Legal Structures and the Informal Economy in Sub-Saharan Africa

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Abstract

Building on previously existing literature relating to the impact of legal structure on a country's economy, this paper looks at how the distinction of common versus civil law tradition impacts informal economies of Sub-Saharan African (SSA) countries. Specifically, it considers how legal tradition correlates to the (1) overall size and (2) size as a proportion of certain sectors of SSA countries' economies. Using both direct and modeling data on informality and Ordinary Least Squares (OLS), multivariate, and truncated regression analysis, this paper finds significant and positive correlation between civil law and agricultural informality (significant and negative for common law), fitting with the model's predictions based on historical colonial legacies. The relationship between nonagricultural informality and civil law is found to be less significant, but still positive (negative for common law), while the relationship between legal tradition and the size of SSA countries' informal economies overall seems to be negligible and insignificant.

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I. Introduction

Almost all new economic activity in Sub-Saharan Africa (SSA)[3] is informal, rather than registered under the jurisdiction of formal regulation.[4] In fact, 80% of labor in the SSA is informal, whereas, throughout the world as a whole, the figure is around 66%.[5] As a region, what defines SSA that makes informality so prevalent? Are the contributing factors for nonagricultural informality versus agricultural informality more similar or more different? Is there some influencing factor that can explain these nuances?

Arguably, legal structure[6] can explain this trend and its variations in SSA. Legal traditions influence how individuals shape their livelihoods and engage in their economies—those formal and those informal. While a subsection of literature in law and economics is devoted to how legal structures impact various aspects of the economy, and while some of these studies have looked at informality in particular, this paper specifically considers how the varying legal traditions of SSA countries have influenced the size and composition of informal economies.

The influence of legal structure on the informal economies of SSA countries is a much more complex and involved study than a simple exercise in descriptive development economics, and it has broad historical, political, and cultural implications. The SSA region is one marked overall by colonial interference in both political and economic structures, despite the significantly varying ways in which colonial powers interfered—different colonizers had disparate goals for their colonization efforts, and achieved these goals in different ways. On the whole, though, colonial powers' seeking to define and control the economies of their colonies has contributed to how countries in SSA experience informality today. This is a particularly salient study, given that a large percentage of both the overall economy and new jobs created within these economies are informal.

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3 Sub-Saharan Africa is defined by the United Nations Statistics Division as region comprised by Eastern, Western, and Southern Africa, or all of Africa excluding the Northern African Region. The entire list of countries in Sub-Saharan Africa can be found here: http://unstats.un.org/unsd/methods/m49/m49regin.htm#africa

4 90% of all new economic activity in SSA is informal. (Xaba, Jantijie, Pat Horn, and Shirin Motala. "The Informal Sector in Sub-Saharan Africa." ILO Working Paper on the Informal Economy (Geneva; 2002/10))

5 African Development Bank Group (2010) http://www.afdb.org/en/blogs/afdb-championing-inclusive-growth-across-africa/post/recognizing-africas-informal-sector-11645/; Sparks, Donald L. and Stephen T. Barnett "The Informal Sector in Sub-Saharan Africa: Out of the Shadows to Foster Sustainable Employment and Equity." International Business and Economics Research Journal (May 2010) Vol. 9 No. 5. https://datapro.fiu.edu/campusedge/files/articles/barnetts3107.pdf

6 For the purposes of this paper, "legal structure" specifically refers to extant legal regulations and frameworks, while "legal traditions" refers more generally to the historical basis of legal systems and their philosophical/coe of origin (i.e. common law tradition vs. civil law tradition).

This analysis uses univariate, multiple, and truncated regression models to isolate the impact of legal structure on informality, in both the size and composition of SSA informal economies. It is found that: (1) civil law traditions are positively and significantly correlated with the proportion of agricultural informality across SSA; (2) civil law traditions are, slightly less significantly, but also positively, correlated with proportion of nonagricultural informality: and, (3) there seems to be little significance to the relationship between legal structure and the overall size of informal economies in SSA.

II. Literature Review

The literature relevant for this study is found at the intersection of development economics, labor economics, and law and economics studies. While the literature has tentatively determined a relation between legal structures and the size of the informal economy, this paper focuses the analysis to see if this is true of SSA as a singular region, and also extends the study to test whether legal origin additionally influences the composition of SSA informal economies.

Origins of the informal economy in colonialism:

On the whole, West Africa and East Africa had more previously-established trade networks and trade infrastructure than Southern African regions at the beginning of the colonial era. Trans-Saharan trade in salt, gold, and slaves, and interaction with Islamic trade networks, had been in existence long before colonization took place. This was important for how informality emerged during and continued after the colonial period. Colonial powers were broadly interested in formalizing the parts of their colonies' economies that were most profitable to them. This was, in the majority of instances, tradable goods and natural resources, rather than any type of subsistence farming or localized trading of services.

C. Magbaily Flye studied how such trends influenced the development of the informal economy specifically in West Africa. He notes that the colonial-era West African population was more interested in products like food items and clothing than their trade-focused colonial governors were. This meant that the production and markets for these good and services remained intact, under the radar of formal colonial governance structures, which in turn set up the beginnings of the informal economy in West Africa.[7]

East Africa had a similar experience because of its position on the other side of trans-Saharan trade networks. However, Southern Africa was not as integrally linked to such trade routes. Therefore, in this region, less of a marked

7 Fyle, C. Magbaily. "Indigenous Values and the Organization of Informal Sector Business in West Africa." Black Business and Economic Power. Edited by Alusine Jalloh and Yoyin Falola. (The University of Rochester Press: Rochester, NY; 2002) p 29-40

distinction between "traditionally" informal and "traditionally" formal economic activity can be seen, as there was not a specific industry or sector in which the colonizing power was interested. This analysis is important for consideration largely because geography is linked to colonial rule (French in West Africa, English in Southern Africa), which obviously is then in turn associated with legal tradition. This specifically is influential in the analysis of how legal tradition determines informal economies' compositions.

Definition of "informality":

While there are certain conventions utilized in an effort to standardize the study of informality, a coherent definition of informality is still elusive. Different authors include a variety of types of work/firms in their classification of "informal," and this necessarily impacts any results of their study.

In 1973, Keith Hart published a study of the Ghanaian economy,[8] which has been since noted as the first acknowledgement of the existence of informal economic activity. This study was explicitly conducted within the context of development economics, however, since then, the topic has also been looked at from the perspective of labor economics. Hart defined informality specifically as economic activity outside the scope of governmental regulation.[9]

The International Labor Organization (ILO) employs a matrix methodology to define informality. Their definition includes both informal activities within "formal" firms, as well as informal firms themselves, and this is the definition to be used in this analysis. Specifically, the characterization of "informality" as employment in the unofficial economy utilized in La Porta, et. al (2007)[10] study is adopted for this paper's analysis of informal economies' size. This allows the study's measurement to account for informal work in both formal and informal firms.

Measurement of informality:

Whichever way the "informal economy" is defined impacts the methodology chosen to measure the informal economy and what to include within that measurement. Framing the question of informality in terms of the ILO's spectrum suggests that using labor data, as opposed to firm data, to formulate measures of the informal economy makes more sense.

