Institutions and Economic Development: Informal Economy in Algeria

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Abstract

Since 1990, Algeria has implemented several economic reforms in order to improve the performance of the economy, and thus reach high growth levels. However, most of these reforms were not accomplished or even worse had led to other economic and social problems, such as unemployment, poverty, smuggling, tax evasion, etc. All these activities are gathered in one inclusive concept, which is the informal economy. Moreover, among the main drivers and the causes of this economy are the state formal regulations on economic activities. But what are of paramount importance are informal institutions, such as informal rules and social norms that are deep-rooted in the society's culture and are influenced by historical patterns, and thus take too much time to be changed.

The emphasis of this paper will be on the impact of informal institutions on economic outcomes, and that the government should take into account social norms as well as the formal institutions in order to reduce the costs of the transition process toward the market economy, such as the rising size of informal activities, etc.

Keywords: institutional economics, social norms, informal economy, bounds testing.

I. Introduction

Algeria, as many developing countries, has implied several economic reforms including baking system, exchange rate regime, the liberalization of trade and price, etc, aiming to achieve high growth rates and to increase the economic performance. However, these reforms had led to many other economic and social issues, such as unemployment, poverty, smuggling, tax evasion, etc, rather than improving the wellbeing of the citizens. These issues are gathered in the so-called "informal economy (IE)", and are all considered as the main causes to go underground and perform illegally.

Moreover, the informal economy became a controversial subject since its discovery by Keith Hart in 1970; where researchers, scientists and policy-makers attempt to find different ways to control its rising size and its effects on economic outcomes. Thus, measuring the size of these informal activities would help better understanding the functioning of the economy and help elaborating relevant and efficient policies to integrate the informal agents in the official economy.

There are several causes of the informal economy, among which: the economic and social institutions of the country that affect the economic agents' behavior. On the one hand, the impact of burdensome government regulations on economic activities that promote economic agents to hide underground, but on the other hand, the informal institutions; such as informal rules and social norms; that are deep-rooted in the society's culture, where the informal production is considered as one of the most pervasive forms of informal institution. (Dell'Anno 2010)

In this paper, our emphasis will be on the impact of institutions in shaping the incentives that promote the economic agents to conceal their activities, and thus, the main issue is to examine how the informal economy interacts with institutional settings and economic policies, which help better understanding the role played by institutions, stage of economic development and the IE. (Onnis 2011)

Where it is found that the existence of these informal activities limits the state capacity to provide strong institutions, and thus curb the expansion of the official economy[1] and elaborating efficient policies, and thus, forming a vicious circle.

Thus, policies or institutions that affect economic growth are expected to impact informality through indirect route. (Bhattacharya 2008)

The remainder of this paper is organized as follows. The first section gives the review of the literature on the institutions and informality, followed by empirical review on the researches that examine the relationship between informality and institutions and economic policies. In section three, we will illustrate the data and the methodology applied to investigate the paper issue in Algeria using the Autoregressive Distributed Lag (ARDL) model, and thus giving the main results and interpretations. Finally, some concludes and recommendations.

[1] L'activitée entreprenariale.

II. Literature review on institutions and informality

- **Defining the informal economy:**

As it is agreed by many researchers in this field, informal economy (IE) is a pervasive phenomenon in developing countries, and developed countries as well. As a result, several attempts to measure its size are undertaken in different countries in order to determine its main causes and to understand its mechanisms.

Furthermore, it is extremely difficult to define the IE because it differs according to the range, the different economic agents engaged in it, degree of compliance and it depends on the chosen method of measurement. All this clues make finding a common definition hard.

Hence, there are many criteria used in the definition of the NOE that it can be summarized in three sub-criteria: political (e.g. government regulation, national statistics, etc), economic (e.g. labor market, tax compliance, size of activity, registration of the activity), and social (social networks, etc).

The IE is therefore very heterogeneous and includes both legal activities; such as unreported income that would normally be reported in GDP and illegal activities including smuggling, fraud, and money laundering, in addition to the unproductive activities; such as: small-scale commercial activities, undeclared incomes to tax authorities.

