# Formalization and Technical Efficiency: Evidence from Small Enterprises in Kenya

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## Abstract

*Using a broader definition of formality than often found in the literature, we have identified female ownership, having either parents or siblings in business, better human capital attributes such as being more educated and having benefitted from business training, and firms size as robust predictors of formality status. Our findings also reveal that male-owned small firms are less likely to formalize after start- up as do firms owned by older persons and those who are more educated. There are also notable technical efficiency differences between formal and informal small firms, the later dominating lower levels of productivity. These findings concur with earlier ones that use more restrictive definitions of formality, and suggest difficulties in taking full developmental advantage of a private sector that is dominated by informal firms.*

**Keywords:** Formalization, enterprises, technical efficiency, Kenya

## *1. Introduction*

Job creation and poverty reduction are major policy goals in Kenya. This can be deduced from policy documents such as the Economic Recovery Strategy for Wealth and employment Creation (Republic of Kenya, 2003) and Vision 2030 (Republic of Kenya, 2007). Private sector development is considered critical in attaining these policy goals. However, a vast majority of Kenya's private sector consists of small informal enterprises, and many of the jobs created in recent years are in such enterprises (Republic of Kenya, 2012, 2013). These enterprises also contribute to GDP and skills training (Daniels, 1998).

The nature of informal sector, defined as firm-level activities that are unregulated by the state in a situation where similar activities are regulated (Portes and Shauffer, 1993), in developing countries is a continuing topic of debate. Although small enterprises do transform (Kimuyu, 2011), there are concerns that a vast informal sector may not contribute to growth and poverty reduction. Some authors (e.g. Loazya, 2006) argue that a large informal sector is a sign of underdevelopment; others (e.g. Kenyon (2005) argue that informality of a large part of an economy has adverse consequences for private sector development. Therefore, as part of efforts to improve investment climate the issue of how to tackle informality is receiving more attention.

The number of Informal enterprises has increased considerably over the years. Although they provide jobs to unskilled workers, such jobs are poorly remunerated and workers have no social security. Few informal enterprises transform and become formal. Given the potential negative consequences of informality, an expanding informal sector poses challenges to policymakers who wish to promote private sector development as the channel for creation of decent jobs and poverty reduction. Since the ILO (1972) report on employment and incomes in Kenya, informality has been recognized as a feature of the Kenyan economy. Although it is commonly believed that bringing the informal enterprise within the fold of the formal or registered sector can have numerous beneficial effects for the economy, the transition from the informal to the formal sector is not well understood.

This study undertook new quantitative analyses to gain a better understanding of the reasons enterprises chose to be formal or not, the importance of business heritage in that process, and the impact of formalization on the firm performance. We are interested in two research questions following from this situation. Why do some MSEs formalize while others do not? That is what determines firms' decision to formalize? Does it matter that an entrepreneur hails from a family of business persons? Second, what is the effect of formalization on firm performance? The broad objective of this study is to investigate factors associated with firm formalization and the impact of formalization on firm performance.

The specific objectives are to: (i) identify the determinants of enterprise formalization; (ii) examine the relationship between enterprise formalization and performance; (iii) derive policy implications for firm formalization. For the Vison 2030 objectives to be achieved, Kenya requires greater investments and increased exports activity. This can only be achieved through an efficient formal sector. However, a vast majority of enterprises in Kenya are informal, and this can have adverse consequences for private sector development. For Kenyan policymakers to design appropriate policies to encourage informal enterprises to formalize, they need to know why some firms choose to formalize while others remain informal. At the same time, they need information on the relationship between firm formalization and firm performance.

The literature on enterprise formalization in Kenya is scarce. Bigsten, Kimuyu and Lundvall (2006) and Kimuyu (2011) are perhaps the only studies that examine the issue. These studies either use enterprise registration status as the only indicator of informality or fail to link formality status with firm performance. We argue that informality can be looked at from other perspectives-that is, other indicators can also provide useful information. We also explore the impact of formalization on firm performance.

Section 2 briefly explains the theory of the decision to formalize and the implications for firm performance. It also presents a review of empirical evidence. Section 3 presents the methods and procedures used in analyzing the survey data. Section 4 reports descriptive evidence and econometric evidence on enterprise formalization and performance. Section 5 concludes.