The three main methodologies for measuring the informal economy are

8 Hart, Keith. "Informal Income Opportunities and Urban Employment in Ghana" The Journal of Modern African Studies, Vol. 11, No. 1 (Cambridge University Press: London, England; Mar 1973), p 61-89 http://www.jstor.org/stable/159873

9 Hart (1973)

10 La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer. "The Economic Consequences of Legal Origin." Working Paper 13608 NBER (2007)

direct measurement, indirect measurement, and modeling. Direct measurement includes both surveys and tax audit reports.[11] Indirect measurement backs out the size of the informal economy by using the observed discrepancies between income and expenditure in macroeconomic measurements or labor force and formal employment, or by calculating currency demand, electricity consumption, etc.[12] The third method is modeling, and the decisive papers using modeling techniques to determine the size of different countries informal economies have been written by Fredrich Schneider. In "Shadow Economies in 145 Countries," and the follow-up papers he wrote on the same subject, Schneider uses Multiple Indicators Multiple Causes (MIMIC) modeling to calculate the percentage of economic activity in a given country that is informal.[13] The MIMIC methodology uses a Structural Equation Model (SEM). The SEM uses covariance matrices to measure the relationship between observed and unobserved variables, in this case the size of the informal sector being the unobserved variable. While modeling has several advantages methodologically over either direct or informal measurement, it is still based on conjecture, if highly mathematical conjecture, as the MIMIC model is estimating parameters indicating a relationship for an unobserved variable.[14]

While this paper focuses on macroeconomic measures of informality, for several reasons discussed below, the analysis of informality on a micro level is also of note. While the macroeconomic study of informality focuses on broad structural factors, microeconomic analysis of the individual informal versus formal decision identifies three separate margins: the intrafirm margin, the firm intersectoral margin, and the worker intersectoral margin.[15] The intrafirm margin considers the decision within a firm as to whether they will adhere to various governmental regulations—underreporting and tax evasion are the types of informal activity considered on this margin. The firm intersectoral margin looks at what influences the decision of a firm as a whole to register and follow the law or to operate in the informal economy. The worker intersectoral margin considers the same choice, but on the level of the individual, choosing whether to engage in formal or informal labor hours.

Microeconomic informality analysis frames the decision between informal and formal economic activity, as determined by both exclusion and exit

11 Oviedo, Ana Maria, Mark R. Thomas, and Kamer Karakurum-Ozdemir. "What is Informal Economic Activity?" Economic Informality: Causes, Costs, and Policies—A Literature Survey. (The World Bank: Washington, DC; 2009)

12 Ovieda, Thomas, and Karakurum-Ozdemir (2009)

13 Schneider, Friedrich , Andreas Buehn, and Claudio E. Montenegro. "New Estimates for the Shadow Economies all over the World", International Economic Journal, 24: 4, p 443-461 (2010)

14 Schneider, Buchn, Montenegro (2010)

15 Perry, Guillermo E., William F. Maloney, Omar S. Aria, et al. Informality: Exit and Exclusion. (The World Bank: Washington, DC; 2007) p 25-27

factors, on an individual level.[16] The more traditional approach to informality framed it as a matter of "exclusion." In this view, informality is characterized as the refuge of the underemployed. The decision to operate within the informal economy is framed as the result of being forced out of the formal sector, due to inefficiencies/non-clearing in the labor market.

The "exit" view of informality takes into account the more dynamic aspects of the informal economy and allows for an individual to participate more voluntarily in both formal economic activity and informal economic activity or to switch between the two. In the exit view, individuals might choose to leave the formal economy for the informal economy if they see governmental regulations as too burdensome for their business, or if they perceive their chances of as well off or better off in the informal economy as opposed to the formal (despite the potential risk of being caught and punished). The exit formulation sees informality less as a forced condition and more as an individual decision to operate outside the rule of (potentially ineffective) law.[17]

While the micro level is an interesting and relevant area of study, for this research question, the paper instead focuses on how macro structures shape the decision that individuals face. Legal origins influence economic structures on a very broad scale. Specific policies or circumstances likely to be the driving decision for an individual's or an individual firm's participation or non-participation decision, i.e. microeconomic decision-making, are likely to be found across legal traditions, while higher level policies or economic structures liable to influence macroeconomic level indicators are more characteristic of legal traditions overall. Therefore, it is an easier and more intuitive exercise theoretically to examine the relationship of macroeconomic informality, as opposed to microeconomic, but it is also more intuitive, and possible, to do so empirically as well. A microeconomic study of the effect of a legal tradition on participation in the informal sector would be challenging, as such a study would present the challenges of correcting for different situations and circumstances across individuals—a panel data set would be required, in order to fix the inability to move certain individuals across countries/legal systems, which would be challenging because the informal sector is highly fluid, meaning that measurement of specific individuals or firms over time would be difficult. A macroeconomic study does not completely erase these challenges, however the level of analysis allows for easier data analysis, in addition to being more theoretically compelling for such a model as well.

Informality and Legal Structure:

16 Perry, et. al (2007) p 1-19
17 Perry, et. al (2007) p 43-45

Rafael La Porta, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny began looking at how legal structures influence a country's economy in their cross-country analysis published in 1999.[18] This study of how legal code determines investor protection measures began a multi-faceted, and much-debated, series of papers on how legal tradition influences economic structures. In these studies, the authors develop what they call the "Legal Origins Theory."

Legal Origins Theory asserts that legal tradition has a distinct and significant impact on a country's economic structures. In other words, legal tradition is more than just a representation of certain economic policies—ceteris paribis, a difference in legal heritage is a determining factor in its own right. The authors contend that legal structure is "a style of social control of economic life,"[19] and, in this way, determines how individuals interact with economic markets and rules.

Methodologically, in order to define a country's legal origins, the authors look at the presence or absence of certain provisions, to match the country with a broad legal tradition. The two main characterizations are civil and common law traditions, but these, particularly civil law, can be broken down further (German Civil Code, French Civil Law, etc.) Legal Origins Theory most generally claims that civil law ("policy-implementing") traditions are associated with higher levels of governmental regulation, whereas common law ("dispute-resolving") traditions are associated with less regulation and more governmental support of free market policies.[20]

The authors, after publishing their first paper on legal origins and investor protection, extended their analysis to determining how legal structure shapes other economic factors, including regulation and employment in the "unofficial economy."[21] They found, using a cross-country regression, including the natural log of GDP per capita, that: (1) civil law is significantly correlated with higher levels of government regulation of firm entry into the formal economy, as compared to common law tradition, and (2) higher levels of government regulation of entry into the formal economy are significantly correlated with higher levels of employment in the unofficial economy.

This second finding supports de Soto's seminal hypothesis, put forward in his 1989 book *The Other Path*,[22] that regulation drives individuals away

18 La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny. "Investor protection and corporate governance" Journal of Financial Economics 58 3-27 (1999)

19 La Porta, et. al (2007) p 3

20 La Porta, et. al (2007) p 4-5

21 La Porta, et. al (2007)

22 De Soto, Hernando. The Other Path: The Invisible Revolution in the Third World. (Harper & Row: New York, NY; 1989)

from the formal sector and forces them to operate outside of legal structures. This is further supported by various other studies,[23] particularly in Loayza, Oviedo, and Serven (2006). This study makes the important contribution of adding an interaction between governance quality and regulation, rather than just controlling for the simple level of regulation. Rita Almeida and Pedro Carneiro extend this analysis to labor market regulation, and find that, despite a correlation between more labor market regulations and more informality, well-enforced labor market policies regarding provision of benefits to workers induce workers to move from the informal economy to the formal economy.[24]

The informal economy in SSA:

Studying the informal economy in SSA is both a particularly important and a particularly challenging proposition. As was previously mentioned, the high percentage of the labor force engaged in informal employment means that informal economic activity is a significant factor in many individual's livelihoods, and also that a large measure of SSA countries' economies are unreported, underrepresented, and untaxed. The ILO over the past decade has made a large effort to improve international measurement and reporting of the informal sector, due to its global importance. The ILO has adopted a definition of informality as "the sum of employment in the informal sector and informal employment found outside of the informal sector,"[25] and encouraged governments and non-governmental organizations (NGOs) to collect data according to this framework, to increase uniformity in reporting. SSA as an economic region comprises both agricultural and non-agricultural informal activity—non-agricultural informal economic activity includes, for example and on the whole, transportation, construction, manufacturing, and trade. Allocation of resources and arable land greatly impacted colonial policies, which then shaped legal heritage of modern SSA countries, and, so, colonial interested played differing roles in how the composition of informal sectors developed in these countries. Additionally, historically, ineffective regulation (mainly due