For Smith (1994)[2], the IE is defined as "*market-based production of goods and services, whether legal or illegal, which escapes detection in the official estimates of GDP*". Besides this, the IE is generally defined as all value added activities that are not registered in the public authorities, in order to reduce the costs of production or seek to survive and meet their own needs. Feige (1989)

There are other studies that focused on the legal status of the activities, where the IE consists of all activities that did not comply with the rules of law and other burdensome government regulations that hampered the economic agents to run their businesses formally. (Feige (1990), (Hernando 1989)

And because the economic agent is rational, he chooses whether to be legal or not basing on the costs and benefits of being formal. (La Porta and Shleifer, 2008)

- **The driving forces of informality**

In another words, the main determinants of informality can be gathered in the following sub-categories: **economic** (as macroeconomic policies …), **political** (as corruption and rent seeking…) and finally the **institutional** (formal and informal institutions) which are the novel of this research.

Moreover, the impact of institutions was been neglected dimension for a long period of time because of the lack of reliable data on institutional quality measures, where the impact of social norms is of a paramount importance.

Institutions are generally defined as the "rules of the game", or "humanly-devised constraints that shape human political and social interactions". Since human

[2] Smith (1994) cited in Shneider and Enste (2000).

beings live in an uncertain world, they devise institutions to control their environment, to bring some certainty. Moreover, they are important for reducing transaction costs that arise while doing business and enforcing contracts, for improving information flows and enforcing property rights. (North, 1990)
Among the different classifications of institutions**,** we select the North's division, where he considered **Formal institutions** as the rules engaged in formal structures such as constitutions, political institution and property rights systems, while **Informal institutions** are largely self-enforcing through *mechanisms of obligation*, and they include: socially sanctioned norms of behavior (e.g. attitudes, customs, taboos, conventions and traditions), extensions, elaborations and modifications of formal rules outside the official framework. (Indra Soysa and Johannes Jutting 2007)

- **Link between informality and institutions, and economic policies (rethinking the IE analysis from an institutional perspective)**

There several school of thoughts that analyze the determinants of informality, **some of them** attribute the rising size of the IE to government size and its economic policies (Dessy and Pallage, 2001) and to tax burden, **while others** found that institutional quality and corruption have a major impact on economic outcomes, and thus on informal economy. (Schneider 2006), (Eric Friedman 2000), (SIMON JOHNSON 1998) and (Torgler and Schneider (2007)

The second school of thought is based on the legalist approach. This approach is emerged in over the years 80s and 90s, by the book of De Soto in 1989, where he interpreted the existence of the underground economy as a rational optimizing behavior of economic agents who seek for circumventing onerous government regulations[3] (in terms of taxes and bureaucratic regulations). Consequently, the lack of respect for the government regulations is the result of the inadequacy of these regulations to the economic and social context. This is why this approach is considered as representative to the NIE, where it pinpoints the role of institutions in the allocation of resources. (Feige, 1990)
Moreover, the complexity of these regulations leads to more amount of time and legal procedures to comply with them, besides corruption costs. The fact that economic agents go underground is because they are rational, and thus they calculate the costs and benefits of formality. However, informality also has costs, such as: the impossibility to access to advertising, bank's credits and public markets, in addition to the costs of corruption to police officers and of rent-seeking bureaucrats to remain informal. Thus, they will choose whether to stay formal or go underground, and they will choose the later. (Lautier. B.2004)
Thus, institutional design plays a crucial role in shaping the incentives to go underground, where both formal and informal institutions are important in reducing the costs of undertaking economic and social interaction between individuals and

[3] De Soto's analysis is based on the idea that all the informal agents are entrepreneurs.

raising the level of economic growth and social welfare, where the *development of underground activities* is the consequence of the gap between public policies and the institutional environment, *where each part of the underground economy reflects the different violated rules.*

According to Feige (1990), who stressed that when formal and informal institutions are complement and consistent, this will promote the agents' behavior to remain formal, whereas when formal institutions conflict with informal norms, this will raise the noncompliance with the formal rules and the informal institutions will dominate, and thus, the IE will be a pervasive issue to be resolved.

The previous thoughts fit with the point of view of *North and al, (2009)*, who found that to be developed economically requires economic organizations, enforcement of property rights and other contractual commitments**.** Besides, to be developed politically requires efficient rule of law and state control, where institutions; both formal and informal; generate and enforce rules of behavior (which structure incentives and constraints) and rules of procedure (means for modifying the existing rules). All of this pinpoints the need for improving the functioning of law and justice by the enforcement of contracts and the protection of property rights. (Schneider, Buehn and Montenegro, 2010)

Therefore, economic performance relies on both the formal and informal institutions and the compliance with them, so it is important to ensure efficient formal institutions that are complementary with the informal ones, in order to enforce property rights and reduce uncertainty and transaction costs, in order to promote economic growth and technological progress. All of this will specify efficient contracts among firms and their environment, where there are *strong formal rules*, such **as rules of law and courts** to enforce those contracts to increase the citizens' attitude towards the state, and *informal rules*; such as **trust and cooperation;** that are the basis for resolving conflicts.