## *2. Literature review*

The first part of this section discusses the theoretical start points for the decision to formalize and the potential impact of formalization on firm performance. The second part surveys empirical evidence on these issues.

### a)  **Theory**

The firm's decision to formalize will depend on perceptions about the benefits and costs of informality (Kenyon, 2007). Johnson, Kaufman, McMillan and Woodruff (2000) identify burdensome and costly government regulations as the reason for business activities taking place in the shadows. Erneste and Schneider (2000) identify the level and administrative complexity of tax laws as the key determinant of informality. A formal enterprise must incur entry costs related to these regulations and laws and once formal must abide by the same. Formality may also expose enterprises to corruption and rent-seeking by public officials. Informal firms save on these costs. Formal firms have some benefits accruing. These include access to formal credit markets, access to contract with the public sector, and access to dispute resolution mechanisms through the judicial system. However, unless informal enterprises perceive these benefits to exceed the costs of formality, they will choose to remain informal. They perceive formality as not being in their self-interest.

Gelb, Mengistae, Ramachandran and Shah (2009) develop a theoretical model based on the assumption that firms may evade taxes subject to a cost (or concealment cost) that is increasing and convex in the firm's employment size. As a result the distribution of labour productivity reflects differences in concealment costs and the opportunity cost of formality. Greater enforcement of laws and better provision of services such as finance and electricity to formally registered firms means that firms are more likely to register. In such a business environment firms that do not register are most likely to be "survivalist" firms. Conversely, weak enforcement of tax laws and insignificant difference in access to services between formal and informal firms means that informal firms have no incentive to register.

The recent literature on informality highlights the adverse consequences of informality for private sector development. Kenyon and Emerson (2005) argue that informality matters. First, it not only stifles investment, but also undermines an economy's competitiveness because many informal enterprises are locked in a low productivity trap. These authors argue that such firms can afford it because they are outside the regulatory and tax regime. But low productivity means that informal firms are locked out of opportunities that could reduce the productivity gap vis-à-vis the formal sector.

### b) **Empirical evidence**

Registration status of firms has been the main indicator of formalization. McKenzie and Sakho (2010) estimate the impact of registering for taxes on firm profits in Bolivia. The impact of tax registration on business profitability is identified using the distance of a firm from the tax office where registration occurs, conditional on the distance to the city center.

The choice of instrument is based on the argument that firm's proximity to the tax office provides more information about registration, but does not directly affect profits. The results show that tax registration leads to significantly higher profits for the firms affected by the instrument. However, the effect of tax formality on profits is not homogeneous. While tax registration increases profits for the mid-sized firms, it lowers profits for both the marginal smaller and larger firms. The study also shows that owners of large informal firms are of higher entrepreneurial ability than formal firm owners.

Fear of high taxation and complex regulations to follow may discourage formalization of firms. Fajnzylber, Maloney, and Montes-Rojas (2011) examine whether high tax rates and complex tax regulations are a barrier to the formalization of micro-firms in Brazil. They also examine whether formalization improves firm revenues, employment and capital stock and the channels through which this occurs. The analysis is based on a micro-enterprise survey and a 1996 reform involving business tax reduction and simplification scheme christened SIMPLES. The results show that SIMPLES increased formalization significantly. In addition, start-ups that chose to operate formally recorded higher revenue and profits, employment and capital intensity (in firms with workers). The improved performance from formalization appears to derive from the lower cost of contracting labor and consequent adoption of production technology that involve permanent location and a larger paid labor force.

Informal sector firms may consider the benefits of formalization to be low. Bigsten, Kimuyu and Lundvall (2004) examined differences between formal and informal firms in inputs use, access to finance and human capital and in factors driving the decision to become either formal or informal at start-up in Kenya. Using the World Bank's RPED survey data (for details of the survey see Bigsten and Kimuyu, 2001), they found that while informal manufacturers were mainly Kenyans of African origin, formal manufacturers were mainly Kenyans of Asian origin. Furthermore, significant differences in experience, productivity and access to finance among Asian formal firms, African formal firms and informal firms were observed. Asian formal firms were the most technically efficient. The productivity difference between informal and formal African firms was not significant. Hence, the incentive for informal firms to transform and become formal appears to be weak.