23 Loyaza, Norma, Ana Maria Oviedo, and Luis Serven. "The Impact of Regulation on Growth and Informality: Cross-Country Evidence." Unlocking Human Potential: Linking the Informal and Formal Sectors. EDGI-WIDER (2006)

Djankov, Simeon Rafael La Porta, F. Lopez-de-Silanes, and A. Shleifer. "The Regulation of Entry." Quarterly Journal of Economics. 117.1 (2002) p 1-37

Friedman, E., S. Johnson, D. Kaufmann, and P. Zoido-Lobaton. "Dodging the Grabbing Hand: The Determinants of Unofficial Activity in 69 Countries." Journal of Public Economics. 76. (2000). p 459-93

24 Almeid, Rita and Pedro Carneiro. "Enforcement of Labor Regulation and Informality." IZA Discussion Paper No. 5902 (The World Bank: Washington, DC; 2011). http://ftp.iza.org/dp5902.pdf

25 "Statistical Update on Employment in the Informal Economy." International Labor Organization (June 2012) http://laborsta.ilo.org/applv8/data/INFORMAL_ECONOMY/2012-06-Statistical%20update%20-%20v2.pdf

to corruption), low levels of education, and prevailing poverty are all particularly relevant in SSA countries, and these all have a strong influence on determining the dynamics of the informal economy.

Because of these specificities in studying the informal economy in SSA, this study differs from the existing literature in several ways. In contrast to the La Porta, et. al (2007) study, this paper only includes SSA countries, to focus this analysis on this region. Additionally, this paper moves to test the effect of differing legal heritage on informality by sector in SSA, whereas previous literature has mainly focused merely on looking at legal effects on informality only by size.

III. Model

For the size study, the model is based on that of La Porta, et. al (2007). This model hypothesizes that civil law traditions, because they are associated with higher levels of economic regulation of entry to the formal economy, are also, therefore, associated with higher levels of employment in the informal economy, while common law traditions are associated with lower levels of regulation and thus informality. Consequently, civil law tradition (French legal heritage) should be correlated with more overall informality than common law tradition (English legal heritage). This means civil law should be positively correlated to informality, while common law is negatively correlated.

However, in order to extract the actual effect of legal tradition, due to differing colonial policies/histories regarding agricultural versus nonagricultural production, both percentage of arable land and percentage of a population living in urban areas should be controlled for within this relationship. These controls are necessary because informality in SSA is more likely to occur in the agricultural sector, rather than the nonagricultural (mainly urban) sector, according to the explanatory theory, and so, SSA countries that are better endowed for farming will also be more predisposed towards higher levels of informality.

Then, tax burden should be controlled for, and should be positively correlated with informality. This is because taxes can be viewed as a cost, specific to formal economic activity. Regulation and governance might additionally play into this relationship, if they are not completely endogenous, as should their interaction. If relevant, these factors should all be positively correlated with informality—excess regulation and poor governance serve to inhibit formal economic activity. Therefore, the corresponding regression equation for the model is as follows:

$$UNOFFICIALEMPLOYMENT = \alpha + \beta_1(COMMON) + \beta_2(ARABLELAND) + \beta_3(URBANPOPULATION) + \beta_4(TAXBURDEN) + \beta_5(INCOME) + \beta_6(EDUCATION) + \beta_7(REGULATION) + \beta_8(GOVERNANCE) + \beta_9(REGULATION)(GOVERNANCE) + \varepsilon$$

Second, when looking at how legal tradition impacts informality by sector, the model predicts that civil law tradition is associated with a higher percentage of agricultural informal economic activity, than common law is. Conversely, civil law should also be associated with a lower percentage of nonagricultural informal economic activity as compared to common law. This should be the case because, outside the degree of regulation mechanism relevant for the size study, the basis for informality was impacted largely differently for agricultural versus nonagricultural production in civil and common law countries.

French colonizers, using civil law traditions, governed the economic systems of their colonies, at least from the beginning of the colonial era, with the intent of controlling Trans-Saharan trade routes and the markets for tradable goods that already existed within the territories of their colonies prior to European arrival. This meant that they focused on controlling nonagricultural economic activity much more so than they concerned themselves with "formalizing" agricultural production in these areas. These strategic policies set the scene for the development of stronger formal economics within nonagricultural sectors, and of much stronger and more prevalent informal agricultural economies, in civil law colonies (later developing into civil law countries).

English colonizers, on the other hand, using common law tradition, were much more concerned with controlling the overall structure and government of their colonies' economies. This meant that they enacted policies and implemented regulatory structures affecting the economy overall, and these changes/governance structures affected economies on a much more broad-based scale, than merely controlling the markets for tradable goods. Common law systems were, therefore, much more likely to impact local service/subsistence farming, translating into lower rates of informality overall, and relatively lower agricultural informality rates than civil law countries, but relatively higher nonagricultural informality rates (earlier start in implementing regulations, driving laborers and firms away from the formal market).

Inclusion of the previously mentioned other factors, such as regulation, governance, the interaction between governance and regulation, and the tax factor, as well as income and education, should have similar effects as in the size regressions, in terms of signs, and so, the two relationships would be modeled as follows:

$$\text{i: AGRICULTURALINFORMALITY} = \alpha + \beta_1(\text{COMMON}) + \beta_2(\text{TAXBURDEN}) + \beta_3(\text{INCOME}) + \beta_4(\text{EDUCATION}) + \beta_5(\text{REGULATION}) + \beta_6(\text{GOVERNANCE}) + \beta_7(\text{REGULATION})(\text{GOVERNANCE}) + \varepsilon$$

$$\text{ii: NONAGRICULTURALINFORMALITY} = \alpha + \beta_1(\text{COMMON}) + \beta_2(\text{TAXBURDEN}) + \beta_3(\text{INCOME}) + \beta_4(\text{EDUCATION}) + \beta_5(\text{REGULATION}) + \beta_6(\text{GOVERNANCE}) + \beta_7(\text{REGULATION})(\text{GOVERNANCE}) + \varepsilon$$

It should be noted that decomposing informality by sector in this manner allows the relationship between sector-specific informality and legal structure to be isolated from effects that can mask this relationship, when the data is viewed for the overall economy. However, this methodology does not control for differences across sectors within a legal tradition. That is to say, decomposing agricultural versus nonagricultural production does not draw out the effect of legal tradition on the sectoral composition (all agricultural versus all nonagricultural production) within either the category of common law countries or of civil law countries.

IV. Data and Empirical Strategy

Legal Classification:

For the empirics of this study, both for size and composition analysis, it is first necessary to categorize the countries of SSA by their legal structure. As was previously mentioned, SSA countries' legal structures were largely influenced by their colonial experiences, and the nature of colonial rule in Africa lends itself fairly easily to simplifying the characterization of Sub-Saharan legal structures into two broad categories: civil law and common law. While there were several countries whose legal traditions can most accurately be characterized as "Portuguese civil law" or "German civil code," the majority of SSA countries' legal structures were based on either French civil law or English common law. The few countries who fall outside of this can comfortably be placed into the broader civil category—although there are some differences between French and Portuguese or German civil law, for the purposes of this study, the effects are the same. It should be noted that all colonies were consistent in legal structure after transition from colony to independent country—no SSA country switched from a common law system to a civil law system or vice versa.

