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Transformative Growth in Eastern Africa:
Catalysts and Constraints

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Private Sector Development and Manufacturing Jobs in Eastern Africa

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Introduction

While Eastern Africa's economic performance over the last decade has been relatively impressive, it has failed to keep pace with increased demand for quality jobs(formal sector jobs). The region's economic growth over the last decade has been characterised by low elasticities of employment creation to growth, implying that the growth does not create sufficient new jobs to keep pace with population pressures[1]. One of the reasons for the weak (formal) job growth is that in many countries in the region economic performance has been driven by the (informal) services sector while the manufacturing sector has lagged behind. Note that growth in manufacturing growth is key for structural transformation because it operates at higher productivity levels (than the agricultural sector) and can absorb surplus labour from the agricultural sector[2].

However, the growth of firms across many developing countries, is constrained by poor business environments characterized by insufficient provision of public capital, regulatory and bureaucratic bottlenecks, poor management and governance practices[3]. These constraints have sustained the high cost of doing business, thereby limiting firm growth and opportunities for employment generation[4].

The World Economic Forum (WEF) global competitiveness indicators show that Eastern Africa economies are still classified as a factor driven, implying that the key pillars for competitiveness are still the basic requirements such as adequacy of infrastructure, institutions, macroeconomic environment, and human capital development including – including education, skills, and health[5]. Therefore, the major constraints that business executives cite as particularly cumbersome for doing business over the last five years continue to be related to corruption, tax policy, access to finance, macroeconomic instability, and inadequate supply of infrastructure including in the transport and energy sectors.

The World Bank's doing business surveys highlight annual global rankings of countries' business environments with regard to the ease or difficulty of opening and running small to medium sized

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[1] UNECA, 2013
[2] Rodrik, 2011
[3] Dethier et al., 2010; Gelb et al., 2007
[4] Aterido et al., 2011
5 Schwab, 2016

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businesses. These rankings are informed by performances across 11 indicators that include: starting a business, dealing with construction permits, getting electricity, registering property, getting credit, protecting minority investors, paying taxes; treading across borders, enforcing contracts, resolving insolvency, labour market regulations. Figure A shows that, except for Rwanda, Kenya, and Seychelles, countries in Eastern Africa are some of the worst performers in the World, with their rankings placing them in the bottom half of the pile.

Figure A: Rank on ease of doing business in Eastern Africa
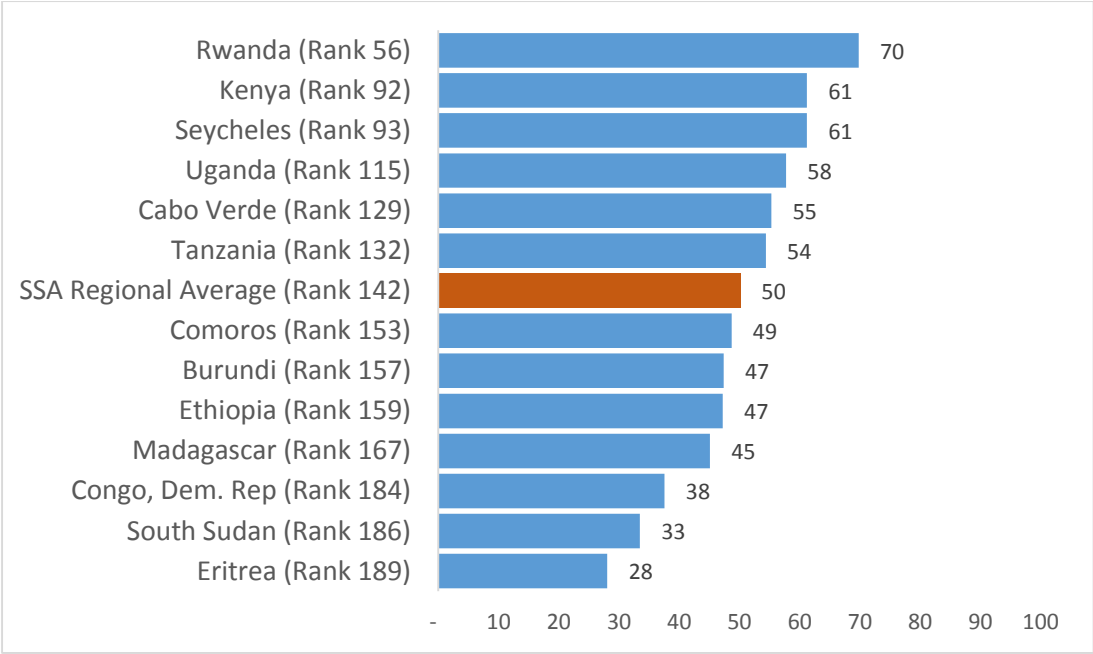
Source: Doing Business Report 2017, World Bank

Objectives of the Study

Creating an environment that is favourable to the development of the manufacturing sector depends on a detailed understanding of the key drivers of manufacturing performance and job growth. Despite its importance, there is limited research on the role of the manufacturing sector in providing employment in the Eastern Africa region – partly due to lack of data.

This study uses firm level data from WBES to analyse key issues, such as the share of jobs provided by manufacturing firms, women and youth employment, and the relationship between employment, skills, and wages in the region. Specifically, the study will investigate;

i. Job flows across industries within the region.
ii. The effect of labour productivity on wages in the manufacturing sector.
iii. The effect of credit constraints on employment growth in the manufacturing sector.
iv. The effect of skill constraints on manufacturing firms in the region.

The study is consequently undertaken in four chapters where chapter one assesses the extent of job creation and destruction in the industrial sector across 10 countries in Eastern Africa region. It exploits a pooled WBES dataset which allows for analyses of differences in job flows by sector, industry, size, and age. Results revealed significant heterogeneity in the processes of job creation and destruction across countries, sectors, size and life cycle classifications. Importantly, Gross Job reallocation rates are highest among large firms and least among small firms. Moreover, with significant variations across subsectors, young firms play a very big role in job creation relative to more mature and older firms.

Furthermore, exploiting the pooled WBES dataset, chapter two examines the effect of labour productivity on the determination of wages in the Eastern Africa's manufacturing sector. Addressing any endogeneity concerns, results indicate that labour productivity is positively associated with wages. These results are robust to controlling for firm characteristics, employee characteristics, business environment indicators, as well as country fixed effects. In addition, skills, location, and the business environment – particularly access to credit and electricity outages – are all significantly associated with manufacturing wages in Eastern Africa region. Moreover, results show significant gender-wage gaps in Eastern Africa's manufacturing firms highlighting the fact that female labour may be underpaid.

Also with the aid of the pooled WBES dataset, chapter three measures the effect of credit constraints on employment growth in the manufacturing sector. This chapter highlights the following: low commercial bank coverage; mobile banking has increased financial inclusion; weak financial sector infrastructure, low commercial bank coverage, 33 percent of firms use external financing, existence of high interest rate spread. Firms are credit constrained partly because of high interest rates, cumbersome application procedures and bribery. In terms the relationship between credit constraints and employment growth, realised access to external financing is shown to be partly associated with positive employment growth. Furthermore, among firms that are credit

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constrained because of a plethora of reasons, high interest rates are shown to be inversely related with employment growth. This chapter thus suggests that efforts to bring down the cost of financial intermediation could be through: 1) strengthening financial sector infrastructure with the rational of reducing the cost of credit; and 2) exploiting the mobile banking revolution beyond facilitation of basic financial payments to credit evaluation and eventual credit uptake.