III. Empirical Review on the link between informality and Institutions

Several researchers in the literature examine the link between institutions, government policies and informal economy, and thus, they link informality to a wide set of institutional quality measures and macro-economic aggregates. The following table (1) gives a synopsis of the main works that control for these related factors that affect informality directly or indirectly:

Table1: empirical evidences on informality and institutions

Authors	Data and methodology	Used variables	Main findings
SIMON JOHNSON et al. 1998	for 49 countries in Latin America, the OECD, and the former Soviet bloc.	**Institutional variables:** bureaucratic quality, rule of law index, property rights index, economic freedom, top marginal tax rate and Corruption. **Control variables:** GDP per capita.	-The unofficial economy accounts for a larger share of GDP when there is more corruption and when the rule of law is weaker. -The problem appears to be not regulation or taxation per se, but whether the state administrative system can operate without corruption. -A high level of regulatory discretion helps create the potential for corruption and drive firms into the unofficial economy.
Axel Dreher and Friedrich Schneider 2006	2002-2002, for 120 countries and a panel of 70 countries.	-Corruption, Log GDP per capita, measures for institutional quality and regulatory burden, tax rates and government revenues.	The shadow economy reduces corruption in high income countries, but increases corruption in low income countries. -The stricter regulations increase both corruption and the shadow economy. -The results also suggest that corruption and the shadow economy tend to be substitutes in high income countries, but complements in low income countries.
Diego Rei and Manas Bhattacharya 2008	N=111, developing countries	**Institutional variables**: labour market regulations index , index of regulatory constraints on business, index of workers' rights, an index of women social	The results from the income measure of informal economy suggest that the quality of governance has a primary role to play and the impact of strict regulation is generally overrated on shadow economy.

		rights, an indicator of the level of democracy in the political process, a set of Word Bank governance indicators. **Policy variables:** an index of the overall tariffs' level and an index of freedom of trade, the ratio of total trade to GDP, the ratio of FDI to GDP, index of sound money, the top marginal income tax rate and an index of the fiscal burden. **Macro-economic variables:** the ratio of gross fixed capital formation to GDP, the per capita GDP, the number of telephone subscribers per 1,000 people in the country, the % contribution of agriculture to GDP, the general government consumption expenditures to GDP, the percentage of gross primary education	

		enrolment and the total working population. **Fixed variables:** : a set of geographical dummies**.**	
Adalgiso Amendola y Roberto Dell'Anno, 2010	1990 to 2004, for 19 Latin American countries.	**Institutional variables:** economic Freedom Index: rule of law; labour regulation, freedom to trade internationall, access to sound money, top marginal tax rate, revenue from taxes on international trade as a percentage of exports and imports, transfers and subsidies to GDP. - C**ontrol variables:** [4]the human development index (HDI); the logarithm of GDP, Gini's index of income inequality	- To reduce constrains on the labour market and improve rule of law are the most effective policies to reduce SE. - At the contrary, fiscal policies seem ineffective to influence the size of the IE.

[4] The control variables listed in table 1 are able to take into account further potential causes of IE and reduce potential omitted variables bias.

		(Gini); the unemployment rate .	
James Alm and Abel Embaye, 2013	1984-2006, for 111 OECD and non-OECD countries.	-Quality of Bureaucracy and the Rule of Law indexes. **Control variables:** Lagged value of dependent variables (C/M2), tax rates, inflation rate, -Dummy variables.	-The results indicate a substantial shadow economy across countries, ranging from 10 to 86 percent of GDP, with some tendency to grow over time. -The shadow economy varies significantly by country income group. -We find that the currency to M2 ratio tends to be higher the higher the economic return from underreporting activities, the weaker the enforcement capacity of the tax administration, and the higher the inflation rate. -The currency ratio is also affected by per capita income, the interest rate, and the degree of urbanization.
Alberto Chong and Mark Gradstein, 2004	1970- 2000, for 57 industrial and developing countries.	- **Institutional variables:** government stability, corruption, rule of law, democratic accountability, and quality of bureaucracy quality, institutional freedom, labor regulations.	The results show a positive and statistically significant relationship between income inequality and the size of the informal sector. Thus, Countries with poor institutional arrangements appear to have larger informal economies, especially so when income is unequally distributed.