Figures 1 and 2 in the Appendices illustrate the categorization of the forty-five SSA countries by legal code. The map in Figure 1 shows how legal origin is disbursed geographically—location had an undeniable influence on the colonization of these regions, which in turn greatly impacted modern legal codes. Civil law countries are the majority of West Africa, while East and Southern African countries are more prevalently common law countries. There is a fairly general consensus on how to classify legal structures by country,

but for this analysis the specific characterizations of the La Porta, et. al (2007) study are used.

While legal structure classification presents few challenges, measurement of SSA informal economies is a complex and difficult task. Of the three previously discussed measurement methodologies, the indirect measurement method is not very useful for SSA. Macro-level data of the kind needed to indirectly calculate the size of the informal economy is not widely available and not generally reliable. Data such as electricity consumption, currency demand, formal employment, etc. are not figures maintained with statistical accuracy by many SSA governments. Many of these governments lack the capacity to collect the information and do the statistical analyses necessary to reliably and regularly publish the relevant statistics that would be needed. Therefore, for this study, as for most other studies in the literature, modeling and direct measurement data for the informal economies of SSA is used.

Size of the Informal Economy:

Looking first at the size regressions, the modeling dataset is taken from Schneider (2005). The descriptive statistics for this data are shown in Column 1 of Figure 5. For each country, the data indicates the percentage of total employment classified as "unofficial," as an average over the years 1999-2007. The main advantage of the modeling dataset is that each SSA country has a datapoint observation. Because modeling does not require the kind of data collection that direct measurement (survey) data does, as it relies on mathematical estimation of the informal economy's size, it is not subject to the same uncertainty and issues of availability/misrepresentation that survey data is.

The first disadvantage of the modeling dataset is that it is technically hypothetical as has been discussed. Second, there is arguably a degree of endogeneity associated with this measurement. Schneider employs a model that considers several "input factors," or order to calculate the size of the informal economy in each country. Somewhere within his methodology, he considers the regulatory environment as a determining input factor for unofficial employment. This plays into the hypothesis that legal structure determines regulatory burden, which then, in turn, significantly impacts the size of the informal economy.

The direct measurement data set is a compilation of the data used in La Porta, et. al (2007) and Heinz and Valodia (2008).[26] The reasoning behind using a compilation of these two sets is that, with survey data, there is significant chance of measurement error. The methodology of asking individuals to report their participation in the unofficial employment market is necessarily an im-

26 Heinz and Valodia (2008)

perfect strategy for determining the over portion of the labor force employed in the informal economy. There is incentive for individuals to misrepresent their involvement (fear of legal punishment or repercussions), and it is also challenging to ensure that the survey sample is an entirely random and unbiased segment of the population. Therefore, by utilizing the compilation of these two data sets,[27] which are both combinations of several studies themselves, some of this error can be averaged out.

Column 2 of Figure 5 itemizes the descriptive statistics for this data. As compared to the modeling data, the direct measurement data are seen to have significantly fewer observations and significantly higher levels of standard deviation. Given the measurement challenges associated with the direct method, this is unsurprising.

Across both methods of measurement, the levels of informality are seen to be much lower than the previously referenced ILO statistics. This discrepancy can most likely be explained through data deficiency and inaccuracy. Informality is challenging to measure in practice, and so it makes sense that the ILO's estimates of the true level of informality in SSA are much higher than the numbers actually seen in the dataset.

The data has been divided by legal characterization into civil and common legal traditions, in order to compare the simple averages of the two categories. Looking at the modeling data, civil law traditions are associated with slightly lower levels of unofficial employment than common law traditions, while the direct measurement data shows that civil law traditions have a slightly higher level of informality than common law countries. The direct data fits with the model for this study, however it is unclear whether this difference in means is statistically significant or not.

Composition of the Informal Economy:

In order to analyze how legal tradition impacts the composition of SSA informal economies, again, the classifications detailed in Figure 2 are used to categorize countries based on civil or common law traditions. The dataset found in Charmes (2000)[28] is used to consider the sector breakdown of these countries' informal economies.

For this analysis, the distinction between sectors is agricultural versus non-agricultural. While non-agricultural production itself breaks down into various sectors (services, manufacturing, etc.), it is most interesting and infor-

27 In order to compile this data, I take the averages of data points that are available in both surveys, and simply use that which is available, if the data point is only found in one study or the other

28 Charmes, Jacques. Measurement of the Contribution of Informal Sector and Informal Employment to GDP in Developing Countries: Some Conceptual and Methodological Issues (Institute of Research for Development: Paris, France; 2000) p 13 table A2

mative to look at the broad difference between agricultural and non-agricultural production. As discussed in relation to the model, common law versus civil law countries developed differently in historic economic contexts, specifically with the distinction of how colonial powers sought to control agricultural/non-agricultural production. Because of this, breaking down the overall size of the informal economy in a particular country into sectors is integral for the analysis. Separating these types of economic activity allows more specific analysis. However, it is, again, important to note that this does not and cannot control for differing sectoral composition across countries, i.e. how agricultural or how nonagricultural an SSA country's economy is.

The relevant series from this dataset are informal agricultural production as a percentage of total agricultural production and informal nonagricultural production as a percentage of total nonagricultural production in a given SSA country. The measurement issues that were relevant in for the size data are also applicable to the composition data (both are directly measured). These data rely on measurement of aggregate economic indicators, both for formal and informal economic activity. Both of these quantities are difficult to measure in SSA. Informal agricultural production is particularly challenging to accurately quantify. However, once again, Charmes used the averages of several estimates for these quantities, which corrects for at least some associated measurement error.

The descriptive statistics for this dataset can be found in Figure 6. According to the simple averages of this data, in both civil and common law countries, informal production makes up a higher percentage of both nonagricultural production and agricultural production when taken separately by sector. That is to say, a higher percentage of nonagricultural production is informal in civil law countries, and also a much higher percentage of agricultural production is informal in civil law countries, when comparing the simple means of the data. These differences seem significant, however, it is still be necessary to test econometrically the relationship's statistical significance and to control for other influencing factors.

Other Factors:

The data for the additional regressors were mostly found through World Bank World Enterprise Surveys and World Development Indicators databases. ARABLELAND is simply the percentage of a country's land area that qualifies as arable (suitable for crop production). URBANPOPULATION is a percentage of a country's population living in areas designated as "urban." TAXBURDEN is a measure of the average tax rate in a given country, and should also be positively correlated with informality, assuming that taxes are a deterrent for

firms and individuals from entering the formal economy. INCOME is a measure of a country's GNI per capita, in terms of PPP. EDUCATION is a measure of the adult literacy rate in each SSA country. These two regressors should be negatively correlated with informality, if it is assumed that poverty and lack of education are two explanatory reasons for informality in SSA. REGULATION is a measure of the percentage of a firm's senior management's time spent dealing with governmental regulations. GOVERNANCE is a measure of the percentage of firms in a particular country identifying corruption as a significant constraint to doing business. Both should have a positive correlation with informality, if they are not endogenous, according to the model that regulatory burden drives firms and individuals out of the formal economy.

Empirical Strategy:

Moving from descriptive data analysis to econometric study, first, simple univariate OLS regressions, focusing on just the relationship between legal structure and informality, were used to test the model's predictions. Then, the other relevant factors were added in sequentially, in a series of multivariate regressions. Finally, truncated regressions were used to ensure that the proportional nature of the dependent variable in both sets of analysis does not impact the econometric results.

This strategy of moving from a very simple, univariate regression to multiple regressions controlling for more factors developed as a way to try and balance the concerns of omitted variable bias and overfitting. Leaving out factors besides legal structure that might explain cross-country variation in informality could result in overstating legal tradition's influence on informality, while including factors that are really channels for how legal structure impacts informality, rather than separate influences in and of themselves, could have resulted in understatement of how much legal structure is responsible for informality.

