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Unlocking Productive Entrepreneurship in Ethiopia: Which Incentives Matter?

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Abstract:

Twenty years after the launch of market reforms, productive entrepreneurship and vibrant small and medium-sized enterprises (SMEs) in Ethiopia remain limited, the recent growth acceleration notwithstanding. This paper first develops a model of entrepreneurial start ups in an economy with frictions in the product and labor markets and a large informal sector, which characterize the Ethiopian institutional landscape. It then examines several mitigating policies that could improve the suboptimal outcomes. The main

findings are that search subsidies would be more effective in encouraging entrepreneurial start ups than wage subsidies, although fewer entrepreneurs may choose to operate in the formal sector than under the latter. Regarding the reform agenda, priority should be put on removing rigidities and establishing property rights. To be effective, both types of subsidies should have a time limit and be phased out with reforms of the business environment, strengthened property rights, and improved labor markets.

Keywords: Model of entrepreneurial start ups, labor markets, frictions, informal sector

JEL Classification: L26, J24, J48, O17.

1. Introduction

Policymakers in Sub-Saharan Africa (SSA) are well aware of the positive role that productive entrepreneurship and small and medium-sized enterprises (SMEs) can play in development of their economies. Productive SMEs can create jobs, broaden the tax base, diversify risks, innovate and adopt new technology. The role of SMEs as engines of growth was shown by the postwar recovery in Austria and Germany and by the diverging paths of the Central European and Baltic countries from those of the CIS countries, among others. In transition economies, the productivity gains, employment, and the convergence to the income levels of the EU-15 countries have hinged on a dynamic private sector, and especially new firms. SMEs have been one of the main driving forces in China's recent growth.

Entrepreneurship and SMEs have received increased interest in the context of the global financial and economic crisis, with developing and emerging market countries searching for other sources of growth than exports and FDI. As countries more integrated into the global economy were hit severely by the crisis, their policy makers turned attention towards domestic and regional demand to diversify risks. The crisis has raised the role of SMEs as the potential drivers of structural change, employment, and growth. It showed that state has an important role to play in development and underscored usefulness of well-targeted government interventions.

After coming to power in 1991, the new Ethiopian government launched market reforms, with a view to develop a vibrant private sector and SMEs. Until recently, however, the economy was dominated by low productivity firms mostly in the informal sector, while the highly productive SMEs could be found only in a few regions and sectors. The lack of good (productive and well-paid) private jobs discouraged workers from acquiring skills, as payoffs for doing so remained low.ⁱ In turn, the lack of skilled workers constrained firms' choices of activities. On the more positive side, hopes that the private sector and SMEs would contribute to growth and employment have gradually started to materialize in selected sectors (especially services) since mid-2000s. Still, aside the recent rapid growth driven mostly by public infrastructure investment, agriculture and a few sub-sectors in services, the productive SMEs have remained limited, especially in manufacturing. The majority of the country is in a vicious circle of low productivity, low-paid jobs, and poverty. Developing further the private sector and productive SMEs is thus a key policy challenge.

This paper develops a model of entrepreneurial start-ups in an economy with frictions in the labor and product markets and with a sizeable informal sector, as is the case in Ethiopia. The model builds on several strands of literature. First, it extends the framework of Brixiova, Li, and Yousef (2009) for transition economies to the case of a low income country by modeling: (i) the imperfect competition (and information) in the skilled workers' labor market; (ii) the frictions in the product markets; and (iii) firms' decision to operate in the formal or the informal sector.

ⁱ Those who acquire skills often emigrate, thus contributing to the brain drain.

Second, building on Snower (1996), the model shows that the labor market failures, including imperfect information, lead to suboptimal outcomes -- especially in low-income countries such as Ethiopia where exchanges in the skilled labor market are sparse and institutions underdeveloped. The large informal sector and the lack of institutions blur entrepreneurs' information about available workers and discourage them from search, and vice versa. Together with the rigid business climate, they impede the highly-productive private sector employing skilled labor. The model focuses on creation of new firms and the informal sector, which characterize Ethiopia and other low-income countries.ⁱⁱ

Finally, the framework differs from that of Gelb et al. (2008) as it considers how regulations, including weak property rights, influence firms' decision to formalize. The model reflects several stylized facts of the Ethiopian urban labor market and examines which policies help develop the highly productive formal SME sector.ⁱⁱⁱ In sum, the model in this paper focuses on start-ups of highly-productive private firms in the formal sector, as their absence is a key constraint to productivity and job growth in Ethiopia.

The paper is organized as follows. Section 2 gives stylized facts on the SME sector and the urban labor market in Ethiopia, including new empirical estimates of the informal sector. Section 3 presents the model, while Section 4 examines the impact of several policies on SME start ups. Section 5 concludes.

2. Stylized Facts on SMEs and the Urban Labor Market in Ethiopia

Since Ethiopia's departure from the central planning, its economy has had unique features. The predominant role of the state sector in the non-agricultural output, low private job creation, and high unemployment make it akin to an early-stage transition economy. At the same time, Ethiopia is one of the poorest countries in the world, with: (i) a large and dualistic informal sector; (ii) high and almost constant share of agriculture in output; (iii) pervasive labor market frictions, including imperfect information; and (iv) a rigid business environment. The sections below highlight main stylized facts about SMEs and the urban labor market.^{iv}

ⁱⁱ This framework differs from that of Snower (1996), who focused on vacancies in existing firms in the formal sector in advanced economies.

ⁱⁱⁱ A more technical version of the model, which utilizes the dynamic programming approach, is in Brixiova (2010). This paper, however, addresses a different set of issues. In addition to carrying out new empirical estimates of the informal sector in Ethiopia, the theoretical framework in this paper models: (i) workers' decision to acquire skills; (ii) entrepreneurs' decision to open their firm in either the formal or the informal sector; and (iii) cost-benefit comparison of subsidizing entrepreneurs' search and subsidizing wages of skilled workers.

^{iv} This paper focuses on urban labor markets. Utilizing data from southern Ethiopia, Kimhi (2010) shows that encouraging rural entrepreneurship may be favorable for both income growth and distribution.

2.1 Limited Formal Private Sector

The role of the private sector in the Ethiopian economy has evolved in several stages.^v Economic policy of the socialist Derg regime during 1974-1990 was based on central planning. Private property was nationalized and private sector activities discouraged. When the new government embarked on market reforms in 1991, it aimed at reducing bureaucratic procedures and encouraging a rapid growth of the private sector.

Twenty years later, however, the role of the productive private sector remains restricted to several exceptional sectors (leather, flowers) and is limited otherwise. Progress with developing manufacturing in particular has stagnated. Subsequently, the share of the state sector in industrial output has been around 50 percent since 2000, after a decline from 80 percent in the mid-1990s. While the majority of SMEs are private, very small firms predominate and the highly productive formal SME sector is thus underdeveloped.

Due to the lack of the vibrant private sector and the stagnating state sector, a wide productivity gap has emerged between Ethiopia and emerging market economies (e.g., China or India) and also some African frontier markets (e.g., Mozambique or Uganda) (Figures 1 and 2). The productivity growth in Ethiopia was both much slower than in these countries and more volatile (Table 1). The last four years are a break with the past – but it remains to be seen whether this trend is sustainable given the continued rigidities that characterize the economy.