		- Inequality (proxied for Gini coefficients), and tax burden -**Macroeconomic controls**: GDP per capita, the rate of economic growth and the rate of inflation.	
Anoop Singh et all, 2012	100 countries, including Advanced countries, Emerging markets, and Developing countries.	**Institutional variables:** voice and accountability, political stability and the absence of violence, government effectiveness, regulatory quality, the rule of law, and control of corruption. **-Control variables**: the top marginal income tax rate , real per capita GDP and inflation rate. -Dummy variables related to geographical and historical.	-The size of underground economies is influenced predominantly by the quality of institutions, where better institutions are associated with a significantly lower share of the shadow economy. - Besides this, Countries with more corruption tend to have larger underground economies.
Luisanna Onnis	2000-2002, for high and low	**-Control variables:** the log	-The stage of development has a negative effect on the size of

and Patrizio Tirelli, 2011	income countries.	of per-capita GDP, the ratio of public expenditure to GDP. -**Institutional variables**: are proxies for the costs and benefits associated to formality, which are: rule of law, voice accountability, government effectiveness, political stability, absence of violence, regulatory quality and control for corruption.	the shadow economy. In addition to negative impact for indicators of institutional quality (such as measures of rule of law, government stability, democratic accountability and regulation of labour). -Public expenditure has also a negative impact on the shadow economy.
Moham mad Javad Razmi, Moham mad Ali Falahi, & Samane Montazer i , 2013	1999-2008, for 51 OIC member Countries.	-**Institutional variables:** control of corruption , political stability and rule of law. -control variables: the growth rate of GDP per capita and Economic freedom respectively.	-There is a negative relationship between the mentioned institutional quality indicators and size of underground economy. The results also confirm that with larger size of formal economy and more freedom of individuals and firms, the smaller size of underground economy is expected.

Source: author's construction.

Main findings:

After highlighting the main papers that investigate the relationship between informality and institutions and economic policies in the table mentioned above, we will summarize their main findings in the following points, which will help us later in the foundation of our model.

As to the **measures of institutional quality**: it is agreed that political, economic and social institutions are the main drivers of the rising size of informal activities. Strict *labor market regulations* increase the size of informal employment, even if these hiring and firing regulations are created to protect workers, but are onerous and thus, they encourage firms to hide. Hence, higher inflexibility in labour regulations (i.e. the labor rigidities**)** is positively associated with a larger hidden economy. (Anoop Singh 2012), (Krakowski 2005) and (Chong 2004)
Besides this, variables as *rule of law,* including strong property rights, *democratic accountability and political or government stability* affect negatively the IE, while there is a positive relationship between *protection of workers' rights* and the IE. (Onnis 2011), (Mohammad Javad Razmi 2013) and (Eric Friedman 2000)
Moreover, the variable for *duration of starting a business* shows a significant influence on the size of the informal economy, in addition to *higher barriers to trade* that increase corruption and thus, ancrease the IE, because when economic agents face more severe restrictions engage in bribery to pursue their business. (Schneider 2006) and (Krakowski 2005)
Concerning, the *index for government effectiveness* has a strongly significant influence on the IE, where more efficient government reduces the relative size of the informal activities through better rule of law, thus increasing the advantages of working in the formal sector. (Krakowski 2005)
Coming to the role of *control of corruption or of the quality of public administration,* it has a big impact on the IE, where the best quality public administrations reduce the size of this economy. (Bhattacharya 2008)
Also, it is found that corruption and IE are substitutes in high-income countries, where corruption and the shadow economy are significantly smaller with better rule of law, greater government effectiveness, more judicial independence, impartial courts, and higher integrity of the legal system. (Schneider 2006), (Mohammad Javad Razmi 2013)
In low-income countries, corruption and IE are complements, where corruption is needed to remain informal and to avoid the detection of tax authorities. This is occur when corruption is a pervasive phenomenon in addition to the lacks of transparency and accountability, and thus, paying taxes cannot be accepted as a social norm, which undermine the willingness of citizens to pay taxes. (Hindriks et al. 1999), (Johnson et al. 1997)
In sum, a causal link is running form week and poor institutional quality towards the IE, because burdensome government regulations and high level of corruption promote individuals to go underground , which decrease the tax revenues, and thus, affect the

quality of public administration and lead to more informal activities, forming a vicious circle. (Eric Friedman 2000)