Looking at these relationships, starting with the univariate regression, and then adding in the other factors (first arable land and urban population, then tax burden, followed by income and education, and then finally adding in regulation, governance, and the interaction between governance and regulation), sequentially, while examining how the addition of each factor contributes to the fit of the model, allowed for minimizing the risk of understating legal structure's influence. In this way, the univariate regressions were arguably the most informative in describing the actual correlation between informality and legal structure.

Finally, truncated regressions were utilized to ensure that the proportional nature of the dependent variable in all of these cases did not impact the esti-

mations. Because the UNOFFICIALEMPLOYMENT, AGINFORMALITY, and NONAGINFORMALITY variables all represent informality as a percentage of either total employment or total sectoral production, these datasets are naturally bounded at 0 and 100 (there can be no observations either below 0% or above 100%). OLS regressions do not account for these boundaries, and so could potentially misestimate the tails of these distributions (if the limits are not accounted for, the relationship could be extended past feasible limits). Therefore, the following truncated regressions were estimated:

$$\text{i: AGRICULTURALINFORMALITY} = \alpha + \beta(\text{COMMON}) + \varepsilon \text{ iff } 0 < \text{AGINFORMALITY} < 100$$

$$\text{ii: NONAGRICULTURALINFORMALITY} = \alpha + \beta(\text{COMMON}) + \varepsilon \text{ iff } 0 < \text{AGINFORMALITY} < 100$$

$$\text{iii: UNOFFICIALEMPLOYMENT} = \alpha + \beta(\text{COMMON}) + \varepsilon \text{ iff } 0 < \text{AGINFORMALITY} < 100$$

V. Discussion of Results

Tables 7 through 9 in the Appendices detail the results of the regressions performed. The sectoral results are more interesting and significant than the size results, where not much significance was found. For the analysis of informality by sector, just looking at the simple differences of means, the relationship between the percentage of agricultural production that is informal in a given country and that country's legal tradition seems to be much more significant than the relationship between legal origin and the size of the informal economy, and this significance plays out in regression analysis.

A univariate OLS regression between AGINFORMALITY and COMMON yields a significant and negative relationship, with a very high adjusted R-squared value.[29] Specifically, this impact of legal tradition on the percentage of agricultural production that is informal is significant at the 1% level. This suggests that legal structure does have an important effect on the informality of agricultural in Sub-Saharan Africa—civil law is associated significantly with a higher percentage of agricultural informality, while than common law tradition is negatively related to agricultural informality.

This indicates that, even in a univariate analysis, civil law countries are significantly more inclined to have a higher level of informality in the agricultural sector, as compared to common law countries. This result fits with the theory of the model—because colonial powers associated with civil law systems (namely France) were more interested in tradable items and natural resources, and less interested in formalizing aspects of the economy that did not directly benefit their economic interests, agricultural production, predominantly rural agricultural production outside of economic/population centers, was left as it was. This set up the beginning of an informal agricultural econo-

29 See Figure 7 Column (1)

my, with little or no regulation.

On the other hand, in common law countries, legal structure makes formal sector participation less prohibitive. Colonial governments (specifically England) were more interested in control of the entire economy as a whole, meaning there was less of a basis for informality established within colonial history. It would seem, then, that this historical factor outweighs the effect of less regulation within the agricultural sector generating less incentive to need to avoid the formal sector, which would imply lower rates of informality. This finding, therefore, runs counter to de Soto's assertion that regulation leads to informality.

Adding in other relevant factors to constitute a multiple regression model, only the inclusion of TAXBURDEN improves the fit of the model, and, even so, once again it is only the legal tradition dummy variable that is significant at any level.[30] While there is an already noted data shortage, as well as noted problems with data collection, the results from these regressions indicate that legal tradition is a highly significant factor in explaining agricultural informality, in both a univariate and multiple regression model. This fits well with the main prediction of the theoretical model—that civil law SSA countries should be correlated with higher levels of agricultural informality, as compared to common law countries, due to historical colonial policies.

Moving to nonagricultural informality, the simple differences of means for this measure seems less significantly correlated with legal structure. A univariate OLS regression between the legal tradition dummy variable and nonagricultural informality (the percentage of nonagricultural production that is informal), in fact, shows significance at the 5% level.[31] This would indicate that legal tradition is an important determinant of the informal share of nonagricultural production, and, since the coefficient's sign is negative, civil law is associated with higher percentages of nonagricultural informality as compared to common law tradition.

Including all relevant factors from the model increases the adjusted R-squared value, however it takes away from the significance of the legal type variable.[32] In fact, none of the regressors were then significant at any level, except INCOME.[33] This indicates that legal structure is not as much of a determining factor with regard to nonagricultural informality as it is for agricultural formality, since the legal dummy is still insignificant. Arguably, however, the univariate regression, in which legal tradition is significant at the 5% level, is the more informative relationship. Adding more regressors seems to merely

30 See Figure 7 Column (4)
31 See Figure 7 Column (5)
32 See Figure 7 Column (8)
33 Significant at the 5% level

increase the noise within the data's relationship—significance of coefficients is decreased, while the fit of the model is only slightly increased. Again, if legal structure influences informality through some of these added regressors, the effect of common versus civil law will be understated.

In this case, COMMON, the legal dummy variable, is significantly and negatively correlated with nonagricultural informality. This does not fit with the model's prediction that civil law should be associated with lower levels of nonagricultural informality—just as with agricultural informality, a negative coefficient on the COMMON dummy variable would indicate a positive relationship between civil law and percentage of nonagricultural informality.

This contradiction of the model can potentially be explained if one considers how colonial policies remained consistent, rather than fundamentally differed, across economic sectors, although, once again, this paper is a comparison across legal structures, not across sectors within a legal tradition. This finding also does not fit with de Soto's view, however it is a testament to how formal legal structures can promote formal economic activity, as opposed to discouraging it (what de Soto's exit hypothesis suggests). Perhaps more consistent economy-wide regulation encouraged development of effective regulations, making exit from formal nonagricultural markets less attractive in common law countries.

It makes sense in that legal tradition is a more significant determining factor for agricultural informality than it is for nonagricultural informality. It is significant with regards to agriculture, potentially, because there is substantial reason as to why colonies with differing legal traditions set up different formal economic mechanisms for regulating agricultural production. Civil law colonial powers (France) were again more interested in controlling nonagricultural production, particularly that of natural resources and tradable goods. However, common law countries (English colonies) were just as interested in controlling nonagricultural production, as they were in controlling agricultural production. They were after the full picture, more so than France. Therefore, legal structure may have had less of a determining influence on nonagricultural informality. Or, it is possible that legal structure still determines nonagricultural informality, but French colonizers mitigated this effect through efforts on their part to regulate formal nonagricultural production.

The regressions testing the relationship between the size of the informal economy of SSA countries and legal tradition yield much less interesting and/or significant results. Looking at the direct measurement data, legal tradition does not seem to have any explanatory power with regard to the size of the informality economy in a given Sub-Saharan country. First, performing a simple OLS regression, the legal tradition dummy variable has no signifi-

cance.[34] Moving to a multiple regression model, URBANPOPULATION and INCOME are both significant at the 10% level, while GOVERNANCE is significant at the 5% level.[35]

This can be explained potentially through data deficiencies. Because direct measurement of unofficial employment is unavailable in a number of Sub-Saharan African countries, the data may be incomplete and therefore obscuring the effect of legal origin. This could be the case because there is some characteristic not included in the model explaining whether or not survey data is easily available that is connected to informality. Something like ease of transportation (allowing survey researchers to easily access workers in all parts of a country) could potentially be this characteristic, however, this is not included in the model.