Finally, chapter four explains the relationship between skills constraints and firm performance in the Eastern Africa region. Using the pooled WBES, the chapter highlights that: 1) more high school graduates than university graduates are employed by firms; 2) firm productivity varies across the Eastern Africa region even with fairly similar educational attainment among firm employees; and 3) reskilling is prevalent among firms across the Eastern Africa region suggesting that workers are either not sufficiently skilled or the quickly changing production technological environment necessitating reskilling; and 4) lower output per worker irrespective of the share of skilled production workers suggests weak skilling mechanisms in the Eastern Africa region. The relationship between skill constraints and firm performance highlights: 1) having both university and high school graduates employees enhances labour productivity; 2) a higher fraction of skilled production workers is associated with increased capacity utilization; and 3) reskilling is associated with productivity gains. Also other business environment factors are shown to be relevant to be firm performance specifically corruption, credit constraints and electricity outage are shown to be deleterious to firm performance. The chapter finally highlights the importance of strengthening skilling to make it relevant to labour requirements in a bid to enhance firm performance.

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CHAPTER ONE

JOB FLOWS IN EASTERN AFRICA

1.0 Introduction

The discourse on ensuring the availability of decent jobs to growing populations has gained increased momentum in recent years. At the micro level, jobs provide the wherewithal with which families are supported by providing decent living standards. At the macro level, jobs are necessary to sustain productivity gains, foster growth, and to reduce inequality. Beyond their critical importance for fostering economic returns, jobs are important in fostering social cohesion as well.[6] As we learnt from the Arab Spring, the lack of jobs for a particular section of the population can lead to social and political tensions, often resulting in the destruction of social fabrics and economic infrastructures. Jobs are therefore of critical importance for maintenance of social order and for the economic advancement of societies.

The private sector plays a key role in the creation of jobs, and in some instances private sector jobs account for more than 90 percent of all jobs in developing countries (World Bank 2013). Providing a conducive business climate, therefore, is not only vital for the prosperity of firms but also importantly for the creation of jobs. In particular, jobs flourish where labour regulations are flexible and supportive of employment creation[7]; and where the business climate is supportive of innovation, growth and access to markets[8].

There has been wide interest in the estimation of job flows in the developed world. A vast amount of research in this area has examined the firm size-age-employment creation nexus highlighting the potential role of business start-ups and young enterprises in employment creation[9]. Interest is also noted in other developing emerging economies[10].

However, fewer studies have been conducted in Africa, and the few available studies tend to focus on the more developed countries in this region. As was observed elsewhere in the world, the entry

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[6] World Bank 2013

[7] Kaplan 2009

[8] Aterido and Hallward-Driemeier 2010; Aterido et al. 2011

[9] See Haltiwanger et al. 2013; Criscuolo et al 2014 for studies on the USA and OECD respectively.

[10] See for example Krauss 2015; Dogan et al. 2017

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of small firms tends to generate the most jobs in the African Private Sector. However, these small firms are the worst performers in terms of net job creation post entry[11]. Furthermore, there is strong evidence of intra industry job flows attributable to entry and exit in Ethiopia with jobs created by small firms more likely to be transitory implying that periods of faster employment growth are associated with re-allocations from small to larger firms[12]. While most available research on job flows in Africa have tended to focus on specific countries, this chapter contributes to a better understanding of job flows in one of Africa's most dynamic regions – Eastern Africa. The analysis of job flows provides the foundation for a more detailed analysis of the labour outcomes in East Africa's manufacturing sector, which include detailed analyses on productivity growth, employment growth and wages.

While productivity growth in the manufacturing sectors in Africa has generally tended to lag those in more advanced economies, Eastern Africa's Manufacturing has started to show some glimpses of recovery. In Ethiopia, for example, the textile and leather industry is starting to take root while Kenya continues to have a more robust and diversified manufacturing sector. In addition, the Eastern Africa region has some of the fastest growing economies on the continent. As economies grow and productivity improves, structural transformation will lead to the reallocation of labour from the primary sector – particularly agriculture – to manufacturing and high values services sectors. These processes will inevitably lead to job creation and destruction across sectors. It is therefore important to generate evidence on the current dynamics with regard to patterns of job creation and destruction in East African manufacturing sector with a view of informing policy debates on the likely directions for generating future employment growth paths.

This chapter relies on pooled enterprise survey day for 10 Eastern African countries to assess the dynamics of job creation and job destruction. In particular, the chapter focuses on gross job creation rates, gross job destruction rates, net job creation rate, and gross job reallocation rate, average job growth rate and the percentage of firms that experienced expansion, contraction and no change in the number of jobs available. These analyses are carried out for each country and by enterprise size and sub sector location. In the section that follows, we provide a brief macro

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[11] As was observed by Rijkers et al. (2014) in Tunisia
[12] Shiferaw and Bedi (2013)

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background on the macroeconomic performance and levels of productivity growth in the manufacturing sector in the countries under consideration. We then follow that with a discussion on the business environment with regard to employment and labour regulation. We conclude the chapter with a discussion of the job flows and how these are related to the macroeconomic environment and the business climate.

1.1 Background: Macroeconomic Performance

Economic performance across the region has been varied over the past decade. The differences in geopolitical risk and domestic policy have majorly been responsible for the differences in growth outcomes across countries. Assessment over a ten year period during 2007 – 2016 shows that majority of countries have experienced impressive economic growth rates averaging above 5 percent per annum (Figure 1.0). Ethiopia, in particular, has experiences the fasted growth rates averaging 10percent over the time period. This is followed Rwanda with an average GDP growth rate of 7.6 percent; Tanzania 6.7 percent; Congo DRC 6.3 percent; and Uganda 6.1 percent.