Table 1. Productivity growth and volatility in selected countries, 1992 - 2008

	1992 - 2008		2004 - 2008	
	mean	rel. st. dev	mean	rel. st. dev
	(%)	(% of mean)	(%)	(% of mean)
Ethiopia	2.1	305.0	7.1	14.7
China	9.2	21.0	9.8	11.4
India	4.5	44.7	6.7	14.8
Mozambique	4.3	101.8	5.1	21.1
Uganda	3.8	59.3	4.6	36.4

Source: Authors' calculations based on the African Development Bank and the ILO.

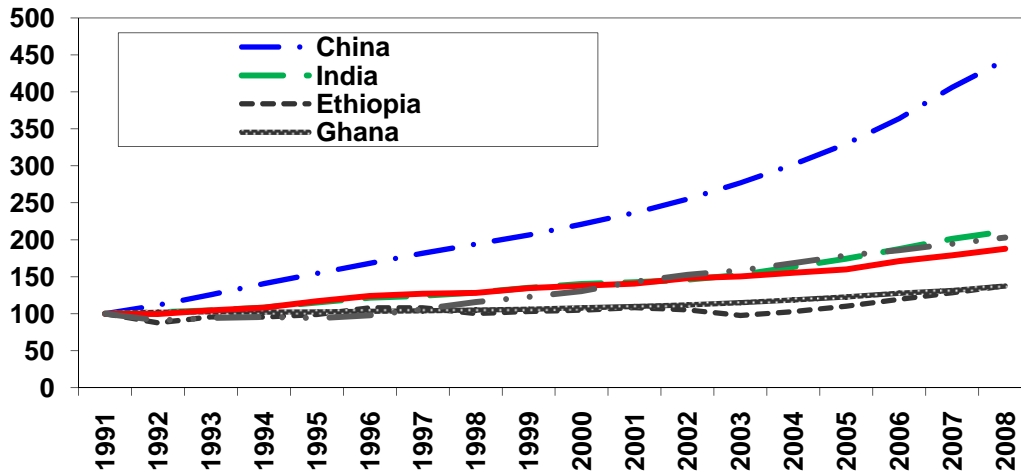
2.2 High Unemployment, Obstacles to SMEs

Regardless of recent growth, the urban labor market has been characterized by persistently high unemployment, which disproportionately affects young people (Figure 3). On the supply side, the contributing factors included a rapidly growing urban population, which more than doubled between 1990 and 2007, from about 6 to 13 million. On the demand side, the stagnating private sector has not created enough jobs to

^v The private sector includes all agents in the economy not formally classified as in the public sector that is agents involved in the government, state-owned enterprises or parastatals, and independent public agencies.

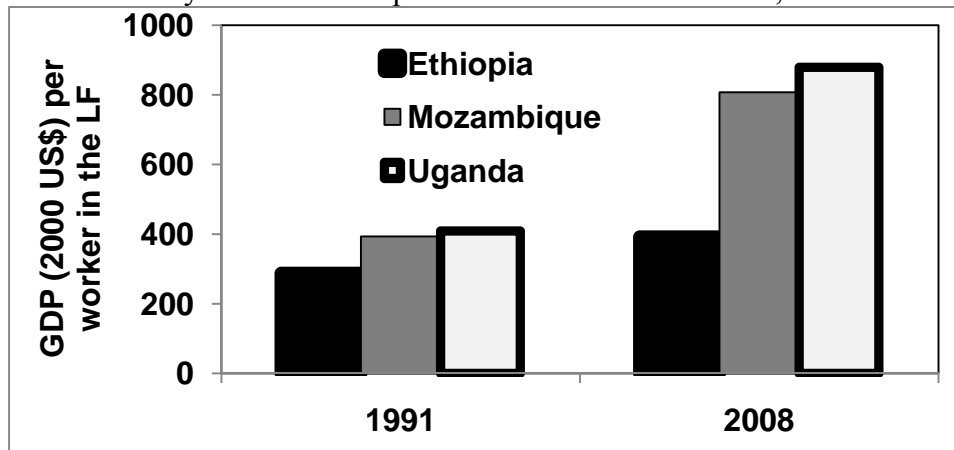
absorb the labor stemming from the fast population growth and the declining public sector. Exit rates from unemployment into the formal private sector have been very low.^{vi} Thus only about half of the total urban population employed in the formal sector was in the private sector. The regional distribution was also uneven, with most of the private sector concentrated in and around Addis Ababa.^{vii}

Figure 1. Labor Productivity, Index (1991 = 100), 1991 – 2008 1/



Source: African Development Bank, ILO and authors' calculation. 1/ Labor productivity is measured in terms of number of people employed.

Figure 2. Productivity levels in Ethiopia and selected African LICs, 1991 and 2008 1/



Source: The African Economic Outlook database, the ILO database, and authors' calculations. 1/ Labor productivity is measured as GDP (in 2000 US\$) per worker.

^{vi} Among workers unemployed in 1994, 30 percent were still unemployed in 2004, while another 22 percent left the labor force altogether. Of those who found jobs, 70 percent went to the informal sector and only 17 percent ended up in the formal private sector (World Bank, 2007a and 2007b).

^{vii} To put Ethiopia's private sector in perspective, a comparison with regional peers and other transition economies may be useful. In Tanzania, the private sector has been the main driver of growth, and it accounted for about 70 percent of non-agricultural GDP in 2000. In most transition countries, which started transition to market in early 1990s, the private sector accounted for most of output by the mid-2000.

In sum, even in 2010, the Ethiopian private sector consists mostly of small-scale, informal, low-productivity firms.^{viii} What factors then have impeded faster creation of highly productive SMEs in the formal private sector? They have changed over time. According to the World Bank's first Assessment of the Investment Climate in 2001/02, high tax rates were the most common complaint of entrepreneurs at the time, cited by 70 percent of respondents. An inefficient and unpredictable tax administration and inadequate access to land associated with unclear property rights followed. The credit constraint was viewed as important, but somewhat less than the tax regime and land access.^{ix} The lack of skilled workers affected 20 percent of entrepreneurs surveyed.