Estimates of productivity differences between formal and informal firms from a broader set of countries are mixed. Gelb, Mengistae, Ramachandran and Shah (2008) analyzed data from surveys of microenterprises in South Africa, Namibia, Botswana, Kenya, Uganda, Tanzania and Rwanda based on whether or not a firm was registered for taxes. The results show that the labor productivity of informal firms is indistinguishable from that of formal firms in East Africa but not in Southern Africa.

Firm formalization has also been defined in terms of whether or not the firm has requisite licenses. Neil, Günther and Janina (2009) analyze the decision of small and micro firms to formalize, i.e. to obtain business and other licenses in rural Indonesia. Their study is based on the rural investment climate survey (RICS) of non-farm rural enterprises, most of them microenterprises. They also analyze the effect of formalization on costs and benefits (tax payments, corruption, access to credit and revenue). Instrumental variables method is used to handle potential endogeneity of the formalization decision to such benefits and costs. They found that formalization reduces tax and corruption payments. The benefits of formalization, and therefore the probability of being formal, also depend on firm size, education and ethnicity of the business owner.

This study adds to the emerging literature on the determinants of the probability of informal firms becoming formal and the impact of formalization on firm performance. Unlike previous empirical studies that consider only registration status as an indicator of formalization, we consider multiple indicators of formality/informality. In particular, we consider the union of several dimensions of formality.

## 3. Methodology and the data

In this section we present the research methodology employed and describe the data on which the study is based. The study follows multiple approaches to achieve the study objectives.

### a) Empirical approach

First, we estimate probit models to investigate the determinants of enterprise formalization. The probit model is a probability model where: Prob (event $j$ occurs) = Prob($Y = j$) = $F$ [relevant effects: parameters]. In our case the firm is either formal ($Y=1$) or informal ($Y=0$) conditional on a set of characteristics of the business owner, the firm, and location. Regarding the owner, we explore the impact of having had parents, grand parents or siblings in business on the formalization decision.

The parameters can be estimated by the maximum likelihood method using the log-likelihood function. Firm performance is captured by technical efficiency. We estimate a stochastic production frontier model and generate technical efficiency levels. The Stochastic production frontier models were introduced by Aigner, Lovell, and Schmidt (1977) and Meeusen and van den Broeck (1977). In using the stochastic frontier analysis the assumption is that each enterprise produces less than it might due to technical inefficiency. The question is how do mean technical efficiency level compared across different indicators of informality/formality?

## b) Data and sample characteristics

The data come from the multi-country enterprise transformation study. The survey was designed to collect information to explore the transformation of MSE in Africa. The purpose was to identify interventions that could encourage MSEs to enterprises. Four sectors were covered by the survey-wood, metal, food, textile. The survey gathered information on owners, firms and most important, information on firm transformation. It is this information that we exploit in this study. No other survey of MSESs in Kenya contains this type of information.

Table 1 reports the incidence of formality (and informality) based on alternative definitions. Registration status of a firm is often used as the indicator of formality (e.g. McKenzie and Sakho, 2010). According to registration status, 64% of enterprises were formal. Conversely, 40% were informal. Measuring the incidence of formality based on whether firms keep books of account yields an estimate of 74% and 36% respectively. Having a paid manager as an indicator of formality, only 19% of the enterprises was formal.

**Table 1: Proportion of formal enterprises (alternative definitions of formality)**

| Definition of formal enterprise | Observations | Mean |
|---|---|---|
| Firm is registered | 202 | 0.639 |
| Firm keeps books of accounts | 211 | 0.739 |
| Has a hired manager | 207 | 0.188 |
| Firm is registered or keeps accounts or had a hired manager | 212 | 0.797 |

Source: Authors' computations from sample survey data

A union of the three indicators shows that almost 80 percent of the firms are formal. Table 2 provides summary statistics for the enterprises in the sample by formality status.