**Figure 1.0: 10 Year Average GDP Growth Rates**

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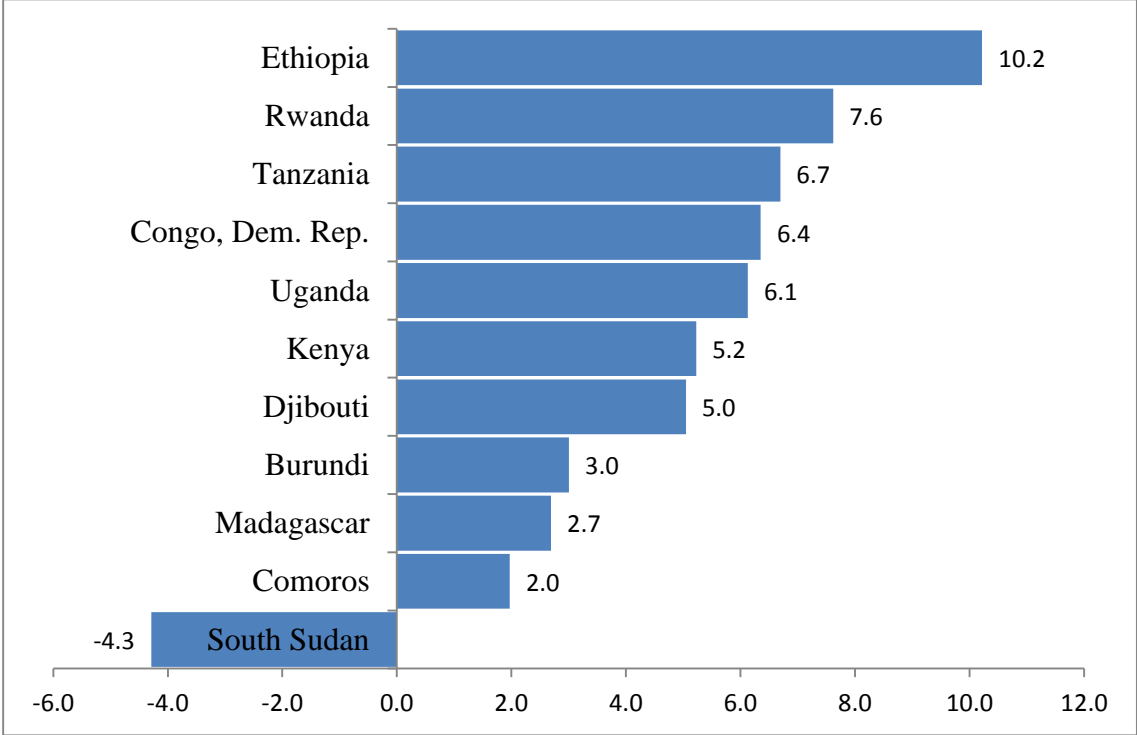
The impressive growth rates in Ethiopia have been made possible by sustained public investments in public capital and policies that have supported productivity improvements in agriculture, and agro-processing. Despite some geopolitical challenges, growth in Congo DRC has been supported by natural resource exploitation. Except for South Sudan where the political environment and stability have curtailed growth, economic performance across the region has been supported by macroeconomic and political stability across the region.

Sustained periods of high economic growth are necessary for economic transformation with productivity gains leading the share of employment and value added to shift from primary to secondary and tertiary sectors. Thus structural transformation would lead to an increase in the share of manufacturing jobs and value added to increase the share of primary activities declining. However, it seems structural transformation has been delayed in Eastern Africa. First the average share of manufacturing valued added in total GDP, estimated at about 9 percent[13] in 2016 is low. Second, this share seems to have been declining over the last decade (figure 1.2). However, given the paucity of data, it is not clear what has happened to manufacturing jobs during the same period. However, what is clear is that countries in Sub Saharan African must industrialize in order to sustain high employment creation rates. The section that follows examines the patterns of manufacturing job creation and in the aforementioned Eastern African countries.

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[13] Data is from the World Development Indicators

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Figure 1.2: 10 Year Average Manufacturing contribution to GDP
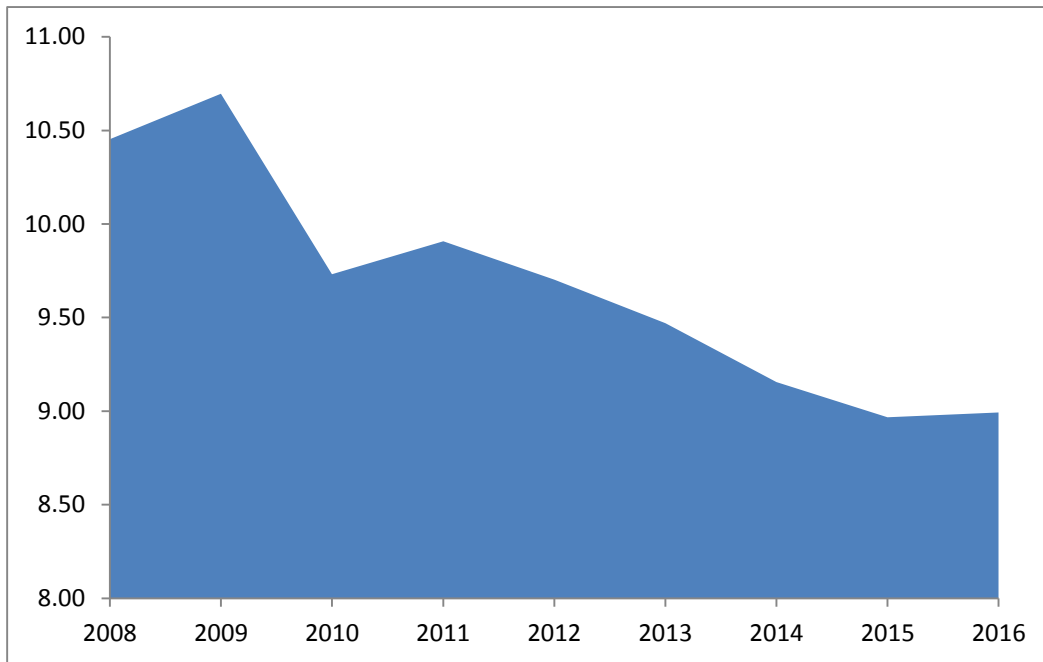
1.2 Analysis of Job Flows in Eastern Africa

Job flows describe the processes of job creation and destruction within firms. There are four sources of changes in job flows: the entry of new firms; the exit of existing firms; firm expansion; and firm contraction. The nature of the business environment, including technological factors, market driven factors, regulations, as well as firm characteristics are the known factors that affect job flows[14]. Given the cross section nature of our enterprise survey datasets, we are only able to observe the contraction and expansion of existing firms. Therefore, our analysis is limited to the role of incumbent firms post entry, with both entry and exit unobservable. This is a major limitation of our dataset because the literature indicates that firm entry and exit plays a major role in determining the patterns of job creation and exit in both developing and developed countries[15].

We define five key concepts with regard to job flows: Gross Job Creation Rate (GJCR); Gross Job Destruction Rate (GJDR); Net Job Creation Rate (NJCR); Gross Job Reallocation Rate (GJRR);

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[14] Haltiwanger et al. 2008.
[15] See for example Shiferaw and Bedi 2013; Haltiwanger et al 2013

and the Average Job Growth Rate (AJGR)[16]. In addition to these concepts, we identify the percentage of firms that experienced a positive employment change (expansion); negative job change (contraction); and no employment change.

The enterprise surveys collect data on both trends and employment outcomes three fiscal years prior to the survey. Thus we define job creation for firm as positive employment changed summed over all enterprises that expand between time periods $t - 3$ and t, such that:

$$C_t = \sum_{i \in g^+} X_{it} - X_{it-3} \tag{1}$$

Thus, we define job destruction as the absolute value of negative employment changes summed over all enterprises that contract between time periods $t - 3$ and t, such that:

$$D_{it} = \sum_{i \in g^-} |X_{it} - X_{it-3}| \tag{2}$$

Based on equation (1) above, the Gross Job Creation Rate is obtained by dividing the total jobs created by the average employment for periods $t - 3$ and t, such that:

$$GJCR = \frac{C_t}{0.5 * (X_{it-3} + X_{it})} \tag{3}$$

Based on equation (2) above, the Gross Job Destruction Rate is obtained by dividing the total jobs destroyed by the average employment for periods $t - 3$ and t, such that:

$$GJDR = \frac{D_t}{0.5 * (X_{it-3} + X_{it})} \tag{4}$$

The NEGR rate is derived as the difference between the GJCR and GJDR, while the GJRR is derived as the summation of the two. Lastly, Average Job Growth Rate is derived as the change in employment divided by the average firm size between the two periods. Thus the AJGR is bounded between -2 and 2 and therefore minimizes the challenges in the growth rate due to base effects that may lead to unrealistically high growth rates, especially for small firms.