Figure 3a. Employment Rate and Youth Unemployment Rate by Urban Centers, 2005

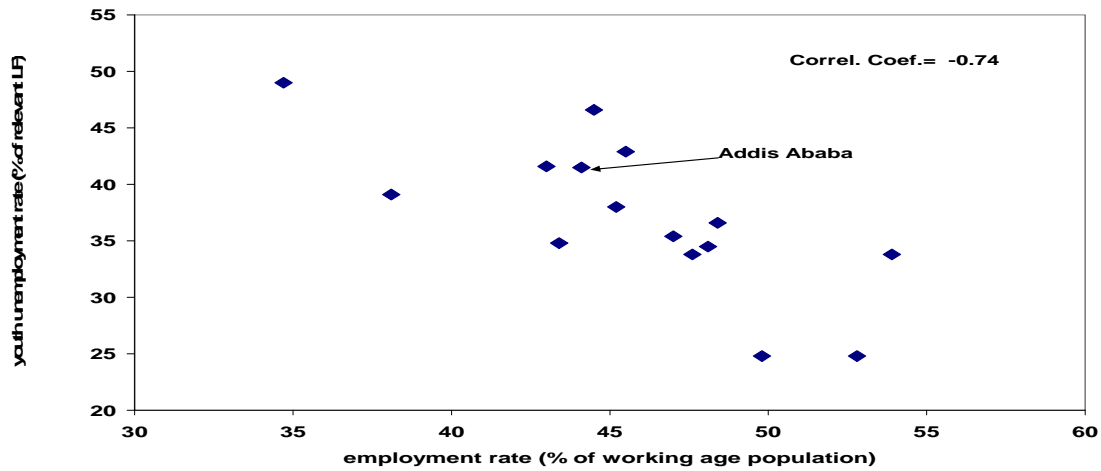
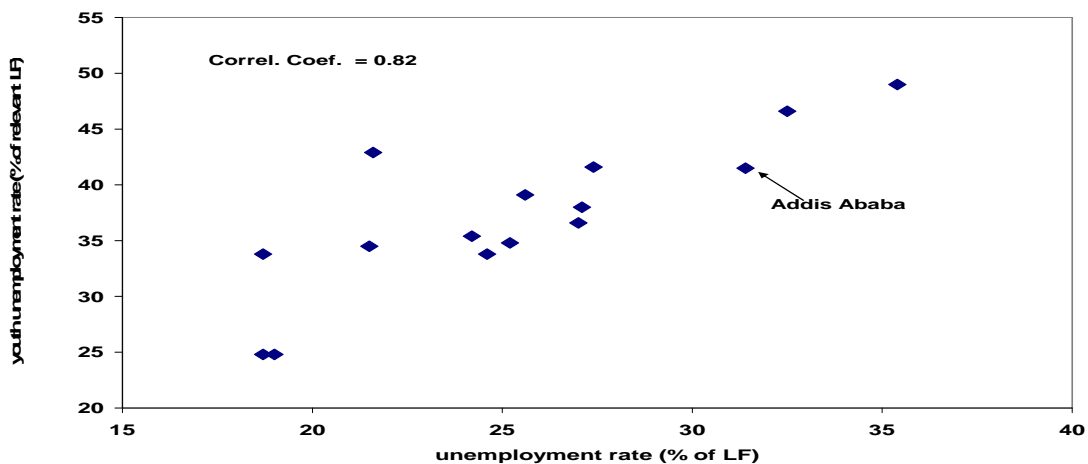


Figure 3b. Total and Youth Unemployment Rates by Urban Centers, 2005



Source: Central statistical office and author's calculations. 1/ Urban centers have above 2000 inhabitants.

^{viii} The thriving leather industry is one of the exceptions. In the early 2000s, it gained share in the domestic market, with its growth being driven by new entrants and expansion of incumbents (Sonobe et al., 2009).

^{ix} For SMEs to grow, their access to credit is crucial. While this topic is important, it has been addressed elsewhere. See Brixiova and Kiyotaki (1997) for transition economies and Gries and Naudé (2010) for developing countries.

2.3 Large and Dualistic Informal Sector^x

Similarly to other low-income countries, the informal sector accounts for a large share of the Ethiopian economy. Given a wide range of estimates of its size (World Bank, 2007a and 2007b, Central Statistics Authority, 2008) new estimates of the size of the Ethiopian informal sector are carried out. Specifically, the “discrepancies in monetary balances” approach is applied to recent data (Annex). The empirical analysis revealed that while the size of the informal output varied across periods, on average it amounted to 30 percent of the official GDP.^{xi} Since the informal sector tends to be labor intensive, the share of its labor force would then be above 30 percent. This is consistent with various surveys, which found that the informal sector accounts for 45-50 percent of employment in all urban areas.^{xii} This estimated range of the informal sector is then used in the numerical simulations of the theoretical model developed below.

The majority of SMEs operate in the informal sector, which consists mostly of low-productive – competitive and largely undifferentiated -- firms concentrated in manufacturing and trade. Still, some highly productive SMEs also operate in the shadow economy, in particular small-scale manufacturing firms. This more dynamic tier typically employs more educated workers. Estimates suggest that this group of SMEs constitutes around 20 percent of the informal sector. The informal sector in Ethiopia is thus dualistic, albeit more stagnant than in, for example, Mexico (World Bank, 2007a). The low productivity of the informal sector results in low wages, especially for unskilled workers. Urban labor markets in Ethiopia are characterized by a large wage gap between the formal and informal sectors (estimated at 30 – 40 %in 2004).^{xiii}

2.4 Labor Market Rigidities

The skill shortages in Ethiopia have been evident by relatively high returns to education, measured by wages of educated relative to wages of the uneducated workers.^{xiv} At the same time, unemployment rates of young people with high school and higher education have been high, pointing to a mismatch between skills supplied by the educational system and those demanded by the private sector (Figure 3b). Moreover, 1/5

^x Firms are considered informal if they have no book of accounts; no license; and employ fewer than 10 workers. Regarding drivers of innovation, Gebreeyesus (2009) finds that vocational training has a strong effect on the innovation activity.

^{xi} The informal economy was particularly large in the 1980s due to the widespread conflict and heavy tax burden imposed by the government. With reform packages introduced in the 1990s, the size of the informal economy contracted, under the new more market-friendly economic structure of the economy.

^{xii} Informal employment amounts to about 35 percent in urban centers, but studies exclude domestic employees, thus underestimating the size of the informal sector.

^{xiii} Wage gaps between formal and informal sector and between public and private sector play a central role in generating unemployment (Kingdon, Sandefur and Teal, 2006).

^{xiv} Taking the illiterate workers as the benchmark, education raised wages by 26 percent for those with grade 1-4 and by 130 percent for the highest skilled (Denu et al., 2005).

of vacancies in early 2000s remained unfilled, due to the lack of skilled workers or their unwillingness to relocate from the urban to the rural areas (World Bank 2007b).

The skill shortages have been amplified by the imperfect information, which has hampered the matching process. Put differently, due to the limited exchanges at skilled labor market and underdeveloped institutions, skilled workers are not always aware of available vacancies, while employers posting them may now know where to find the skilled workers. Furthermore, even though the employment exchanges are formally responsible for informing the unemployed about openings, their services are rarely used. Instead, job seekers search through relatives, stop by at work sites, or establish their own enterprise. The declining vacancy-to-unemployment ratios posted by agencies thus also reflect the reduced trust of firms in agencies' services, in addition to scarcity of jobs (Denu et al, 2005).

3. The Model

The model outlined below reflects several of the key stylized facts on the labor markets in Ethiopia: (i) low formal private employment, (ii) the large informal sector consisting of self-employed and small, low-productivity enterprises, and (iii) the wage and productivity gap between firms in the formal and informal sectors.

3.1 The Environment

The population size is normalized to 1. There are two types of agents, entrepreneurs and workers, with population shares μ and $1 - \mu$, respectively.^{xv} They live for 1 period, are endowed with 1 unit of time and \bar{w} amount of consumption good, and have risk neutral preferences, $E(c)$, where c denotes consumption and E the expectations they form at the beginning of the period.