**Table 2: Descriptive statistics**

| Variable | Formal enterprises | | | | | Informal enterprises | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Obs | Mean | SD | MIN | MAX | Obs | Mean | SD | MIN | MAX |
| Male | 42 | 0.76 | 0.43 | 0 | 1 | 165 | 0.93 | 0.26 | 0 | 1 |
| African Owner | 43 | 0.95 | 0.21 | 0 | 1 | 163 | 0.55 | 0.50 | 0 | 1 |
| Age of the firm | 43 | 16.00 | 11.42 | 1 | 53 | 169 | 21.38 | 15.40 | 2 | 82 |
| Age of Owner | 43 | 41.44 | 11.95 | 24 | 74 | 169 | 45.43 | 12.16 | 24 | 79 |
| Married | 43 | 0.86 | 0.35 | 0 | 1 | 164 | 0.95 | 0.22 | 0 | 1 |
| Parents in business | 43 | 0.37 | 0.49 | 0 | 1 | 160 | 0.61 | 0.49 | 0 | 1 |
| Grandparents in business | 42 | 0.10 | 0.30 | 0 | 1 | 159 | 0.25 | 0.44 | 0 | 1 |
| Siblings in business | 41 | 0.29 | 0.46 | 0 | 1 | 156 | 0.47 | 0.50 | 0 | 1 |
| Owner has low education | 43 | 0.67 | 0.47 | 0 | 1 | 169 | 0.22 | 0.41 | 0 | 1 |
| Owner has secondary education | 43 | 0.28 | 0.45 | 0 | 1 | 169 | 0.30 | 0.46 | 0 | 1 |
| Owner has higher education | 43 | 0.05 | 0.21 | 0 | 1 | 169 | 0.48 | 0.50 | 0 | 1 |
| Owner has business training | 42 | 0.40 | 0.50 | 0 | 1 | 166 | 0.48 | 0.50 | 0 | 1 |
| Output | 32 | 177581 | 192483 | 3600 | 720000 | 141 | 1.94E+07 | 4.11E+07 | 3 | 2.50E+08 |
| Log output | 32 | 11.47 | 1.25 | 8.189 | 13.49 | 141 | 14.13 | 3.07 | 1.099 | 19.34 |
| Capital | 40 | 243181 | 323217 | 350 | 1.5E+05 | 154 | 3.24E+07 | 7.48E+07 | 1500 | 4.00E+08 |
| Log capital | 40 | 11.41 | 1.77 | 5.858 | 14.22 | 154 | 14.56 | 2.82 | 7.313 | 19.81 |
| Number of workers | 32 | 4.66 | 3.53 | 1 | 16 | 115 | 23.30 | 29.73 | 1 | 173 |
| Log number of workers | 32 | 1.31 | 0.68 | 0 | 2.773 | 115 | 2.48 | 1.17 | 0 | 5.153 |
| Wood sector | 43 | 0.16 | 0.37 | 0 | 1 | 169 | 0.26 | 0.44 | 0 | 1 |
| Textile sector | 43 | 0.35 | 0.48 | 0 | 1 | 169 | 0.27 | 0.45 | 0 | 1 |
| Metal sector | 43 | 0.40 | 0.49 | 0 | 1 | 169 | 0.22 | 0.42 | 0 | 1 |
| Firm located in capital city | 43 | 0.65 | 0.48 | 0 | 1 | 169 | 0.57 | 0.50 | 0 | 1 |
| Starting number of workers | 39 | 2.18 | 1.93 | 1 | 10 | 149 | 14.42 | 28.64 | 1 | 200 |

Source: Authors' computations from sample survey data

## *4. Econometric results*

This section presents the estimation results. The first part reports probit estimates of the predictors of the probability of a firm being formal in various dimensions and transition to formal status. The second set of results shows levels of technical efficiency among formal and informal firms.

a) **Determinants of enterprise formality status**

Table 3 presents probit estimates of enterprise formality status based on three indicators of formality.

Male owned enterprises and enterprises in the textile sector are significantly less likely to be registered. Enterprises owned by entrepreneurs whose parents were in business or whose siblings were in business are significantly more likely to be registered. Similarly, firms whose owners have attained higher education are more likely to be registered. Current firm size and firm size at startup (measured in number of employees) are significant predictors of registration status. The message is that larger firms are more likely to be registered than smaller firms. We turn to another dimension of formality-keeping books of accounts. The most visible finding is the role of human capital variables. Firms with relatively more educated owners are more likely to keep books of accounts. Similarly, firms with owners who have business training are also more likely to keep books of accounts. Firms in the wood sector and firms owned by persons whose parents were in business are significantly less likely to keep books of accounts. Large firms are more likely to keep books of accounts.