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[16] Haltiwanger et al. 2008.

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$$AJGR = \frac{X_{it} - X_{it-3}}{0.5 * (X_{it-3} + X_{it})} \tag{5}$$

1.3 Patterns of job flows

We have access to cross section data from the enterprise surveys. The data is pooled over 10 Eastern Africa countries to explore the rates of job creation and destruction. Job flows are estimated over periods of three years. There are major limitations of our dataset that need to be declared: first, the data were not collected at the same time for all countries. This is likely to introduce noise in the estimations to the extent that there are country specific factors that might affect jobs in one period and not in the other. Second; the cross section nature of the data does not allows for the estimation of the roles of entry and exit in job flows. Despite these challenges, however, the data provides important insights in the role of firm expansion and contraction in the patterns of job flows in the Eastern Africa region.

Rates of job creation and destruction are computed for the overall pooled sample, but also by size category, country, and industry ISIC classifications (sub sectors). Results in table xxx show that 46 percent of firms experienced positive job growth, 18 percent negative job growth, and 36 percent did not experience any employment changes. These results point to significant job creation rates for the overall sample. Indeed, job creation rates over a three year period averaged 34 percent, whilst job destruction rates averaged around 24 percent. This implies that the net job creation rate over a three year period was about 10 percent and that on average the gross job reallocation rate is in excess of 58 percent. These job flow rates are significantly higher than those reported in other studies focused on African countries, particularly for: Ethiopia[17]; South Africa[18]; and Tunisia[19].

1.4 Job flows across firm size categories

Turning to role of firm size, results show that gross job creation rates increase with size. Job creation rates were estimated at 3.1 percent among the small firms; 12.7 percent among medium sized firms; and 112 percent among the large firms. This abnormally large job creation rate in large firms is driven by one large company in Kenya that created more than 1000 jobs. We re-estimated

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[17] Shiferew and Bedi (2013)
[18] Kerr et al. (2013)
[19] Rijkers et al. (2014)

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the results omitting this particular firm and the Job Creation Rate reduced to 87 percent. Job Destruction Rates were estimated at 6.7 percent for small firms and 24 percent for medium sized firms with these rates doubling the job creation rates for these size classifications.

Table 1: Analysis of job flows

Firm Category	GJCR	GJDR	NJCR	GJRR	AJGR	% firms with employment change		
						Positive	Negative	No change
ALL	0.341	0.243	0.098	0.584	0.111	0.455	0.184	0.361
CLASSIFICATION BY SIZE								
Small	0.031	0.067	-0.036	0.098	0.095	0.350	0.158	0.491
Medium	0.127	0.239	-0.112	0.366	0.117	0.528	0.205	0.267
Large	1.122	0.881	0.241	2.003	0.164	0.645	0.133	0.222
CLASSIFICATION BY COUNTRY								
Burundi	0.123	0.193	-0.07	0.316	0.100	0.485	0.357	0.158
DR Congo	0.089	0.072	0.017	0.161	0.133	0.500	0.133	0.367
Djibouti	0.048	0.038	0.01	0.086	0.174	0.475	0.088	0.436
Eritrea	0.113	0.135	-0.022	0.248	-0.113	0.264	0.490	0.246
Ethiopia	0.325	0.401	-0.076	0.726	0.125	0.551	0.110	0.339
Kenya	0.634	0.368	0.266	1.002	0.057	0.379	0.220	0.401
Madagascar	0.296	0.232	0.064	0.528	0.115	0.449	0.133	0.418
Rwanda	0.102	0.172	-0.07	0.274	0.254	0.637	0.092	0.272
Tanzania	0.200	0.140	0.06	0.340	0.259	0.501	0.109	0.390
Uganda	0.108	0.157	-0.049	0.265	0.037	0.243	0.226	0.531
CLASSIFICATION BY SUB SECTOR								
ISIC 15	0.199	0.217	-0.018	0.416	0.050	0.347	0.178	0.475
ISIC 16	0.204	0.453	-0.249	0.657	0.295	0.616	0.286	0.098
ISIC 17	0.301	0.388	-0.087	0.689	0.156	0.395	0.218	0.386
ISIC 18	0.234	0.137	0.097	0.371	0.130	0.457	0.120	0.423
ISIC 19	0.189	0.213	-0.024	0.402	0.035	0.600	0.247	0.153
ISIC 20	0.086	0.117	-0.031	0.203	-0.032	0.346	0.250	0.404
ISIC 21	0.156	0.267	-0.111	0.423	-0.021	0.393	0.223	0.384
ISIC 22	0.103	0.164	-0.061	0.267	0.219	0.492	0.188	0.320
ISIC 23	0.342	0.114	0.228	0.456	0.006	0.363	0.508	0.129
ISIC 24	0.321	0.076	0.245	0.397	0.195	0.689	0.075	0.236
ISIC 25	0.283	0.294	-0.011	0.577	0.195	0.701	0.061	0.238
ISIC 26	0.198	0.275	-0.077	0.473	0.139	0.558	0.139	0.304
ISIC 27	0.348	0.179	0.169	0.527	0.008	0.329	0.186	0.484
ISIC 28	0.197	0.183	0.014	0.38	0.255	0.594	0.111	0.294
ISIC 29	0.281	0.028	0.253	0.309	0.145	0.500	0.131	0.368
ISIC 30	0.035	0.000	0.035	0.035	0.266	1.000	0.000	0.000
ISIC 31	0.136	0.127	0.009	0.263	0.012	0.318	0.145	0.536
ISIC 32	0.383	0.000	0.383	0.383	0.274	1.000	0.000	0.000
ISIC 33	0.156	0.000	0.156	0.156	0.144	1.000	0.000	0.000
CLASSIFICATION BY AGE								
Young	0.524	0.071	0.453	0.595	0.232	0.568	0.095	0.337
Mature	0.214	0.134	0.080	0.348	0.108	0.476	0.139	0.385
Older	0.416	0.348	0.068	0.764	0.089	0.372	0.211	0.417

Large firms, too, depict large job destruction rates, that averaged 88 percent. These numbers, too, could have been influenced by a group of five large firms that experienced large job destruction. We re-estimated the results omitting these particular firms and the Job Destruction Rate reduced to 60 percent. While available literature shows the role of small firms in the creation of new jobs, our results show that post entry, job creation is concentrated in larger firms, even after correcting the sample for outliers[20].