As regards to the impact of **state economic policies** on the IE:

It is found that the size of the government helps to reduce informality, where *government consumption, trade* (as percentage of GDP) and the *level of FDI* influence positively informality, where the stronger trade freedom or openness of the economy, the higher the size of the IE. (Dell'Anno 2010), (Bhattacharya 2008) and (Onnis 2011)

Furthermore, the *money index* affects positively the IE, where the inflation rate is among the determinants of IE because it increases the lack of trust in the government policy and the tax burden. (Chong 2004), (Dell'Anno 2010)and (Alm 2013)

In addition to that, the GDP per capita and economic growth affects negatively the size of the IE. (Chong 2004), (Onnis 2011) and (Mohammad Javad Razmi 2013)

According to Tanzi, 1999, *the unemployment rate* is weakly related to the IE, because of the heterogeneity of the labor force in the IE, where a part of this labor force include official unemployed individuals, another part include informal workers consists of retirees, minors, and homemakers, besides of those individuals who have both official and informal jobs.

As to the impact of *taxation*, there are two points of view. The first one did not contribute informal economy to tax burden, because high tax rates increase the government revenues, and thus, ameliorate the quality of public goods and services, including an efficient legal system, which encourage individuals to remain formal. The second point of view considers the tax burden as the main driver of informality, because of the onerous tax rates and administration. (Eric Friedman 2000), (Schneider 2006), (Bhattacharya 2008) and (Anoop Singh 2012)

In sum, countries that have higher tax rates but week enforcement mechanisms have large size of informal activities. (Alm 2013) And (Chong 2004)

IV. Institutional framework in Algeria

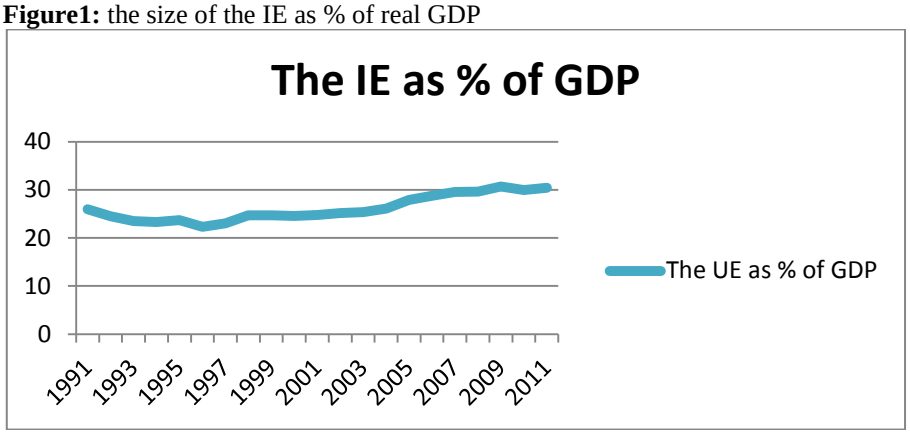
Algeria as many developing countries has suffered from the rising size of the informal economy over a long period of time. Thus, several researchers attempted to estimate and interpret the reasons behind the existence of these kind of activities, where some considered it as "petty commodity production" which focuses on the development of small-scale activities and different forms of employment (caregivers, apprentices, work at home and multiple activities). Others called it as "parallel economy" in the period of state-led economy, where is includes parallel activities resulting from the inefficiency of the public regulations, such as: production in black market, distribution and import-export, foreign exchange. (Henni, 1991)

And others extended the informal economy to include illegal activities particularly in the period of the transition to market economy, where the legalist approach is introduced to understand the behaviors of illegal economic agents who seek to maximize their profit by the circumvention of the government regulations. (Henni, 1991, Bounoua, 1999, 2002b)

Even each one of them has a different interpretation of the informal economy; all of them agreed that it kept raising especially in these last decades, and this is due to the weak institutional framework and inefficient economy and social policies of the government especially after *the transition towards the market economy*, where good institutions are of paramount importance in protecting property rights, insure economic performance and cooperation among the society's citizens.