Entrepreneurs

At the beginning of the period, entrepreneurs search for opportunities to open private firms. This effort costs them $d(x) = x^2 / 2\gamma$, $\gamma > 0$, units of consumption good, and results in the probability x of finding a business opportunity with high productivity, z_s . In order to turn a highly-productive opportunity into a highly-productive firm, each entrepreneur needs to hire \bar{n}_s number of skilled workers.^{xvi} Denoting m_p as number of entrepreneurs with skilled vacancies, $V_s = m_p \bar{n}_s$ as the number of the aggregate skilled

^{xv} Thus supply of entrepreneurs is not endogenous. Entrepreneurs tend to be individuals with specific background. For example, Djankov et al (2006) found that family characteristics had a strong influence on becoming an entrepreneur in China. Similar assumption is used in Gelb et al. (2008) for Africa.

^{xvi} This assumption reflects that productive firms employ mostly productive workers. Fafchamps et al., 2006, who examined employee-employer matched data for 11 African countries, confirmed this empirically also for Ethiopia.

vacancies, N_s as total number of skilled workers searching for jobs, and h number of matches, the matching function can be described as:

$$h = A \min(N_s, V_s) = A \min(N_s, m_p \bar{n}_s) \quad (1)$$

where A is constant.^{xvii} $A < 1$ since skilled workers have imperfect information about available vacancies and entrepreneurs with skilled vacancies are also not fully aware of available skilled workers. Entrepreneurs with high-productivity business opportunities thus find skilled workers with probability $\rho = A \min[\frac{N_s}{V_s}, 1]$.^{xviii} Policy measures that raise

A increase the efficiency of the matching process; they include information dissemination and, more generally, job search support, establishment of a national job databases, and quality of labor market placement offices. Transport infrastructure and housing supply are also important, as they allow linking suitable jobs and workers in different locations, overcoming regional mismatches.

After finding both the business highly-productive opportunity and skilled workers, entrepreneurs decide whether to operate in the formal or informal sector. If they operate in the formal sector, they produce output according to $y_s^F = \beta^F z_s \bar{n}_s$. The output is influenced not only by the productivity of the opportunity, z_s , but also by the quality of the business climate in the formal sector, which enters as an efficiency component of the production function β^F , $0 \leq \beta^F \leq 1$.^{xix} Each entrepreneur running a highly productive firm in the formal sector is also taxed at rate τ , where $0 < \tau < 1$, and earns after-tax profit:

$$\pi_s^F = (1 - \tau)(\beta^F z_s \bar{n}_s - w_s^F \bar{n}_s) \quad (2)$$

where w_s^F is the wage of skilled workers employed by formal sector firms, determined through bargaining. If the entrepreneurs decide to operate in the informal sector, they do not pay profit taxes. However, the business climate in the informal sector, approximated by β^I is less favorable than in the formal sector, that is $0 < \beta^I < \beta^F < 1$.

^{xvii} In the widely used dynamic search model of Mortensen and Pissarides (1999), the matching function takes Cobb-Douglas form and is described by $h = AU^\alpha V^{1-\alpha}$.

^{xviii} In (1), the skilled workers do not always find skilled employment due to the imperfect information. As Snower (1996) points out, when firms are imperfectly informed about the availability of skilled workers and workers about availability of firms, even skills that are useful to all firms are not general since not all firms have access to these workers. Such skills are also not specific since more than one firm usually has access to an available skilled worker.

^{xix} More generally, β^F reflects quality of formal institutions. Amoros (2009) shows empirically that differences in institutional quality help explain differences in entrepreneurship across countries.

The output of the highly-productive firm in the informal sector, $y^I = \beta^I z_s \bar{n}_s$ and the wage rate, w_s^I , are also lower than those in the formal sector. In addition to imposing tax rate τ on firm profits, the government monitors tax payments and detects tax evading firms with probability $\phi \in (0,1)$. Assuming that the government confiscates the firm's entire profit if it detects tax evasion, the expected profit of the firm operating in the informal sector amounts to:

$$\pi_s^I = (1 - \phi)(\beta^I z_s \bar{n}_s - w_s^I \bar{n}_s) \quad (3)$$

The tax-evading entrepreneur takes the probability of being detected, ϕ , as given. After finding the high-productivity opportunity and skilled workers, the entrepreneur will choose to operate in the informal sector if the after-tax profit in the formal sector is less than the expected profit in the informal sector, that is if $\pi_s^I < \pi_s^F$.

Entrepreneurs who do not find highly-productive opportunities or skilled workers open low-productivity firms in the informal sector, with productivity per worker of z_u . As with the highly-productivity firms, their actual productivity is lowered by the business climate factor β^I , $0 < \beta^I < 1$. The entrepreneurs employ unskilled workers, \bar{n}_u , where $0 < \bar{n}_u < \bar{n}_s$. Since they are also subjected to tax monitoring and full confiscation for tax evasion, their profit amounts to:

$$\pi_u = (1 - \phi)(\beta^I z_u \bar{n}_u - w_u \bar{n}_u) \quad (4)$$

where w_u is the wage in the low-productivity firm, which equals the income, b , of the self-employed in the informal sector, and ϕ is the probability of being detected.

Workers

Workers acquire skills demanded in the highly productive private firms, and incur cost $k(q) = q^2 / 2\theta$, where $\theta > 0$. Their effort results in probability q of obtaining skills.^{xx} Skilled workers find employment in a high-productivity firm with probability $\xi = A \min[\frac{V_s}{N_s}, 1]$. Workers who do not obtain skills or do not find skilled jobs work in the informal sector, either as self-employed or in low-productivity firms. In both cases they earn income amounting to $b < w_s$.

While the market for unskilled workers is perfectly competitive, wages for the skilled workers are set through decentralized Nash bargaining between them and the

^{xx} x (and q) are restricted to be between 0 and 1. This assumes that despite their efforts, workers (entrepreneurs) occasionally fail to acquire skills (find business opportunities).

highly-productive private firms.^{xxi} If bargaining between matched workers and entrepreneurs does not lead to an agreement, both workers and entrepreneurs would get the income from self-employment in the informal sector, b . Since the outcome of decentralized bargaining depends on the relative strength of the skilled worker and the firm, α , $0 < \alpha < 1$, the resulting wage is:

$$w_s^h = \alpha(\beta^h z_s - \pi_u) + (1 - \alpha)b; h=F, I \quad (5)$$

where F denotes the formal and I the informal sector. Because the business climate is more favorable in the formal sector and hence productivity there is higher, that is $\beta^F > \beta^I$, the wage of the skilled worker in the formal sector exceeds that of the same worker in the informal sector, in line with productivity differences. Accordingly, the wage gap between the skilled and unskilled jobs is $\alpha(\beta^h z_s - \pi_u - b)$, $h = F, I$ and is again wider for the formal sector workers.^{xxii}

Labor Market Equilibrium

The characterization of the environment is completed by the labor market equilibrium conditions. Denoting m_u as the share of entrepreneurs running low-productivity firms and employ the unskilled workers, the market equilibrium condition for the entrepreneurs is:

$$\mu = m_s^h + m_u, h = F, I \quad (6)$$

Similarly, denoting $n_s^h = m_s^h \bar{n}_s$, $h=F, I$, to be the total number of skilled labor employed in the high-productivity private sector (again either in the formal of the informal sector), and $n_u = m_u \bar{n}_u$ total unskilled labor in the low-productivity firms in the informal sector, and n_i total number of self-employed in the informal sector, the market equilibrium condition for workers is:

$$1 - \mu = n_s^h + n_u + n_i, h = F, I \quad (7)$$

3.2 Solution

Maximizing the utility of workers and entrepreneurs and substituting from the labor market conditions yields the following decentralized equilibrium conditions:

^{xxi} Any recontracting is assumed away. Nash bargaining was also utilized by Acemoglu (1996) in a matching framework akin to the one in this paper. Bougheas and Reizman (2010) use mechanism where surplus from the match is divided between workers and firms and show that results are robust to alternative matching mechanisms.