1.5 Job flows across countries

Job flow rates differ greatly across countries. Job creation rates are highest in Kenya and Ethiopia and lowest in Djibouti and Congo DRC with these countries experiencing job creation rates of 63 percent, 33 percent, 8.9 percent, and 4.63 percent respectively. Job destruction rates indicate significant job destruction processes across countries and are highest in Ethiopia (40 percent), Kenya (37 percent), Madagascar (23 percent), and Burundi (19 percent). Thus, some of the countries with the highest GJCR also have the highest GJDR. With these patterns of job flows, half of the countries in our sample experienced negative NJCR with Kenya standing out with the highest NJCR of 27 percent.

Thus GJRR are highest in Ethiopian and Kenyan Manufacturing and lowest in Djibouti and Congo DRC. Overall, average job growth rates are positive with only Eritrea experiencing negative average job growth rates. With the exception of Eritrea (26 percent) and Uganda (24 percent) the share of firms that experienced positive employment growth dominate those that experienced negative growth.

1.6 Job flows across industry sub-sectors

In line with the experience with country and size level job flows, job flows across industries do show considerable variation. Gross job creation rates range between 3.5 - 35 percent, with the highest rates experienced in ISIC 27 (35 percent), ISIC 23 (34 percent), and ISIC 24 (32 percent), while the lowest rates are experiences by ISIC 30 (3.5 percent), chemicals (8.6 percent), and ISIC 22 (10 percent). Job destruction rates are zero for ISIC 20, ISIC 32, and ISIC 33, with all firms in

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[20] This finding is consistent with among others, Haltiwanger et al (2008) and Rijkers et al. (2014).

these sub sectors experiencing positive employment growth. Finally, only chemicals and ISIC 21 sub sectors experienced negative Average Job Growth Rates with the rest of the subsectors experiencing positive growth rates ranging between 1 – 30 percent.

1.7 Job flows across age categories

While manufacturing sector as a whole exhibits high rates of job creation and destruction, it is likely that there might be variations across firm age due to age specific differences such as managerial characteristics. To investigate such variations, we create three age classifications that include young, mature and older firms. The young category included firms aged 0 - 5 years; the mature category includes firms aged 6 – 15 years; and the older category includes firms aged above 15 years. As before, we do not observe firm entry and exit, but rather compute job flows post entry over the three years preceding the enterprise surveys.

Results show that gross job creation rates are much higher in the young firms category (52 percent) followed by older firms (42 percent) and mature firms (21 percent). Moreover, young firms also have the lowest GJDR estimated at 7 percent. In particular, Gross Job Destruction Rates are positively correlated with firm age with mature and older firms experiencing GJDRs of 13 percent and 35 percent respectively.

These patters imply that Net Job Creation rates are significantly higher in the young category (45 percent) as compared to Mature (8 percent) and older (7 percent) firms. However, Gross Job destruction rates are highest among the older (76 percent) and Young (60 percent) than the mature (35 percent) firms. Consistent with age specific GJCRs and GJDR patterns, there seems to be an inverse relationship between age and AJGR. In particular, Average Job Growth Rates are higher in Young (23 percent) firms as compared to mature (11 percent) and older (9 percent).

Overall, young firms are more likely have positive employment growth (57 percent) than mature (48 percent) and older (37 percent) firms. These results are consistent with the literature indicating the role of firm entry and by extension young firms in the job creation process[21].

1.8 Conclusions:

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[21] See for example Rijkers et al. 2014

This chapter examined the patterns of job flows in the East African Manufacturing Sector using a unique pooled dataset from the World Bank's enterprise surveys. Results indicated significant differences in the dynamics of employment creation and destruction across countries. Gross job reallocation rates are highest among the large firms. Moreover, with significant variations across subsectors, young firms play a very big role in job creation than more mature and older firms.

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CHAPTER TWO

THE EFFECT OF LABOUR PRODUCTIVITY ON WAGES

2.0 Introduction

Jobs are important for social economic transformation to the extent that they provide the means necessary to improve the living standards of the people. Therefore, the discussion on jobs should go beyond the numbers of jobs created and destroyed to include the quality of these jobs. At its most basic level, the quality of jobs is reflected in the wage. This is an oversimplification, of course, because job quality is a function of much more than just the wage. In perfectly competitive labour markets, wages reflect the marginal productivity of labour. However, given the imperfections in the labour markets this is not usually the case. In addition, given the high under employment rates across many developing countries wages are unlikely to reflect marginal productivity rates.

Wages typically tend to be low in developing countries. Whether this reflects low marginal productivity of labour is an empirical question. Given the need to support living standards, it is important to examine the correlates of wages in the African Private Sector. An important first step would be to examine the relationship between wages and labour productivity on the one hand, and the business environment on the other. In other words, can wages be improved by improving labour productivity? What roles does the business environment play in determining wages? These issues are discussed in the section that follows, starting with a discussion on wages and labour productivity and followed by selected elements in the business environment.

2.1 Wages and labour productivity

Using enterprise survey data, wages are computed the total annual cost of labour including wages, salaries, bonuses, and social security payments divided by the number of full time workers at end of the previous fiscal year.

$$Wage_{ijs} = \frac{X_{ijs}}{N_{ijs}} \qquad (1)$$

Where i indexes firm; j indexes sector; and s indexes country; X is the total cost of labour; and N is the total number of full time employees. For ease of comparison across countries, the cost of

labour is converted to its dollar equivalent using the prevailing nominal exchange rates at the time of the survey. It should be noted that the surveys were carried out during different years.

Labour productivity is computed as total annual sales for any given firm divided by the number of full time workers at the end of the previous fiscal year.

$$LabProd_{ijs} = \frac{S_{ijs}}{N_{ijs}} \qquad (2)$$

Where i indexes firm; j indexes sector; and s indexes sector; S is the total value of sales; and N is the total number of full time employees. As before, the value of sales is converted to its dollar equivalent using the prevailing nominal exchange rates at the time of the survey. The exchange rates applicable to each country are the yearly average exchange rates obtained from the World Bank and IMF macroeconomic databases and they are provided in table 5.2.

2.1.1 Labour productivity

Labour productivity has great variation across the East Africa region, and is highest in Kenya's manufacturing sector with an output per worker ratio of $ 156,500 per year. This followed by DRC at $102,700 and Djibouti at $81,100 (figure 2.0).