**Table 3: Probit estimates of enterprise formality status (marginal effects)**

|  | Firm Registered (=1 otherwise 0) | Firm keeps books of accounts (=1 otherwise 0) | Firmre gistered, keeps books of account or has a paid manager(=1 otherwise 0) |
|---|---|---|---|
| Male | -0.00112** | 0.01707 | -0.00001 |
|  | (0.00049) | (0.03589) | (0.00003) |
| African | -0.00201 | -0.04555 | 0.00001 |
|  | (0.00199) | (0.03031) | (0.00006) |
| Age of the firm | 0.00008 | -0.00065 | -0.000001 |
|  | (0.00005) | (0.00086) | (0.000001) |
| Age of Owner | -0.00003 | 0.00111 | 0.000001 |
|  | (0.00005) | (0.00090) | (0.000001) |
| Married | 0.01091 | -0.01258 | 0.00063 |
|  | (0.00954) | (0.03869) | (0.00059) |
| Owner's parents in business | 0.00290** | -0.03599* | -0.00003 |
|  | (0.00144) | (0.02104) | (0.00003) |
| Owner's grandparents in business | 0.00009 | 0.01994 | -0.000001 |
|  | (0.00134) | (0.02050) | (0.00004) |
| Owner's siblings in business | 0.00166* | 0.01146 | 0.00003 |
|  | (0.00099) | (0.01801) | (0.00003) |
| Owner has secondary education | 0.00031 | 0.03485** | 0.00008*** |
|  | (0.00101) | (0.01579) | (0.00003) |
| Owner has higher education | 0.00215* | 0.04178** | 0.00007* |
|  | (0.00110) | (0.02041) | (0.00004) |
| Owner has business training | 0.00190 | 0.03254* | 0.00012*** |
|  | (0.00131) | (0.01952) | (0.00005) |
| Wood sector | 0.00079 | -0.09487* | -0.00041 |
|  | (0.00128) | (0.05627) | (0.00026) |
| Textile sector | -0.01859** | -0.03601 | -0.00063** |
|  | (0.00775) | (0.03768) | (0.00031) |
| Metal sector | -0.00424 | -0.06630 | -0.00100** |
|  | (0.00356) | (0.04304) | (0.00041) |
| Firm located in capital city | 0.00115 | 0.01877 | 0.00005 |
|  | (0.00135) | (0.02227) | (0.00004) |
| Firm size at start-up | 0.00067*** | 0.00043 | 0.00001** |
|  | (0.00021) | (0.00147) | (0.00001) |
| Current firm size | 0.00022** | 0.00492*** | 0.00001*** |
|  | (0.00011) | (0.00182) | (0.000001) |
| Observations | 113 | 117 | 118 |

Note: *** p<0.01, ** p<0.05, * p<0.1; Robust standard errors in parentheses

**b) The transition to formality**

Table 4 shows estimation results for the probit equation with the formality indicator as the union of registration status, keeping books of accounts and having a paid manager. The sub-sample of informal firms decreases considerably. The key predictors of formality are human capital variables, sector of operation and firm size. Some of the formal firms became formal at birth while some firms were informal at birth but became formal after start-up. In this section, we analyse the role of individual and firm characteristics for the timing of formalization decision. When formality is defined in terms of keeping books of account, male owned firms are more likely than female owners to have been formal from the start. Older firm owners are likely to have registered their firms at start-up. Higher education is associated with higher chances of starting formal firms (formality defined as keeping books of accounts) from start-up. Firms in wood and textile sectors are less likely to start-up as formal firms. Those in the wood sector are less likely to have been keeping books of accounts or to register from start-up. Those in the textile sector are less likely to have been formal (defined as being registered) at birth. Firms located in Nairobi (Kenya's capital city) are more likely to have started as formal firms. However, the effect is only statistically significant in one dimension of formality (keeping books of accounts from start-up). An interesting finding was that large firms at start-up as indicated by initial employment are more likely to start formal in both dimensions of formality.