Moreover, our estimate of the informal economy in Algeria using the MIMIC (Multiple Indicators, Multiple Causes) approach confirmed the rising size of the informal economy, and that its main causes are: unemployment rate, inflation rate, minimum wages (labor market restrictions) and government expenditures that we used as a proxy variable of institutional measures. The following graph exhibits the size of the IE as percentage of real GDP:

Figure1: the size of the IE as % of real GDP



Source: Bounoua and Bouanani, 2013.

We can see from the graph above that the size of the informal economy follow an upward and downward trends during the sample period 1990 - 2011, starting from 26% of real GDP in 1991 till 30% of real GDP in the year 2011.

The downward trend of the informal economy (i.e. from 1991 to 2004) is due to the rising size of the rising size of the tax burden and unemployment rate in this period that force the individuals to go underground in order to improve living standards and reduce poverty, besides the falling of the GDP per capita and the crude oil prices that aggravate the economic and social situations of the Algerian economy.

We believe that the rising size of the informal economy is due in the first place to the weak institutional framework of the business environment that contains some inadequate regulations for creating businesses whether the procedures, time or costs, in particular: Starting a Business (164), Dealing With Construction Permits (147), Getting Electricity (148), Registering Property (176), Getting Credit, (130)Protecting Investors (98), Paying Taxes (174), Trading Across Borders (133), Enforcing Contracts (129) and Resolving Insolvency (60). *(World Bank, Doing Business 2014)*

In this perspective, we can see that starting a business in Algeria is a lengthy, bureaucratic and difficult process to engage in, which promote economic agents to go underground. According to the *economic freedom's indices*, property rights and freedom form corruption in Algeria is about 30 and 28.7 respectively; which reflects the rule of law or courts are slow, and thus, the enforcement of legislation, trademarks, patents and protection of property rights are inconsistent because of the corruption and rent-seeking activities of bureaucrats.
As to fiscal freedom and government spending are about 80.5 and 51 respectively; which reflects that the government spending kept rising about 43.1 percent of GDP and also the tax burden is about 10.4 percent of total domestic income.
As to the regulatory efficiency, business freedom, labor freedom and monetary freedom amount to 66.3, 48.3 and 67.8 respectively; which reflects that the labor market regulations remain rigid and thus contribute to the high level of unemployment.

To sum up, the rising size of the informal economy is the result of many social and economic phenomena, among which the weak institutional settings and inefficient economic policies. In the following section we will investigate empirically the impact of those policies on informality.

V. Model and econometric methodology

- **The model presentation and description of variables**

In this section we will use econometric approach to examine the link between informal economy (IE) and institutions and economic policies in Algeria, and thus, assess their impact on the rising size of the IE. To do so, we will use the Autoregressive Distributed Lag model (ARDL) to co-integration over the period 1995 till 2011.
For the explanatory variables, we will use a set of institutional variables most used in the literature to capture the impact of the different dimensions on informality: fiscal, monetary, regulatory and institutional, in addition to a *policy or macro-economic variable* that reflects the stage of development: GDP per capita.
The sources of the database are World Bank governance indicators and Heritage foundation indicators[5], in addition to our measure of the informal economy in Algeria using the MIMIC model.

[5] The **Worldwide Governance Indicators** include six broad dimensions of governance: *Voice and Accountability; Political Stability; Government Effectiveness; Regulatory Quality; Rule of Law; Control of Corruption*, where each series is constructed so that an increase in the value of the indicator represents an amelioration of the underlying concept.
As to the **Heritage Foundation indicators**, there are seven variables that are gathered to form an index of economic freedom; which are: *business freedom, fiscal freedom,*

- **Estimation and interpretation of the estimation results**

As it is mentioned earlier, we will examine the long run relationship between IE and the institutional and policy variables and their impact on the rising size of the IE.

First of all, we need to test for the presence of unit root using the ADF stationarity test to avoid any spurious regression. The null hypothesis is that the variable in question has a unit root (i.e. it is non-stationary), which is tested against the alternative hypothesis that the variable has no unit root (i.e. it is stationary). The table (2) exhibits the stationarity results:

Table2: Unit root test results (sample period: 1995- 2011)

variable	ADF. test				Order of integration I(d)
	level		1st difference		
	intercept	Trend and intercept	intercept	Trend and intercept	
Size of Informal economy (as% of GDP)	-0.1316	-1.606	-4.726	-4.449	I(1)
Log GDP capita	-0.599	-1.833	-2.406	-5.848	I(1)
Corruption index	-1.587	-3.606	-2.752	-2.853	I(1)
Voice and accountability	-1.258	-1.564	-3.191	-3.238	I(1)
Gov. effectiv	-1.853	-1.134	-3.638	-3.743	I(1)
Regulation	-4.009	-5.142	/	/	I(0)
Rule of law	-1.541	-1.165	-3.689	-3.852	I(1)
Labor freedom	-1.670	-2.113	-2.910	-3.018	I(1)
Fiscal freedom	-0.657	-2.847	-3.669	-3.751	I(1)
Business freedom	-1.657	-1.439	-3.562	-3.556	I(1)
Money freedom	-1.580	-0.378	-2.396	-3.255	I(1)
P.rights freedom	-1.322	-1.581	-3.872	-3.851	I(1)

trade freedom, monetary freedom, financial freedom, investment freedom and property rights.

Source: author's construction basing on EVIEWS 6 software. The critical value in level is (-3.065) at 5%, and in first difference is (-3.081) at 5%.
As is clear from the table, the ADF test suggest that the levels of all variables contain unit roots and are thus non-stationary in their levels. The non-stationarity is removed when the variables are converted to first differences; which means that all of these variables are integrated of the first order, denoted as I (1) except for the variable Regulation that is I(0).

After testing the explanatory variables, we will apply the bounds testing of the ARDL approach to examine co-integration relationship between the variables.

The ARDL model uses the lags of the dependent variable and the lagged values of the explanatory variables to estimate the short run and long run effects. There are many advantages of using this model: it can be applied to small sample sizes, and it can be employed whether the underlying variables are I(0) or I(1). (H. PESARAN 2001)

Moreover, the ARDL model is applied in two steps for estimating the long run relationship. As two the first is to examine the existence of long run relationship among the used variables. Then, the long-run coefficients are estimated using the OLS estimation method.

Mathematically, our model takes the following form:

$$IE = \alpha + \lambda_1 IE_{t-1} + \lambda_2 IQ_{t-1} + \lambda_3 LPGDP_{t-1} + \sum_{i=1}^{q} \varphi_1 \Delta IE_{t-i} + \sum_{i=1}^{k} \varphi_2 \Delta IQ_{t-i} + \sum_{i=1}^{k} \varphi_3 \Delta LPGDP_{t-i} + \varepsilon_t \quad . \qquad (1)$$

Where:
IE: informal economy as % of GDP.
IQ: institutional quality measures.
LPGDP: log GDP per capita.
And the parameters λ1, λ2 and λ3 are the long-run parameters, φ1, φ2 and φ3 are the short-run dynamic coefficients of the ARDL model, and ε_t are white noise errors.

Furthermore, the long run relationship is examined basing on F-test for the significance of these coefficients, where the null hypothesis of "non-existence of the long-run relationship" is defined by:
H0 : λ1 = λ2 = λ3 = 0.
H1: λ1 ≠ λ2 ≠ λ3 ≠ 0.
These hypotheses are examined using the standard Wald test basing on the F-statistics. If the calculated F-statistic is greater than the critical values, then the null hypothesis will be rejected, which means that there is a co-integration relationship among the variables.

In this paper we will estimate two versions of the model of the impact of institutional quality measures on informal economy (IE), using in the first the World

government indicators, and in the second alternative measures of institutional quality from Heritage Foundation Indicators. The rest of variables included are the same. The following table shows the results of Wald test of co-integration for the two versions of the equation (1):

Table 3: Co-integration Test (dependent variable IE)

Equation (1)	**F. Stat**	**Critical bounds value of the F-statistics**			
		1% level		5% level	
		I(0)	I(1)	I(0)	I(1)
Version (1)	32.936 (0.0297)	3.15	4.43	2.45	3.61
Version (2)	20.86 (0.0464)				

Source: author's calculations. Critical Values are from table C1 iii, case III in Pesaran et al. (2001).

As seen in Table above, the calculated F-statistic for our equation exceeds the corresponding upper critical bounds value at the 1% and 5% significance level. Therefore, we reject the null hypothesis of no co-integration, which means that there is a long-run relationship between the explanatory variables and the dependent variable for the two versions.

After confirming a long run relationship between the variables of our ARDL model for the two versions, we should select the appropriate lag order of the used variables to obtain the conditional restricted ARDL model; which will help to correct for the autocorrelated residuals and the problem of endogenous variables, and because our model has a small sample size, the lag order of one is used, so that our model is ARDL (q =1, K_j =1).