Figure 2.0: Labour productivity across countries
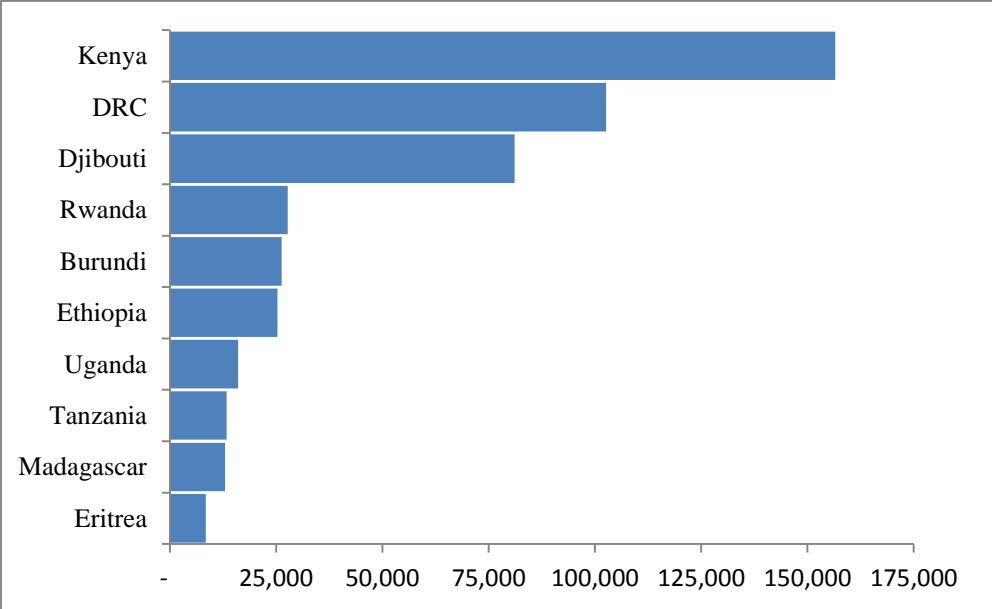
The variation in labour productivity across the region is so wide that the least performer, Eritrea, would have to improve productivity by a factor of eighteen (18) to catch up with Kenya. Moreover, the divide between the top three performers and the rest of the countries is so wide that the productivity differential between the third and the fourth country is by a factor of three. This implies that the fourth placed country, Rwanda, would have to improve productivity threefold to catch up with the third placed country – Djibouti.

With regard to the relationship between labour productivity and firm size, there seems to be a direct positive relationship. Compared to small enterprises, labour productivity is 60 percent higher in medium enterprises and 56 higher percent among large enterprises.
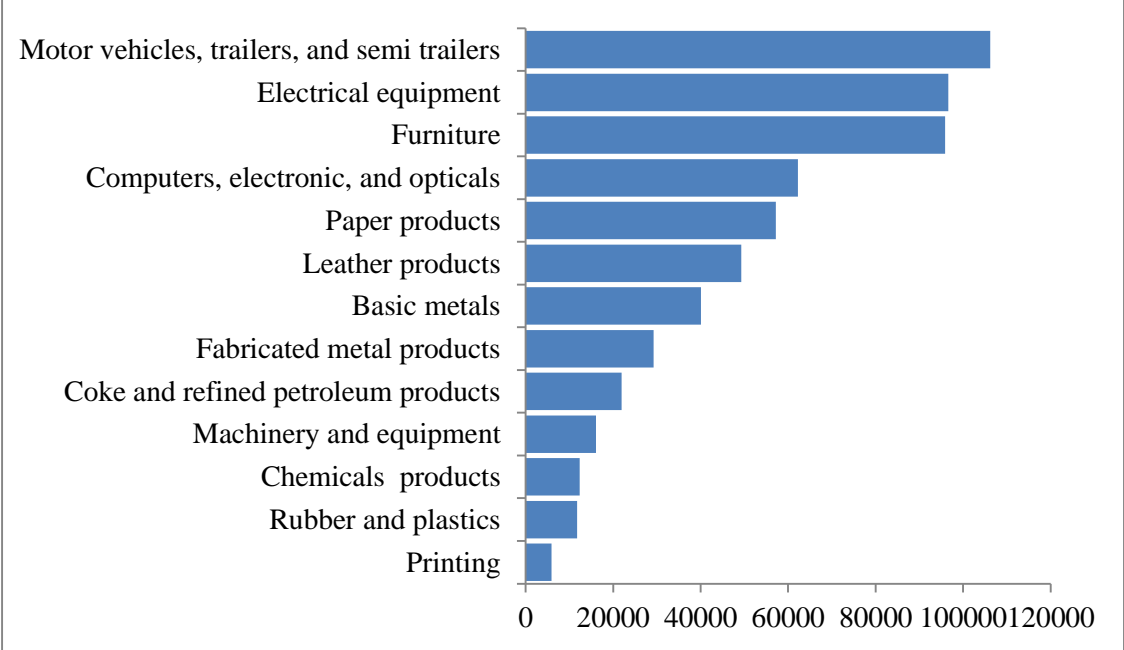
Figure 2.1: Labour productivity and firm size
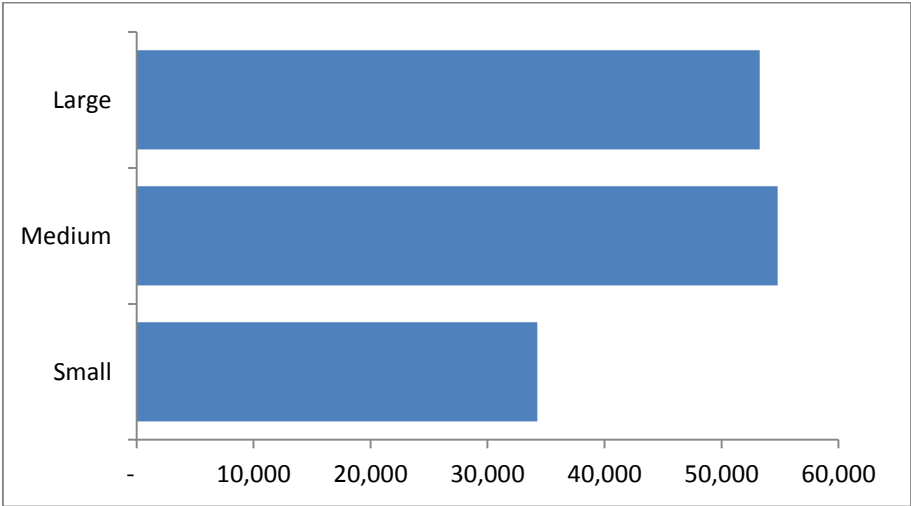
Moreover, labour productivity is 3 percentage points lower among large enterprises when compared to medium enterprises. While this shows that labour productivity increases with size, it also points to some potential nonlinearity whereby this positive relationship is weakened as size increases beyond a certain point.

Examining labour productivity patterns at the two-digit ISIC classification levels, we find important within industry differences in labour productivity. In particular, labour productivity is highest in the manufacture of motor vehicles, trailers, and semi-trailers; manufacture of electrical equipment; and manufacture of furniture and lowest in the printing and the reproduction of

recorded media sub sector. The differential between these two is so huge that productivity in the former is 19 times greater than in the latter subsector.

Figure 2.3: Labour productivity and industrial sectors

In order to have a better understanding of the nature of the relationship between labour productivity and firm age, we decompose firm age into three categories: young, mature, and older. Young firms are aged five years and below; mature firms are aged between 5 and 15 years; and older firms are aged above 15 years. We find that labour productivity increases with age (figure 4). In particular labour is 175 percent more productive in older firms than in the young category, and 61 percent more productive in when compared to medium sized firms.