**Table 4: Probit estimates for the determinants of formalization**

|  | Firm always registered(=1 otherwise 0) | Firm always kept books of accounts(=1 otherwise 0) |
|---|---|---|
| Male owner | -0.00153 | 0.00464* |
|  | (0.00364) | (0.00278) |
| Age of the firm | -0.00002 | -0.000001 |
|  | (0.00014) | (0.000001) |
| Age of business owner | 0.00032** | 0.000001 |
|  | (0.00015) | (0.000001) |
| Owner's parents in business | 0.00697 | -0.00001 |
|  | (0.00708) | (0.00010) |
| Owner's grandparents in business | 0.00596 | 0.00015 |
|  | (0.00415) | (0.00010) |
| Owner's siblings in business | -0.00600 | -0.00006 |
|  | (0.00394) | (0.00009) |
| Owner has secondary education | -0.00778 | 0.00009 |
|  | (0.00769) | (0.00009) |
| Owner has higher education | 0.00346 | 0.00088** |
|  | (0.00423) | (0.00035) |
| Owner has business training | -0.00272 | -0.00004 |
|  | (0.00380) | (0.00008) |
| Wood sector | -0.05336** | -0.00334** |
|  | (0.02501) | (0.00171) |
| Textile sector | -0.03458* | -0.00017 |
|  | (0.01809) | (0.00022) |
| Metal sector | -0.00156 | -0.00011 |
|  | (0.00564) | (0.00019) |
| Firm located in capital city | 0.00515 | 0.00076** |
|  | (0.00487) | (0.00039) |
| Firm size at start-up | 0.00140** | 0.00006** |
|  | (0.00064) | (0.00003) |
| Current firm size | 0.00023 | -0.000001 |
|  | (0.00016) | (0.000001) |
| Number of Observations | 80 | 79 |

Note: *** p<0.01, ** p<0.05, * p<0.1; Robust standard errors in parentheses

c) **Technical efficiency and formality status**

Table 5 reports estimates of the stochastic production frontier (Aigner, Lovell and Schmidt (1977). The coefficients of the inputs have expected positive sign. These estimates are used to generate measures of technical efficiency for each enterprise in the sample. We summarize the estimated technical efficiency levels in Figures 1, 2 and 3 in the Appendix for the three definitions of informality. The comparison suggests that informal enterprises dominate at lower levels of technical efficiency distribution, while formal firms dominate the upper levels of technical efficiency distribution.

**Table 5: Stochastic production frontier estimates (dependent variable is log output)**

| Variables | Ordinary Least Squares estimates | Maximum Likelihood estimates |
|---|---|---|
| Log(Physical capital) | 0.382*** | 0.422*** |
| | (0.070) | (0.074) |
| Log(Number of employees) | 1.126*** | 1.032*** |
| | (0.166) | (0.173) |
| Constant | 5.709*** | 6.631*** |
| | (0.722) | (0.742) |
| Log likelihood value | | -216.158 |
| R-squared | 0.744 | |
| Likelihood-ratio test: $H_0$: $\sigma_u^2 = 0$: | | $\chi^2(1) = 3.17$ |
| | | P-value = 0.038 |
| $\sigma_v$ | | 0.923 |
| | | (0.172) |
| $\sigma_u$ | | 1.577 |
| | | (0.326) |
| $\sigma^2 = \sigma_u^2 + \sigma_v^2$ | | 3.338 |
| | | (0.803) |
| $\lambda = \sigma_u / \sigma_v$ | | 1.708 |
| | | (0.474) |
| Number of observations | 128 | 128 |

Note: *** p<0.01, ** p<0.05, * p<0.1; Standard errors in parentheses

## 5. *Summary and conclusion*

Informal firms are ubiquitous in the developing world. Although literature adduces some evidence that informal firms do transform, there continuing research debates about the structure of informal firms, the drivers of their overall performance and their future prospects. This paper contributes to the debate by exploring predictors of the decision to formalize, the influence of business heritage in formality choices, and the efficiency implications of formalization. This works extends early work by Bigsten, Kimuyu and Lundvall (2004) by expanding the definition of informality beyond that which is purely legal to include keeping books of accounts and changing management structure to include employed manager.