^{xxii} Mengistae (2001) found that both skills and job-matching influence wage growth in manufacturing in Ethiopia.

$$\frac{x}{\gamma} = \rho(\pi_s - \pi_u) = A \min \left[\frac{(1-\mu)q}{\mu x \bar{n}_s}; 1 \right] (\pi_s - \pi_u) \quad (8)$$

$$\frac{q}{\theta} = \xi(w_s - b) = A \min \left[\frac{\mu x \bar{n}_s}{(1-\mu)q}; 1 \right] (w_s - b) \quad (9)$$

$$w_s = \bar{p}w_s^F + (1 - \bar{p})w_s^I, \quad \text{and} \quad (10)$$

$$\bar{p} = \begin{cases} 1 & \text{if } \pi_s = \pi_s^F(w_s^F) \geq \pi_s^I(w_s^I) \\ 0 & \text{otherwise} \end{cases} \quad (11)$$

where w_s^h , $h = F, I$, is specified in (5). Equation (8) states that in equilibrium, the marginal cost of entrepreneur's search for a business opportunity, x/γ , is equal to the profit from search. According to (9) - (11), the workers' marginal cost of acquiring skills equals the net marginal benefit from working, which amounts to the expected difference between the skilled wages and the income from self-employment. In (9) and (10), the number of skilled vacancies is $V_s = \mu x \bar{n}_s$, $h = F, I$, where $m_p = \mu x$ is the number of entrepreneurs who found highly productive business opportunity that to operate in sector h . Similarly, the number of skilled workers searching for skilled jobs is $N_s = (1 - \mu)q$; $h = F, I$.^{xxiii}

Due to several factors, the equilibrium conditions (8) – (11) lead to suboptimal outcomes in terms of workers' and firms' efforts and hence the number of SMEs. Because of frictions in the business environment, entrepreneurs under-invest in searching for business opportunities relative to the effort they would exert in a more conducive climate. As the impact of the lack of skilled vacancies is amplified by the imperfect information in the labor market, workers are uncertain that they will find skilled jobs and thus under-invest in training.^{xxiv}

The harsh business climate, high tax rates, weak monitoring of tax evasion and strong bargaining power of skilled workers drive high productivity firms into the informal sector. By lowering productivity and skilled wages, these factors discourage workers from acquiring skills. Policies to address the above weaknesses through better incentives are discussed below.

^{xxiii} The model either has (i) a unique trivial equilibrium where workers and entrepreneurs exert zero effort, or (ii) a trivial equilibrium and a unique one with positive effort by workers and entrepreneurs. In what follows, we focus on the unique equilibrium with positive workers' and entrepreneurs' efforts.

^{xxiv} Underinvestment in training is also exacerbated by low wages reflecting low productivity.

4. Subsidies and Other Policies

Since the early 1990s, Ethiopia has been supporting SMEs through the investment incentives scheme, consisting of exemptions from income taxes and duties on imported capital goods. The income tax exemption scheme applies to SMEs in specific industries and located in government-preferred or underdeveloped locations (Ayele, 2006). So far, it has thus only limited impact on Addis Ababa and surrounding regions where majority of SMEs operate.^{xxv} While other initiatives exist, their scope has been limited. More proactive policies towards the SME sector along the lines of those adopted in other countries are currently being explored.

In 2000 China adopted national policy to support SMEs, especially high-tech and innovative SMEs, which launch new products and improve quality of existing ones; in 2003 the policy was adopted as Law on Promotion of SMEs. China's program is particularly focused on helping technology-based start ups in selected – high-productivity, high value added – innovative industries. Clearly, which sectors are innovative and highly productive depends on country-specific circumstances, including level of development, endowments, capital stock. One of the promising sectors in Ethiopia seems to be agro-processing, especially in rural areas.^{xxvi}

Sections below examine the impact of policies on (i) entrepreneurs' search for highly-productive business opportunities; (ii) their decision to operate in the informal sector and (iii) workers' effort to acquire skills.

4.1 Subsidizing Entrepreneurs' Search

One of the policy options consists of (partial) government financing of the entrepreneurs' search for highly productive business opportunities.^{xxvii} In case of subsidy that is proportional to the entrepreneurs' search, sx , equation (8) now changes to:

$$\frac{x}{\gamma} = \rho(\pi_s - \pi_u) = A \min \left[\frac{(1-\mu)q}{\mu x \bar{n}_s}; 1 \right] (\pi_s - \pi_u) + s \quad (12)$$

The workers' training curve is as in (9) and (10); the entrepreneur's choice of sector is described by (11). Subsidizing entrepreneurs' search will raise their efforts, but it will not

^{xxv} Investment incentives were first introduced in 1960s, abolished during the Derg regime and then reintroduced with the change of the government in the early 1990s.

^{xxvi} World Bank (2009) suggests that Ethiopia's comparative advantages "are ... cultural and human capital as embedded in art, jewelry and handicrafts-creating industries...." The report argues that at the current stage, policies should not limit Ethiopia's self-discovery process through lock-ins into static choices.

^{xxvii} In practical terms, these subsidies could include support for training of entrepreneurs to overcome their own skill shortages. Martinez et al. (2010) found that greatest effect of such training on early-stage entrepreneurial activity is in countries with favorable institutional contexts, consistently with the model developed in this paper.

impact choice of sectors, which depends on profit tax rate, τ , the business environment relative to conditions in the informal sector, β^F / β^I , and the probability that informal firms are detected, ϕ .^{xxviii}

4.2 Subsidizing Skilled Workers' Wages

Another policy contemplated and implemented to encourage highly productive businesses is subsidizing wages of skilled workers.^{xxix} In case of the wage subsidy per skilled worker amounting to ω , profit of the entrepreneur in the formal sector, who receives wage subsidy ω per skilled worker hired, is: $\pi_s^F(\omega) = (1 - \tau)[\beta^F z_s \bar{n}_s - (w_s^F(\omega) - \omega)\bar{n}_s]$. Profit of the entrepreneur working in the informal sector is unchanged, that is $\pi_s^I = (1 - \phi)(\beta^I z_s \bar{n}_s - w_s^I \bar{n}_s)$.