The size regressions performed with modeling data were no more significant. Neither the univariate, nor the multiple regression models tested led to any significant results for legal tradition, although, once again, INCOME and URBANPOPULATION are somewhat significant.[36] This makes sense, however, because the modeling dataset is not ideal for this analysis. In formulating his modeled estimates of the size of the informal sector in each Sub-Saharan African country, Schneider considers regulatory structures, which have been previously linked to legal origin. This suggests the possibility of colinearity and could explain why the REGULATION variable was insignificant and why the legal origin dummy variable did not account for much of the variation in the data.

Controlling for Data Deficiencies:

In order to try to correct for the differing samples available for the size versus composition analyses, the size regressions,[37] for both direct and modeling data, were repeated using a sample of only observations corresponding to the countries included in the composition regressions.[38] For both the modeling dataset and the direct measurement dataset, this specification had no impact on the results—no independent variable became significant, and the fit of the model only decreased.[39] This would indicate that the lack of significance found in the initial analysis is not due to any unobserved characteristic of the countries included in the sample. Instead, it is the case that legal tradition,

34 See Figure 8 Column (1)
35 See Figure 8 Column (6)
36 See Figure 9 Columns (1) - (6)
37 Again, as there is limited data available, the datasets used contained an overlapping, but not identical, catalogue of countries. These further tests were conducted to ensure that differences in results were not due to any country-specific characteristics
38 See Figure 8 Column (-) and Figure 9 Column (-)
39 See Figure 8 Column (-) and Figure 9 Column (-)

notably controlling for percentage of arable land in a given SSA country, does not have a significant impact on the size of the informal economy in a given SSA country overall.

Truncated Regressions:

Finally, in order to make sure that the limited range of possible dependent variable values for both sets of regressions did not impact the accuracy of the estimation, truncated regressions were performed for the agricultural production, nonagricultural production, and overall size (both direct and modeling) data.[40] This technique shifts the methodology to a maximum likelihood estimation, limiting the possible results to the possible range of 0% - 100% (of either employment or a given type of production).

The results did not indicate anything different from the previous OLS regressions. Legal tradition remains significant for both informality as a percentage of agricultural production and informality as a percentage of nonagricultural production—civil law is positively correlated with informality in both instances, whereas common law is negatively related to informal production. And, legal structure still has a negligible impact on the overall size of an informal economy in a given SSA country, using both direct and modeling data. This implicates that the potentially misestimated tails of the preceding regressions were not problematic in the interpretation the statistical relationships.

VI. Further Study

Considering these results and drawing conclusions implicates several ways in which this paper could informatively be furthered. Because legal structure much more significantly impacted informality as a percentage of a given sector than it did the size of informal economies overall in SSA, furthering this aspect of the study seems more important. To corroborate the model's explanation of the correlation between agricultural informality and civil law, regarding varying colonial experience of French vs. English interest in formalizing agriculture, cross-country data from around the world could be analyzed. As opposed to focusing on specifically SSA, testing to see whether or not the relation holds in countries that do not have a colonial history could confirm whether this colonial explanation is the right one, or whether the relationship between civil law and agricultural informality has a different explanation.

The nonagricultural analysis yielded results that seemed significant, despite being less statistically rigorously correlated than the agricultural data was. This study could be furthered by decomposing the nonagricultural sector along two different aspects of this economic activity: (1) urban versus rural

40 See Figure 10

and (2) specific type of nonagricultural production (manufacturing, services, construction, mining, professional, etc.). However, obtaining the data for this decomposition would be a major challenge to confront.

Additionally, this study leaves unexplored the impact of and variation in household production. In other words, it neglects informality that occurs on a household level, which includes growing food in gardens, raising children, etc. This consideration was omitted from the analysis due to a lack of data, but if survey data on household production were to ever be available, this would potentially be an informative extension of the analysis.

Finally, although it fell outside the scope of this paper, legal tradition's significance in determining informality by sector in SSA suggests that there may be an underlying relationship between legal structure and the distributional composition of economic production, both formal and informal, across the agricultural vs. nonagricultural sectoral divide. It would be interesting to study this relationship in order to determine whether historical colonial policies regarding nonagricultural versus agricultural production affected not just a country's informality, but also its sectoral composition in general.

VII. Conclusion

In sum, this paper found a highly significant and positive relationship between civil law and agricultural informality as a percentage of a SSA country's total agricultural production, and a slightly lower degree of significance to the similarly positive relationship between civil law and nonagricultural informality as a percentage of total nonagricultural production.

Differing colonial interests in countries with common law versus those with civil law was the explanation offered to explain this significant difference in informality by sector. Size of the overall informal economy in a given SSA country seems largely unaffected by differences in legal tradition, based on both direct and modeling data, and importantly controlling for a country's percentage of arable land and urban population. It makes sense that this relationship is less important than that between legal tradition and sector-specific informality, because the differences in common versus civil law countries had to do with colonial powers' policies regarding agriculture, rather than in economic activity overall, and because dividing sectors was seen to draw out correlations hidden by other relationships occurring within the overall data.

Appendix

Figure 1: Sub-Saharan African Countries Identified by Legal Tradition[41]

Civil Law Countries:	Common Law Countries:
Angola	Botswana
Benin	Ghana
Burkina Faso	Kenya
Burundi	Lesotho
Cameroon	Liberia
Cape Verde	Malawi
Central African Republic	Namibia
Chad	Nigeria
Comoros	Seychelles
Congo, Dem. Rep.	Sierra Leone
Congo, Rep.	South Africa
Cote d'Ivoire	Sudan
Equatorial Guinea	Swaziland
Ethiopia	Tanzania
Gabon	Uganda
Guinea	Zambia
Guinea Bissau	Zimbabwe
Madagascar	
Mali	
Mauritania	
Mauritius	
Mozambique	
Niger	
Rwanda	
Sao Tome and Principe	
Senegal	
Togo	

Figure 2: Legal Characteristics of Sub-Saharan Countries[42]

41 La Porta, et. al 1999
42 La Porta, et. al 1999

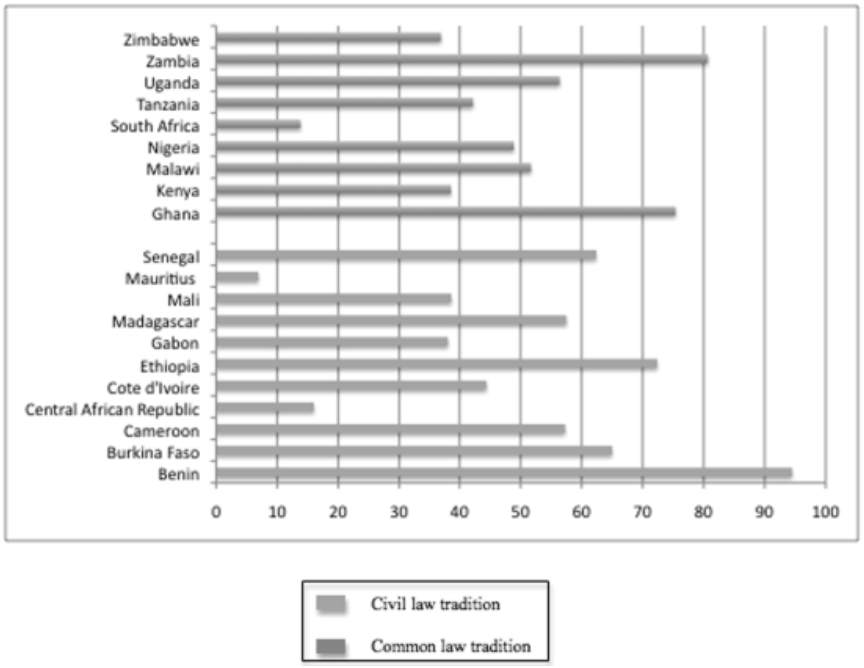


Figure 3: Unofficial Employment by Country as a Percentage of Total Employment (Direct)[43]