**Figure 2.4: Labour productivity and firm age**
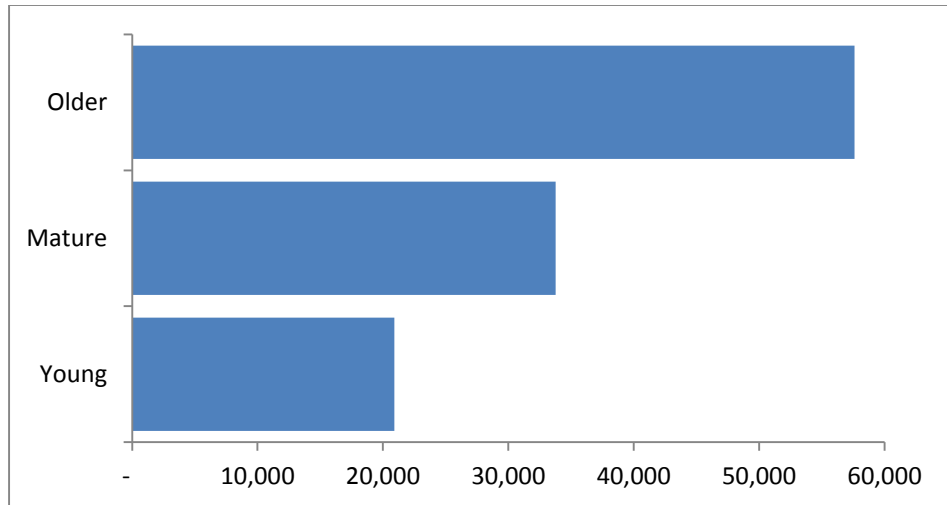
2.1.2 Wages

The countries with the highest wages also seem to be the countries with the highest labour productivity. Wages are estimated to be highest in Djibouti at about $17,000 per full time employee per year, followed by DRC at $11,000, Madagascar at $7900 and Kenya at $6750 (figure 5). After that, wages dramatically fall with wages in the fifth placed country accounting for half of wages in the fourth placed country. Moreover, wages in the country with the lowest wage – Uganda, would have to improve by factors of 19, 13, 9, and 8 respectively to catch up with the top four countries respectively. Generally, the distribution of wages by country mirrors that of labour productivity suggesting that the two are closely related.

**Figure 2.5: Wages across countries**
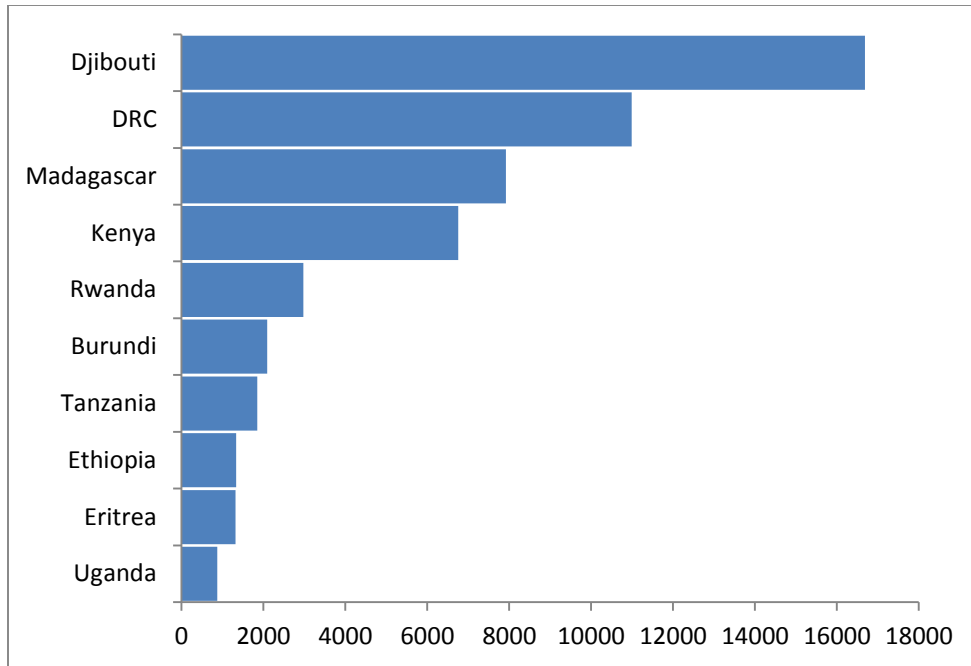
We now proceed to investigate the relationship between wages and firm size. There seems to be a positive relationship between wages and firm size. In particular, wages increase with firm size. Wages in large enterprise are on average 4 times higher than in small enterprises, and 2.5 times higher than in medium enterprises. Likewise, wages in medium enterprises are 68 percentage points higher than wages in small size enterprises.

**Figure 2.6 Wages and firm size**

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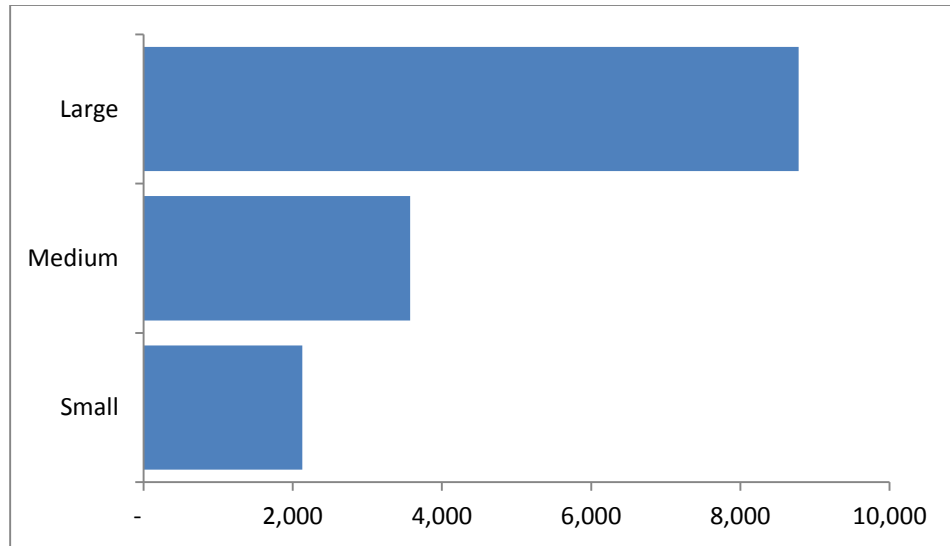
In line with earlier patterns, wages shows considerable heterogeneity across industry ISIC classifications. In particular, wages are highest in the other manufacturing industry with average wages of about $16,000 per year. This category includes sub sectors such as manufacture of jewelry, music instruments, sports goods, games and toys, as well as medical and dental instruments. The manufacture of paper and paper products category have the second highest wages of about $ 14,500 per year. This sector includes activities such as manufacture of pulp, paper, and paper board; and manufacture of corrugated paper and paperboard and containers of paper and paper board. However, wages are lowest in repair and installation of machinery, printing and recording media and manufacture of machinery and equipment. The wage differential between the sectors with the highest and the lowest wages is so huge. Wages in the top sector are 25 times higher than in the lowest and 21 times higher than in the second lowest. This implies that sector-location of enterprises is an important determinant of wages. Importantly, the sectors with the highest productivity also tend to have the highest wages as was shown earlier.

