31	0.31	0.27
F-statistic	274.53	216.29	507.58	246.50	119.12	99.99
Prob > F	0.00	0.00	0.00	0.00	0.00	0.00

*Note: Driscoll-Kraay robust standard errors are in parentheses. ***, **, * are significant levels at 1%, 5%, and 10%, respectively. Informal economy (IE) is the dependent variable. FD3 is deposit money banks' assets (% of GDP). The interactions refer to the interaction terms between FD3 and institutional variables.*

This paper suggests that in a policy design to reduce informality, it is crucial to identify whether the constraints stem from the financial or institutional framework and act accordingly. Therefore, this analysis suggests how the shadow economy might be reduced through the improved financial sector for countries with inefficient institutions. However, It is also worth emphasising that this study does not suggest that financial development and institutions act as perfect substitutes. Instead, it indicates that some of the beneficial effects

of institutions on information and transaction costs may come from a well-functioning financial sector.

6. Conclusion

Researchers discuss the phenomenon of the shadow economy and use several indicators to determine the factors that drive individuals and corporates to participate in the shadow economy. Of these, the impact of financial sector development and institutions on the informal economy has received considerable attention in recent academic studies. This paper exploits both these strands of the literature to explore if institutional quality has any role in moderating the impact of financial development on the shadow economy. In other words, we investigate if financial development and institutional quality work as substitutes for reducing informality. Assessing this relationship is important in determining the most appropriate resource allocation between these two factors. In a policy design to reduce the shadow economy size, it is crucial to identify whether the constraints stem from the financial or institutional framework and act accordingly.

This paper analyses the interactive effect of financial development and institutions on the shadow economy using data from 67 developing countries from 2002-2017. Results show that financial development impacts informal economy operations most when the institutional quality is the lowest. In other words, in the absence of a sound institutional setup, financial development mitigates the negative impact of institutions on the formal economy. On the other hand, a higher level of institutional quality is more effective in combating shadow economies in countries where the financial sector is less developed. More specifically, financial development and institutions work as substitutes in reducing informality.

Overall, this analysis provides evidence of how the shadow economy might be reduced through development in the financial sector for countries with inefficient institutions. Ultimately, we can propose two main policy recommendations based on this article. Firstly, countries with low institutional quality can use their resources in favour of financial development to combat informal economies. Secondly, in the markets of countries that are not yet financially developed, the size of the informal economies can be reduced by giving higher priority to institutions in using resources. The main reason behind this substitution effect may be that some of the duties associated with institutions are also fulfilled by financial development to combat informality and vice versa. For example, individuals and corporates might prefer to engage in underground activities because of the high transaction and information costs in the absence of sound institutions. However, a well-functioning credit market can change their preferences by reducing these costs and thus compensate for the deficiencies of inefficient institutions.

However, it is also worth emphasising that this study does not claim that financial development and institutions are perfect substitutes. Instead, it suggests that institutions' beneficial effects on information and transaction costs may come from a well-functioning

banking sector. Although this study may offer a few policy recommendations for the macroeconomic framework, it does not propose any precise microeconomic instruments for how the quality of institutions relates to the linkage between the shadow economy and financial development. There is a need for further analysis of individuals and firms in deciding whether to operate informally. Future work might consider this relationship at microeconomic levels.

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