Workers capture part of the subsidy in proportion to their bargaining power, α . The wage of skilled workers working for a firm in the formal sector then increases to: $w_s^F(\omega) = \alpha(\beta^F z_s - \pi_u + \omega) + (1 - \alpha)b$, while the wage of a skilled worker employed in the informal sector firm is unchanged, $w_s^I = \alpha\beta^I z_s + (1 - \alpha)w_u$. With higher expected wage of skilled workers due to the subsidy, the condition (10) for worker's training changes to:

$$\frac{q}{\theta} = \xi(w_s(\omega) - b) = A \min \left[\frac{\mu \alpha \bar{n}_s}{(1 - \mu)q}; 1 \right] (w_s(\omega) - b) \quad (13)$$

Profit in the formal sector also increases as entrepreneurs receive part of the subsidy. Equation (3) thus changes to:

$$\frac{x}{\gamma} = \rho(\pi_s(\omega) - \pi_u) = A \min \left[\frac{(1 - \mu)q}{\mu \alpha \bar{n}_s}; 1 \right] (\pi_s(\omega) - \pi_u) \quad (14)$$

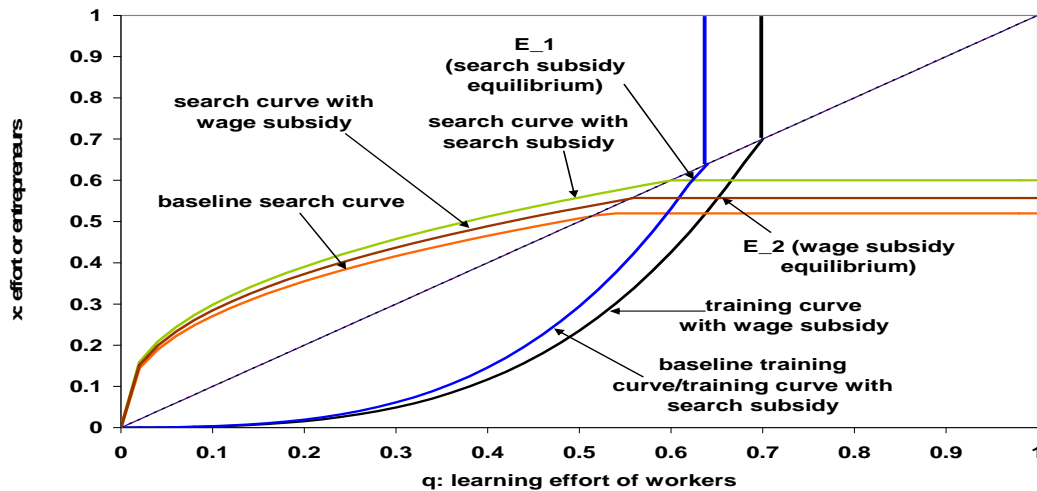
The impact of wage subsidy on entrepreneurs' search is more nuanced in this case than under the search subsidy. First, if in the absence of subsidy the firm would opt for the informal sector and if the subsidy is not large enough to entice it to move to the formal sector, the entrepreneurs' search effort would not change due to the subsidy. So the wage subsidy can raise entrepreneurs' search effort only if the firms end up working in the formal sector. Where it changes the effort, it results in the higher number of both highly productive firms in the formal sector and the low productivity firms in the

^{xxviii} Another way to subsidize entrepreneurs search would be through covering part of the cost or raising efficiency of search, γ . The subsidy is assumed to be financed by the lump-sum tax. Brixiova, Li and Yousef (2009) derive the optimal subsidy for the first best solution (with perfect information) and show that consumption taxes are more efficient for financing these subsidies than profit taxes.

^{xxix} In many aspects, but not all, this is equivalent to income tax exemption as selectively applied in Ethiopia.

informal sector, as workers do not know at the outset what type of opportunity they will find. Second, in addition to stimulating entrepreneurs' search, the wage subsidy can also raise the net profit in the formal sector relative to that in the informal sector and thus influences in which sector – formal or informal – the entrepreneurs operate. Third, even when $s = \omega \bar{n}_s$, that is when amounts paid by the government are equal under both subsidies, the wage subsidies will be less effective in stimulating entrepreneurs' search. This is because they receive only $(1 - \alpha)\omega \bar{n}_s$ of the subsidy; the rest accrues to workers. On the positive side, workers raise their training effort due to higher wages (Figure 3).

Figure 3. The Impact of Wage and Search Subsidies



The dependence of the impact of the wage subsidy on the sector in which the firm ends up operating constitutes a key difference in these two types of subsidies. Search subsidies, paid before entrepreneurs find their business opportunities, impact only their search effort, but not whether they work in the formal or the informal sector. With wage subsidies, forward-looking entrepreneurs increase their effort only when they will work in the formal sector after finding a business opportunity and skilled workers. In contrast to search subsidies, they also influence entrepreneurs' decision in which sector to operate.

When choosing between various instruments, policymakers need to consider the binding conditions that the economy faces. If the pre-subsidy equilibrium is low because of the lack of skilled vacancies, as is the case in Ethiopia, search subsidies would be more appropriate to generate such openings, even though they may be in the informal sector. In contrast, the number of skilled workers seeking employment in highly-productive firms would rise more under wage subsidies, but more of these workers would end up in low-skilled employment or self-employment. This example reconfirms that for policies to be effective, they need to address binding constraints and not to fall on unintended recipients.

4.3 Improving the Business Climate and Reforming the Property Rights

Suppose that in the initial equilibrium, E_1 , firms operate in the formal sector and the number of skilled workers looking for jobs exceeds the number of skilled (formal sector) vacancies $(1 - \mu)q^F > \mu x^F \bar{n}_s$. With improvements to the business climate in the formal sector, β^F , entrepreneurs intensify their search for highly productive businesses.^{xxx} In turn, the increased number of skilled vacancies encourages workers' to acquire skills. Thus in the new equilibrium E_2 , both entrepreneurs' and workers' efforts would be higher (Figure 4). A related observation is that when the lack of skilled vacancies is the key constraint to job creation, improving the business environment should be a priority. Policies encouraging more workers to acquire skills would lead only to additional skilled workers employed in low-skilled jobs or as self-employed; policies thus need to be well-targeted to address binding constraints.

Reforming Property Rights^{xxxi}

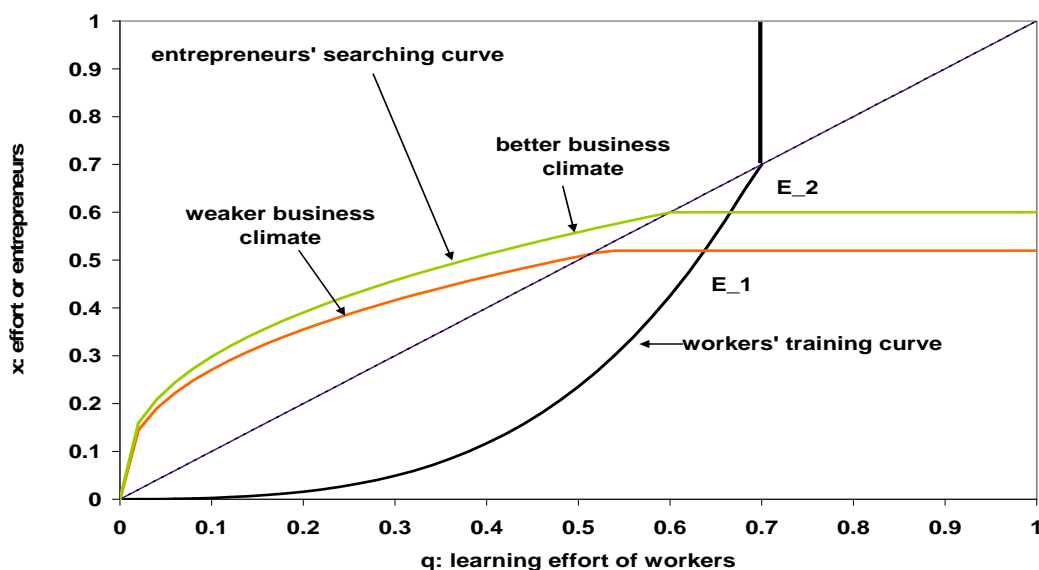
An important component of the business climate in Ethiopia is unclear property rights, which in principle could imply a possibility of expropriation and thus an extreme form of taxation on the business capital, where $\beta^F = 0$. Denoting probability of expropriation as ψ , the entrepreneurs' efficiency coefficient in the production function in the formal economy changes to $\bar{\beta}^F = (1 - \psi)\beta^F + \psi 0_s$. The entrepreneurs will thus more likely opt for the informal sector, as the expected profit in the formal sector is reduced by the possibility of expropriation. Even if they do not opt for the informal sector, the entrepreneurs will lower their search effort. The reverse is also true – if improvements to property rights are sufficiently large, entrepreneurs who would otherwise opt for the informal sector will increase their search effort and opt for the formal sector. In that sense, improving business environment resembles wage subsidies/tax incentives.