Applying probit and stochastic frontier methodologies on unique data set that mopped up not only initial conditions at firm start-up but also firm dynamics up to the time of survey, we have demonstrated that the entrepreneur's personal attributes such as gender, educational attainment and a business background are useful predictors of formality status as are the sizes of the firm at start-up and at the time of the survey. The transition from informality to formality is muted and harder to model on that account although the entrepreneur's gender, age and educational status appear somewhat important in that decision.

Our findings on predictors of formality status are however generally robust to different measures of formality. It was also found that informal firms enjoy lower levels of technical efficiency than the formal ones. These results concur with earlier ones based on narrower definition of formality, and suggest that further efforts should be made to reduce the costs of formalization in order to increase its incidence. Considering the importance of business heritage in predicting formality status, high levels of employment that have driven Kenyan to find self employment in the informal sector provide an excellent setting for more formal business is the future.

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**Appendix**

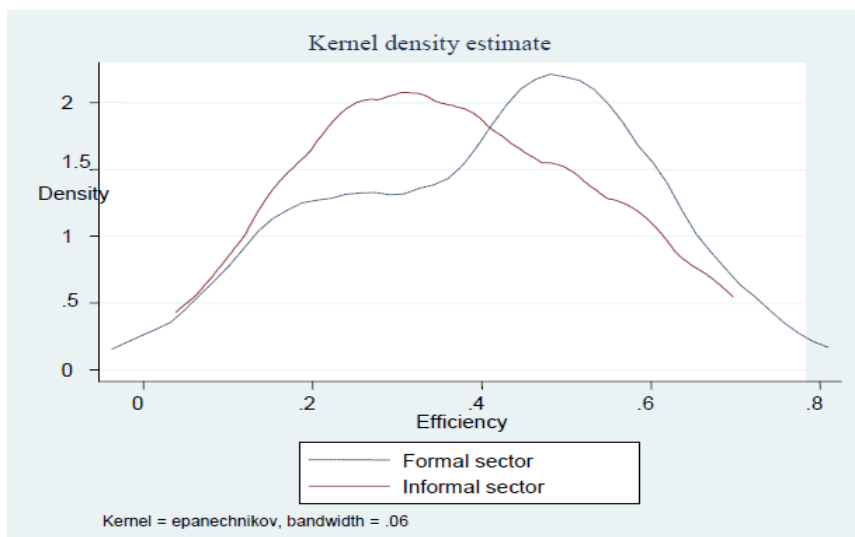**Figure 1: Technical efficiency by formality status (union definition of formality)**



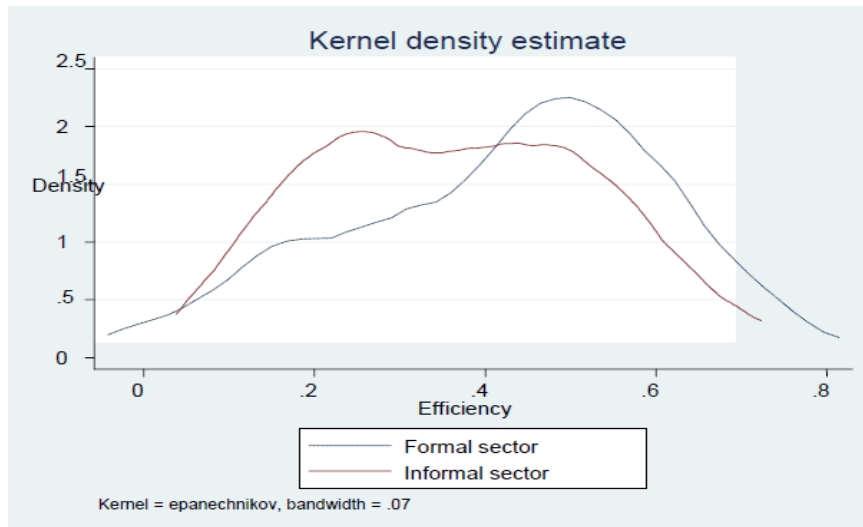**Figure 2: Technical efficiency by registration status (registered firm= formal)**



**Figure 3: Technical efficiency by formality status (Firm keeps books of accounts)**