- **Estimation of the Long-Run Relationship**

In order to estimate the long-run parameters λ1, λ2 and λ3, we will apply the OLS method to the conditional ARDL (1, 1) long-run for the two versions, as follows:

$$IE = \alpha + \sum_{i=0}^{q} \lambda_1 IE_{t-1} + \sum_{i=0}^{k} \lambda_2 IQ_{t-1} + \sum_{i=0}^{k} \lambda_3 LPGDP_{t-1} + \varepsilon_t$$

Table 4: Estimation of long-run coefficients (dependent variable IE)

Variables	Version (1)		Variables	Version (2)	
	Model 1	**Model 2**		**Model 1**	**Model 2**
Lagged IE $_{(t-1)}$	0.230265 (0.195916)	/	Lagged $IE_{(t-1)}$	0.247054 (0.264778)	/
$CORRUPT_{(t-1)}$	-4.986301 (1.599407)**	-4.470083 (1.54066)**	$LABOR_{(t-1)}$	0.456025 (0.252689)	0.599139 (0.102924) **
$EFFECTIV_{(t-1)}$	2.074063 (1.897535)	/	$BUSIN_{(t-1)}$	0.0004 (0.199231)	/
$Voice_{(t-1)}$	1.279604 (0.43621)**	1.200901 (0.426021)**	$MONEY_{(t-1)}$	-0.001971 (0.053079)	/
$REGUL_{(t-1)}$	0.738527 (0.86735)	/	$PRIGHTS_{(t-1)}$	-0.029515 (0.045882)	/
$RULE_{(t-1)}$	-1.489999 (1.091478)	-1.024534 (0.71958)***	$FISCAL_{(t-1)}$	0.133805 (0.053782)**	0.199082 (0.013714) *
$LPGDP_{(t-1)}$	27.70056 (6.246008)*	34.50974 (2.754449)*	$LPGDP_{(t-1)}$	/	/
Constant	-110.1607 (25.94772)*	-137.2647 (13.57887)*	Constant	-12.45148 (13.66251)	-19.32315 (5.684276) *
Model diagnostics					
R-squared	0.98	0.97		0.96	0.95
Adjusted R-squared	0.97	0.97		0.93	0.94
Prob (F-statistic)	0.000001	0.00005		0.00008	0.00007

Source: author's calculations. *, **, *** mean significant at 1%, 5% and 10% respectively.

The table above exhibits the coefficients of the long run relationship for the two versions of our ARDL model. All the estimated models goodness of fit are high, which reflect the statistically significance of all regressors.

As to first version of the equation (1) that includes the World Governance Indicators, we found that only corruption, voice and accountability, rule of law and GDP per capita have an impact on the rising size of informal economy, besides this none of these variables have the expected sign except for the variable rule of law where an increase of rule of law by 1% will decrease IE by 1.48 %.

As to the second version that include the Heritage Foundation indicators, the estimation results show that only labor and fiscal freedom effect the rising size of IE, where an increase in labor and fiscal freedom by 1% will rise the IE by 0.59 % and 0.19 % respectively.

Moreover, in all the estimated models the IE is not affected by its previous value.

To sum up, even the high level of the goodness of fit of all the estimated equations, some variables that are the main causes of informality have not the expected sign; or worse; have no impact on informality, this is due to the small size of the estimation period or the existence of other variables that have been excluded in our model such as informal institutions that have a great impact on the IE.

VI. Conclusion

In this paper we attempt to examine the link between informality, institutions and economic policies; where we found that labor market restrictions, tax burden and rule of law are the main drivers of the rising size of informal activities.

Furthermore, there are other institutional quality measures that affect informality but are not significant because of the small sample size of our econometric study or the existence of other variables that are not included in the model.

Among those variables, we have corruption. Even that the main reason for the deterioration of Algeria's business climate is corruption; where it is widespread at all levels of the public sector as a result of low wages and difficult living conditions; it is significant but has not the expected sing in our model.

On the basis of these results, the increasing size of the underground economy is due to the labor market restrictions and inefficient and corrupt formal institutions that hinder the development of the formal economy, in addition to the inefficient social and economic policies that reflects the state tolerance of informality as a result of its incapacity to create jobs and provide social services.

In this perspective, the main recommendation of this paper will be the introduction of other relevant variables, such as informal institutions and social norms in the elaboration of the economic policies in order to reduce the costs of transaction towards market economy, increase the performance of formal economy, and thus reduce the size of informal activities.

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