However, wage subsidies are less effective than improvements in the business climate in encouraging entrepreneurs to search for business opportunities and opt for the formal sector. This is because improved business climate also raises firms' productivity, output and wages of skilled workers. At the same time, when considering incentives that would move firms to the formal sector, wage subsidies (or tax incentives) may be preferable to extra expenditures on tax monitoring. Unless the revenues from enhanced tax monitoring are spent in a way that benefits entrepreneurs, the profitability of running a firm may decrease, discouraging entrepreneurship.

^{xxx} Entrepreneurs' search would rise relative to the case with high-productivity firms in the informal sector, provided that the improvement in the business environment is sufficiently large.

^{xxxi} Aidis, Estrin and Mickiewicz (2009) found that the key institutions that encourage entrepreneurship are property rights and limits on the state sector.

Figure 4. The Impact of Improved Business Climate



4.4 Numerical Example

To illustrate the impact of policies such as improved functioning of the labor market, A , and business environment, β^F , as well as lower cost of search for business, γ , and reduced profit tax τ , this section provides a numerical example. The baseline parameters are in Table 2.

Table 2. Baseline parameters

Parameter	A	μ	ϕ	θ	γ	β^F	β^I	α	n_s	n_u	z_s	z_u	b	τ
Value	0.5	0.3	0.1	0.1	1	0.55	0.35	0.5	4	2	1.95	1	0.2	0.35

These values yield the share of informal sector in total employment of 50 percent and of informal sector firms in total firms of 71 percent.^{xxxii} The indicative elasticity of informal sector employment to changes in each of the policy variables A, ϕ, γ, τ may be calculated by changing values of these variables by 20 percent and computing the new informal employment rate.

The results in Table 3 are consistent with those in Section 4, namely that improvements in the business climate would raise number of highly-productive firms and

^{xxxii} Parameters are chosen to match the available information or convey reasonable values. For example, the productivity parameters are chosen so that shares of the formal and informal employment are 50 percent each. The gap between the wages of unskilled workers in the informal sector amounts to 1/3 of the wage of the skilled workers, and the wage gap between skilled workers in the formal and informal sector is 40 percent.

high-skilled employment. In the example, the 20 percent improvement would lower low-skilled/low-wage employment in the informal sector by 27 percent, with a corresponding increase in employment in the formal sector. Another effective way of raising productive, formal sector employment are improvements in the labor market functioning, including through provision of information and reducing costs of job search. As Table 3 also illustrates, reduced costs of entrepreneurial search (search subsidy) would increase number of highly productive firms and skilled employment (in either formal or informal sector). For firms in the formal sector, wage subsidies or income tax cuts would have similar effect, even though they would not impact informal sector firms unless the cuts/subsidies were sufficiently large to induce these firms to formalize.

Table 3. Elasticities

Variable	New value	New share of informal firms 1/	New share of informal employment 1/	Elasticity of informal and unskilled employment to 20 % change in variable
		% of total		% change
A	0.60	65	40	-20
τ	0.29	69	47	-6
γ	1.20	68	45	-10
β^F	0.65	63	37	-27

Source: Authors' calculations. 1/ Original shares in the formal sector were 30 percent of firms and 50 percent for employment.

5. Conclusions

Are subsidies an effective way to support entrepreneurial start ups and skilled employment in Africa's low-income countries with a largely underdeveloped private sector such as Ethiopia? Our policy analysis shows that subsidies may help, but the government's choice of the type of subsidy must address the main constraints that the private sector faces. In countries such as Ethiopia, where entrepreneurship is limited and productivity low, the key objective should be to help entrepreneurs open high-productivity firms, regardless whether in the formal or informal sector. In such a situation, the search (or start-up) subsidy is useful, as it encourages entrepreneurs to search for highly-productive business opportunities.^{xxxiii} In contrast, wage subsidies (tax cuts) would be less effective for start-ups as they mostly do not affect firms in the informal sector, where most SMEs in Ethiopia operate. Wage subsidies would be less effective even for firms entering the formal sector as they would partly accrue to workers. On the positive side, they may reduce income inequality, facilitate SME formalization, and broaden the tax base.

To facilitate start ups of highly productive SMEs and skilled employment, the underlying inefficiencies and failures in the factor markets also need to be addressed. Hence both types of subsidies should be accompanied by further reforms of the business climate and functioning of the labor market. The key among them is strengthening of

^{xxxiii} In practical terms, such subsidies include training of potential entrepreneurs to open businesses and operate them.

property rights. In addition to encouraging entrepreneurship -- through higher firm creation and increased rate of formalization -- clearer property rights raise firms' productivity and thus wages of skilled workers. This, in turn, would encourage workers to acquire skills without creating an excessive supply of educated labor. The gaps in the functioning of the labor market, such as the lack of information about high-wage jobs and suitable workers, could be also tackled, for example by building up the employment exchange offices. With progress of these reforms, the need for subsidies would decline and they would be phased out.

Taking a broader view, the global financial and economic crisis has underscored the importance of the diversified private sector, including dynamic SMEs. For African policymakers, the crisis has led to rethinking of their growth strategies. Before the crisis, many SSA small open economies relied almost exclusively on FDI and exports as the main drivers of growth. However, in light of the crisis, countries are trying to achieve a more broad-based growth by shifting some of their resources to domestic private enterprises and demand. In this context, enhanced efficiency of the financial sector would help channel savings to their most productive use. In addition, in resource-poor landlocked countries such as Ethiopia, domestic resources would likely need to be supplemented by external financing to ease credit constraints and shortages of foreign exchange. Magnitudes of such constraints and a design of mitigating interventions as well as application of similar frameworks to other low-income countries in SSA could be subject of further research.