43 Data is an average from data used in La Porta, et. al (2007) and Heinz and Valodia (2008)

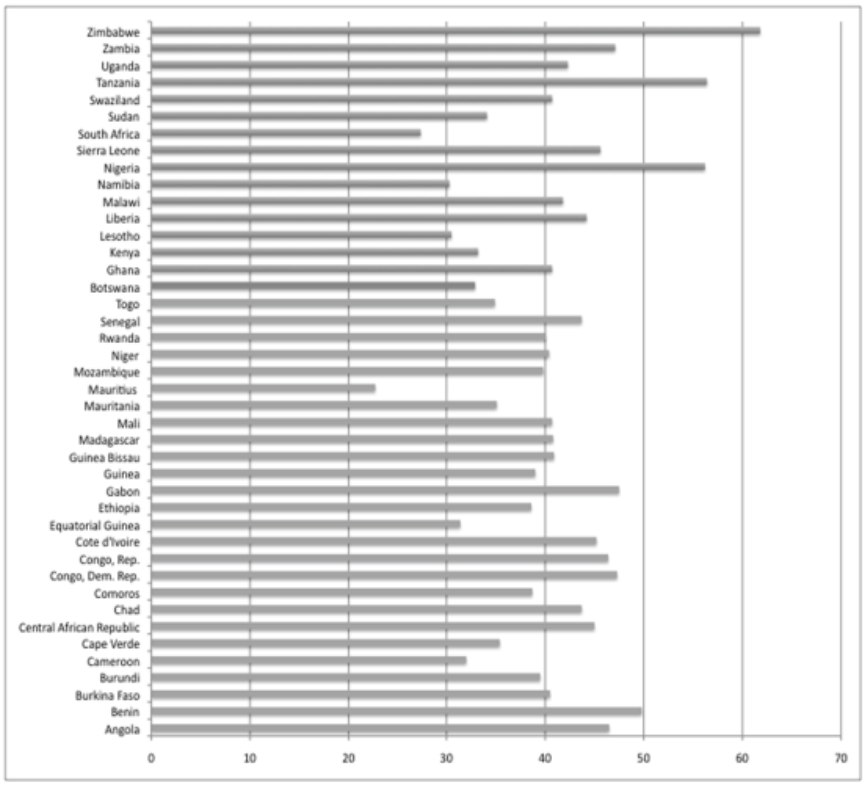


Figure 4: Unofficial Employment by Country as a Percentage of Total Employment (Modeling)[44]

Civil Law

	Modeling	*Direct*
Average	40.22	51.412
Median	45.99	57.30
Min	22.70	6.90
Max	49.80	94.50
Standard Dev	5.942	25.07
# of Observations	25	11

Common Law

	Modeling	*Direct*
Average	41.57	50.72
Median	41.25	48.90
Min	27.30	13.80
Max	61.80	80.70
Standard Dev	10.18	21.21
# of Observations	15	9

Figure 5: Descriptive Statistics Size Regressions[45] [46]

44 Schneider (2005)

45 Columns represent unofficial employment as a percentage of total employment for a given country

46 Modeling data set is taken from Schneider (2005) and Direct Measurement data is an average from La Porta, et. al (2007) and Heinz and Valodia (2008)

Civil Law

	%NonAgINF/Total	*%AGINF/Total*	%NonAgINF/NonAg	%AGINF/AG
Average	26.70	21.01	41.61	95.94
Min	11.00	0.53	11.00	85.89
Max	62.00	41.24	62.00	100.00
Median	44.10	16.38	44.10	99.62
Standard Deviation	14.94	15.43	14.94	5.82
# of Observations	15	15	15	15

Common Law

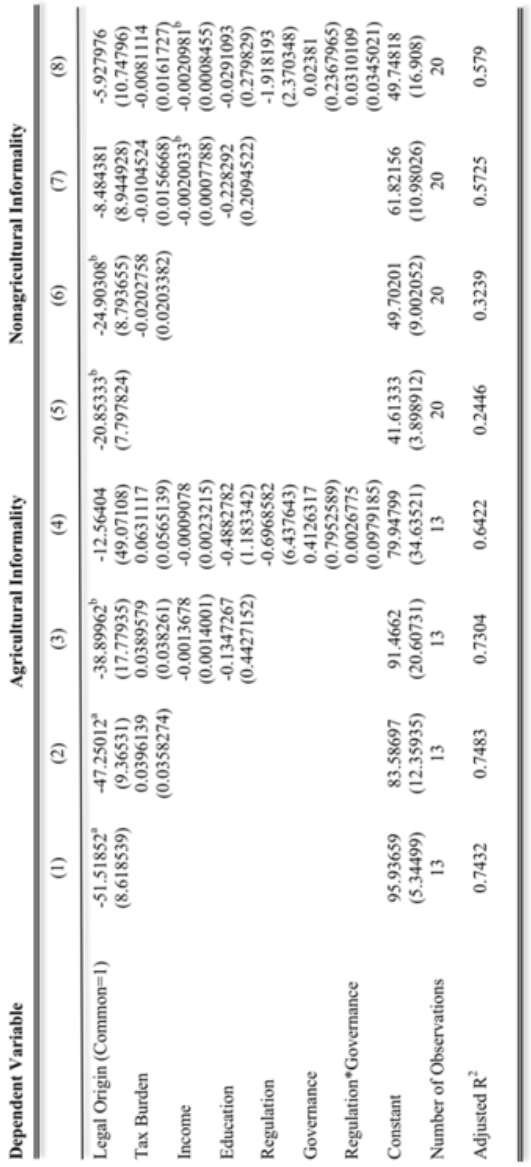
	%NonAgINF/Total	*%AGINF/Total*	*%NonAgInf/NonAg*	*%AGINF/AG*
Average	15.85	6.35	20.76	44.42
Min	4.40	0.30	4.40	19.5
Max	43.10	15.73	43.10	71.48
Median	24.20	5.28	24.20	35.65
Standard Deviation	15.65	5.94	15.65	23.86
# of Observations	6	6	6	6

Figure 6: Descriptive Statistics: Composition Regressions[47] [48] [49]

47 Column 1 represents aggregate nonagricultural informal production as a percentage of total GDP. Column 2 represents aggregate agricultural informal production as a percentage of total GDP. Column 3 represents aggregate nonagricultural informal production as a percentage of total nonagricultural production. Column 4 represents aggregate agricultural production as a percentage of total agricultural production

48 Source: Charmes, Jacques. Measurement of the Contribution of Informal Sector and Informal Employment to GDP in Developing Countries: Some Conceptual and Methodological Issues (Institute of Research for Development: Paris, France; 2000) p 13 table A2