Annex: Estimates of the Share of the Informal Sector in Output in Ethiopia

The output produced in the informal sector in Ethiopia is estimated based on the money demand function:

$$M_t = \beta_0^1 TAXR_t^{\beta_1} Y_t^{\beta_2} R_t^{\beta_3} CPI_t^{\beta_4} dlib_t^{\beta_5} \exp(\varepsilon_t) \quad (A1)$$

where the nominal money demand (M_t) is a function of the tax rate ($TAXR_t$), the income in the official economy (Y_t), the nominal interest rate (R_t), the consumer price index (CPI_t), and the dummy variable defining the economic liberalization ($dlib_t$). The error term ε_t is normally and independently distributed. The tax rate is included in the model based on the assumption that agents undertake activities in the hidden economy to avoid paying higher taxes, which raises the share of cash transactions.^{xxxiv} Letting $\beta_0 = \log(\beta_0^1)$, and taking natural logarithms (represented in lower cases) yields:

$$m_t = \beta_0 + \beta_1 taxr + \beta_2 y_t + \beta_3 r_t + \beta_4 cpi_t + \beta_5 dlib_t + \varepsilon_t \quad (A2)$$

The expected signs are β_1 , and $\beta_2 > 0$ and β_3 and $\beta_5 < 0$ while the sign of CPI coefficient is ambiguous. The model is estimated using the time series data from the Ethiopian Statistical Office and the National Bank of Ethiopia for period 1971 – 2008.

Utilizing the co-integration framework, and in particular the error-correction model, the currency in circulation, M_t , was estimated for each year during 1971 – 2008 from equation (A.2); the estimation results are given in Table A1.^{xxxv} The model satisfies the standard requirements. All variables were found to be significant at 10% level in explaining the demand for money in Ethiopia, with signs as expected above.

Based on the key assumption that the informal sector is caused by high taxes, the coefficient of the tax variable, β_1 , is set to zero. By doing so, (A.2) yields the amount of money demanded in the absence of taxes, (LM). The difference between the two terms ($M_t - LM_t$) is an estimate of the money circulating in the informal sector (IM), i.e. money demand in the (tax-induced) informal sector. An assumption of an identical money velocity, (V_t), in both the formal and informal economy is applied to derive the output in the informal sector (Y_t^I):

^{xxxiv} The main assumption behind this approach is that transactions in the informal sector are mostly carried out in cash, in order to remain unrecorded.

^{xxxv} Augmented Dickey-Fuller (ADF) test, carried out to check the stationarity of variables, revealed that the variables in the model are stationary of order 1, i.e. I(1). Stationarity (unit root) test on the saved residual confirmed long-term relationship among the variables in the model. Diagnostic tests of the model showed no evidence of serial correlation, specification problem and heteroskedastic variance (Table A.1).

$$Y_t^I = IM_t V_t = (M_t - LM_t) V_t \quad (A3)$$

Equation (A.2) can be estimated within the cointegration framework and, in particular, using an error-correction model. First, the presence of unit roots by taking the natural logarithm of each variable and applying Augmented Dickey-Fuller(ADF) test specified as

$$\Delta Z_t = \rho_0 + \rho_1 Z_{t-1} + \sum \sigma_1 \Delta Z_{t-1} + \eta_t \quad (A4)$$

Table A.1. Augmented Dickey-Fuller Unit Root Tests 1/

Variables	Critical value		Levels	First difference	Order of integration
	At 1%	At 5%			
<i>M</i>	-3.6210	-2.9434	0.4784	-6.3530	I(1)
<i>Y</i>	-4.2268	-3.5366	0.2365	-4.8219	I(1)
<i>CPI</i>	-4.2268	-3.5366	-2.4500	-6.3515	I(1)
<i>TAXR</i>	-3.6210	-2.9434	-1.8807	-5.4639	I(1)
<i>R</i>	-4.2268	-3.5366	-1.7915	-6.1899	I(1)

Source: Authors' calculations. 1/ In logarithms.

Results

The estimation of equation (A.2) is in Table A.2 below. All variables are significant at 10% level in explaining the money demand in Ethiopia; signs are as expected. From the regression exercise below, the share of underground output in GDP (as percent) during 1971-2008 was estimated (Figure A.1). The exercise revealed that while the size of the informal output varied during different periods, on average it amounted to 30 percent of the official output.

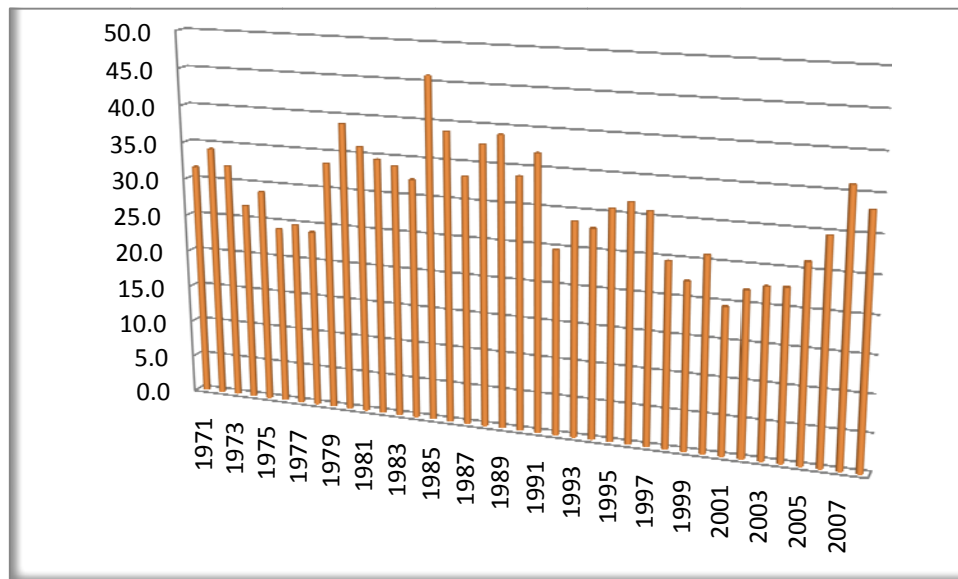
The size of the informal economy was particularly high during the 1980s owing to the widespread conflict and heavy tax burden imposed by the government. With reform packages introduced in later years, the size of the informal economy contracted in the 1990s, under the new more market-friendly economic structure of the economy that also allowed the for SMEs. Even with the relative decline, the absolute level of the underground economy was increasing from Birr 11 billion in 1993 (US\$ 2.2 billion) to Birr 81 billion (US\$ 8.2 billion) in 2008. Since the informal sector tends to be labor intensive, its share in employment is above 30 percent.

Table A.2. Estimation Results

Dependant variable: <i>LM</i>				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
<i>C</i>	-3.6480	0.4951	-7.3685	0.0000
<i>LY</i>	0.3484	0.1872	1.8613	0.0719
<i>LCPI</i>	1.9528	0.3309	5.9008	0.0000
<i>LR</i>	-0.2175	0.0836	-2.6019	0.0139
<i>LTAXR</i>	0.3011	0.1309	2.2995	0.0282
<i>dlib</i>	-0.1310	0.0696	-1.8828	0.0689
R-squared	0.99	Mean dependent var		8.7427
Adjusted R-squared	0.99	S.D. dependent var		1.3744
S.E. of regression	0.13	Akaike info criterion		-1.0594
Sum squared resid	0.56	Schwarz criterion		-0.8008
Log likelihood	26.13	F-statistic		788.9043
Durbin-Watson stat	1.10	Prob(F-statistic)		0.0000

Source: Authors' estimates.

Figure A.1. Share of the Underground Economy, 1971-2008 (% of GDP)



Source: Authors' estimates.

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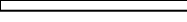
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