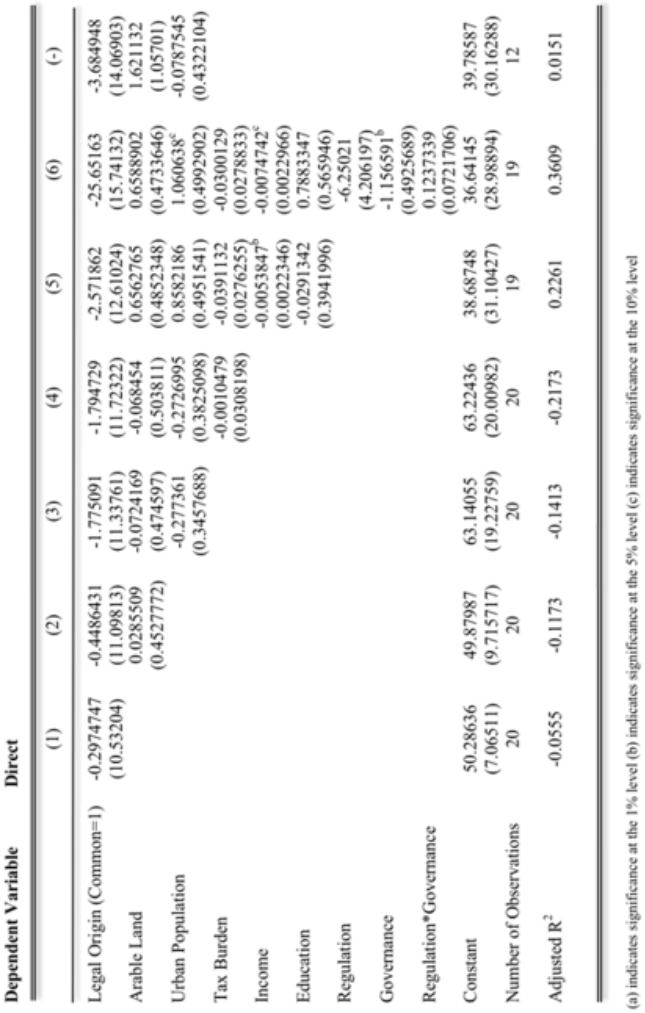
49 The observation for Ghana's nonagricultural informal production was determined to be an outlier (outside three standard deviations from the mean), and so was excluded from the dataset



Dependent Variable	Agricultural Informality					Nonagricultural Informality		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Legal Origin (Common=1)	-51.51852[a]	-47.25012[a]	-38.89962[b]	-12.56404	-20.85333[b]	-24.90308[b]	-8.484381	-5.927976
	(8.618539)	(9.36531)	(17.77935)	(49.07108)	(7.797824)	(8.793655)	(8.944928)	(10.74796)
Tax Burden		0.0396139	0.0389579	0.0631117		-0.0202758	-0.0104524	-0.0081114
		(0.0358274)	(0.038261)	(0.0565139)		(0.0203382)	(0.0156668)	(0.0161727)
Income			-0.0013678	-0.0009078			-0.0020033[b]	-0.0020981[b]
			(0.0014001)	(0.0023215)			(0.0007788)	(0.0008455)
Education			-0.1347267	-0.4882782			-0.228292	-0.0291093
			(0.4427152)	(1.183342)			(0.2094522)	(0.279829)
Regulation				-0.6968582				-1.918193
				(6.437643)				(2.370348)
Governance				0.4126317				0.02381
				(0.7952589)				(0.2367965)
Regulation*Governance				0.0026775				0.0310109
				(0.0979185)				(0.0345021)
Constant	95.93659	83.58697	91.4662	79.94799	41.61333	49.70201	61.82156	49.74818
	(5.34499)	(12.35935)	(20.60731)	(34.63521)	(3.898912)	(9.002052)	(10.98026)	(16.908)
Number of Observations	13	13	13	13	20	20	20	20
Adjusted R^2	0.7432	0.7483	0.7304	0.6422	0.2446	0.3239	0.5725	0.579

(a) indicates significance at the 1% level
(b) indicates significance at the 5% level
(c) indicates significance at the 10% level

Figure 7: Sectoral Composition of the Informal Economy



Dependent Variable	Direct						
	(1)	(2)	(3)	(4)	(5)	(6)	(-)
Legal Origin (Common=1)	-0.2974747	-0.4486431	-1.775091	-1.794729	-2.571862	-25.65163	-3.684948
	(10.53204)	(11.09813)	(11.33761)	(11.72322)	(12.61024)	(15.74132)	(14.06903)
Arable Land		0.0285509	-0.0724169	-0.068454	0.6562765	0.6588902	1.621132
		(0.45277772)	(0.474597)	(0.503811)	(0.4852348)	(0.4733646)	(1.05701)
Urban Population			-0.277361	-0.2726995	0.8582186	1.060638[c]	-0.0787545
			(0.3457688)	(0.3825098)	(0.4951541)	(0.4992902)	(0.4322104)
Tax Burden				-0.0010479	-0.0391132	-0.0300129	
				(0.0308198)	(0.0276255)	(0.0278833)	
Income					-0.0053847[b]	-0.0074742[c]	
					(0.0022346)	(0.0022966)	
Education					-0.0291342	0.7883347	
					(0.3941996)	(0.565946)	
Regulation						-6.25021	
						(4.206197)	
Governance						-1.156591[b]	
						(0.4925689)	
Regulation*Governance						0.1237339	
						(0.0721706)	
Constant	50.28636	49.87987	63.14055	63.22436	38.68748	36.64145	39.78587
	(7.065111)	(9.715717)	(19.22759)	(20.00982)	(31.10427)	(28.98894)	(30.16288)
Number of Observations	20	20	20	20	19	19	12
Adjusted R^2	-0.0555	-0.1173	-0.1413	-0.2173	0.2261	0.3609	0.0151

(a) indicates significance at the 1% level (b) indicates significance at the 5% level (c) indicates significance at the 10% level

Figure 8: Direct Estimates of Unofficial Employment

Dependent Variable	Modeling						
	(1)	(2)	(3)	(4)	(5)	(6)	(-)
Legal Origin (Common=1)	1.353365	1.307274	1.328756	1.991465	3.172907	4.405732	-1.291724
	(2.479633)	(2.507741)	(2.549287)	(2.609906)	(2.855356)	(3.310694)	(3.549808
Arable Land		-0.0377541	-0.034181	-0.0214231	-0.0101702	0.0239456	-0.0682311
		(0.0886585)	(0.0966751)	(0.0970473)	(0.0928373)	(0.1030342)	(0.162110
Urban Population			0.0084474	-0.0072608	0.0952355	0.1976559[c]	-0.0479965
			(0.0846153)	(0.0855179)	(0.090593)	(0.1150742)	(0.0987971)
Tax Burden				0.0075485	0.0050972	0.0028299	
				(0.0067749)	(0.0066008)	(0.0070728)	
Income					-0.0005844[c]	-0.0010888[b]	
					(0.0003112)	(0.0004863)	
Education					-0.0594286	-0.0222296	
					(0.0924069)	(0.1005605)	
Regulation						-0.5777431	
						(0.901281)	
Governance						-0.0887463	
						(0.1144004)	
Regulation*Governance						0.012035	
						(0.0134279)	
Constant	40.21538	40.79522	40.41025	38.1304	40.28482	38.5128	43.66127
	(1.530463)	(2.06041)	(4.384685)	(4.826071)	(6.399586)	(8.54089)	(5.343539)
Number of Observations	42	42	42	42	41	38	21
Adjusted R^2	-0.0174	-0.0387	-0.0657	-0.059	0.0838	0.0498	-0.1463

(a) indicates significance at the 1% level (b) indicates significance at the 5% level (c) indicates significance at the 10% level

Figure 9: Modeling Estimates of Unofficial Employment

	% Sector		Unofficial Employment	
	Agricultural	*Nonagricultural*	*Direct*	*Modeling*
Common	-131.9544[c]	-24.36976[c]	-0.3922712	1.353367
	94.54818	9.462025	13.17609	2.419877
Constant	175.0011	41.47587	50.37762	40.21538
	91.2816	3.963571	8.83918	1.493581
# Observations	10	20	20	42
Wald chi2(1)	1.95	6.63	0	0.31
Upper Limit	100	100	100	100
Lower Limit	0	0	0	0

(a) indicates significance at the 1% level (b) indicates significance at the 5% level (c) indicates significance at the 10% level

Figure 10: Truncated Regressions

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