Figure 2.7: The distribution of wages across sectors
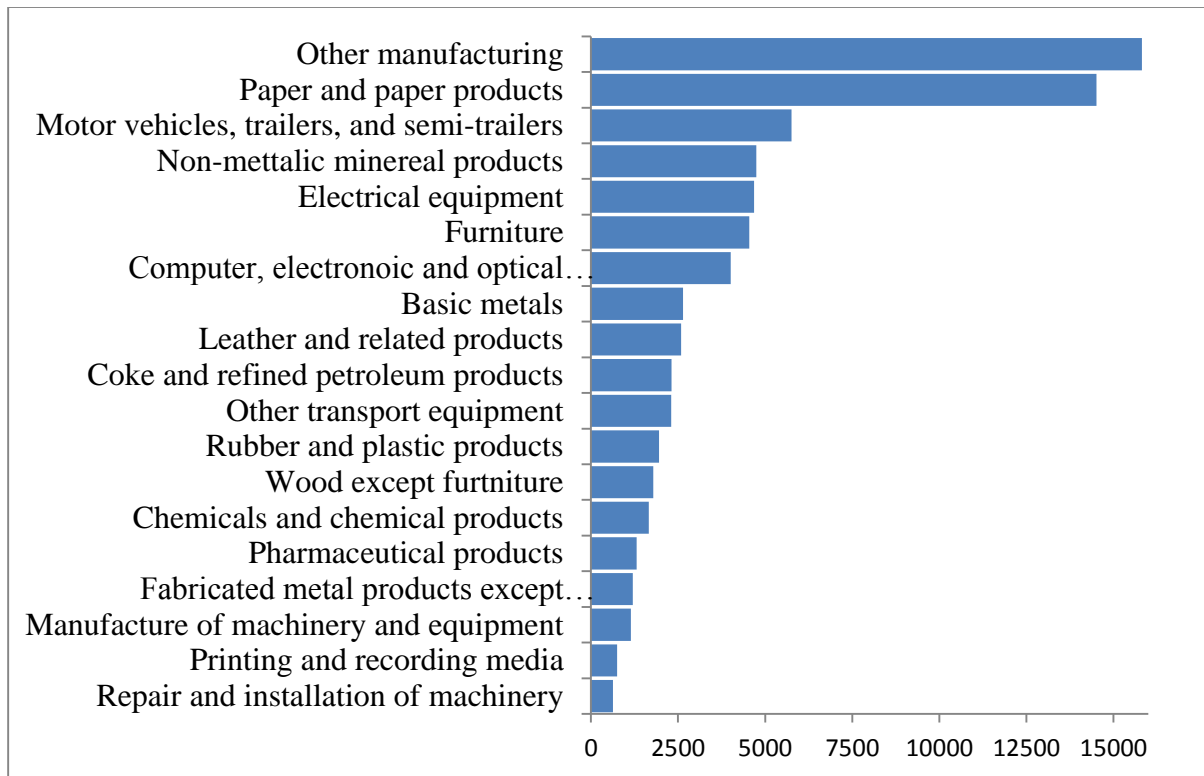
With regard to the relationship between firm age and wages, we do find a non linear relationship. Wages are highest amongst mature firms, that is, those aged between 5 − 15 years, and lowest among the young firms. Wages among mature firms are more than double those in the young category and more than 60 percentages points higher than those in the older category. However, wages in the older category are 39 percentage points higher than wages in the young category.

Figure 2.8: Wages and firm age

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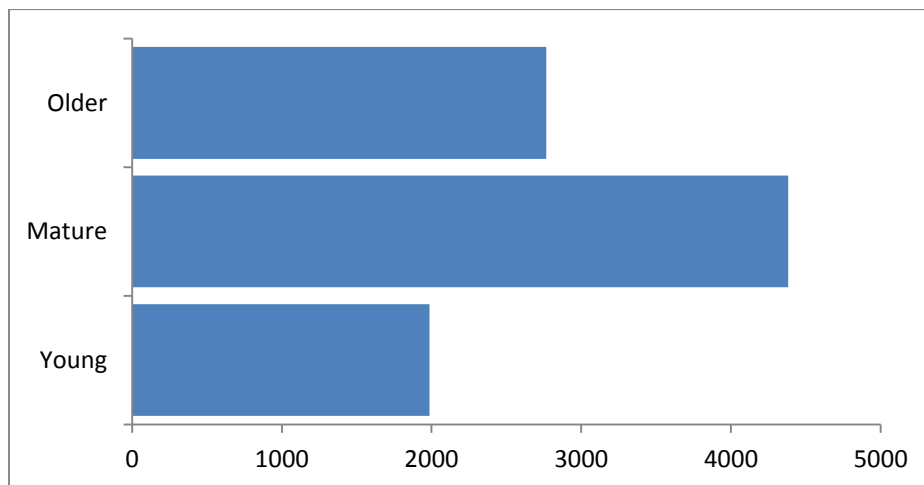
2.2 The effect of labour productivity on wages

To finalize the analysis, we estimate a wage model highlighting the role of labour productivity. However, any econometric analysis of the effect of labour productivity on wages in likely to be faced with potential endogeneity bias arising from three sources: (a) there is likely to be significant measurement error challenges for both wages and labour productivity (b) both wages and labour productivity are likely to be jointly determined, and (c) there are likely to be issues of reverse causality whereby a two-way relationship between wages and labour productivity exists. Indeed, with regard to the latter, many studies have estimated the wage-productivity nexus showing that wages are important determinants of productivity[22].

To overcome these challenges, we follow the instrumental variable approach using the two-stage least squares methodology. The identification strategy involves constructing instruments that are correlated with labour productivity but not with wages. In that regard, we generate country-sector-size averages for labour productivity and use these as instruments[23]. Therefore, to evaluate the effects of labour productivity on wages amongst firms in Eastern Africa, we estimate the following system of equations:

$$W_{ics} = \beta_0 + \beta_1 L_{ics} + \beta_2 X_{ics} + \beta_3 Y_{ics} + \beta_4 Z_{ics} + \beta_5 \gamma_C + \varepsilon_i \qquad (1)$$

$$L_{ics} = \beta_0 + \beta_1 LAvg_{ics} + \beta_2 X_{ics} + \beta_3 Y_{ics} + \beta_4 Z_{ics} + \beta_5 \gamma_C + \varepsilon_i \qquad (2)$$

Where W_{ics} represents wages for firm i in country c, and sector s. L is measure of labour productivity determined as before; X are firm level characteristics such as size, age, and geographic location; Y are labour specific characteristics such as experience, skill level, and education; Z reflect the intensity of selected business environment variables such as electricity outages and access to finance; γ are dummy variables controlling for country fixed effects; $LAvg$ are

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[22] See for example Konings and Marcolin 2014
[23] See Aterido et al (2011). Note that this approach is considered suitable and has been used elsewhere by among others Angrist and Krueger (2001), Fisman and Svensson (2007), Gauthier and Goyette (2014) and Mawejje and Okumu (2016).

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instruments employed in the first stage regression and represent labour productivity averages computed at the country-sector-size level for each firm in the sample excluding the level of labour productivity estimated for each specific firm for which the average is calculated.

Results are presented in table 2.1. Model (1) represents our base equation in which only estimates the effect of labour productivity on wages. Results indicate that labour productivity is positively associated with wages: a one percentage point increase in sales per worker is associated with an 0.6 percent increment in wages. The implication is that policies that seek to improve labour productivity can also enhance wages.

Model (2) builds on model (1) and includes some labour characteristics that include the proportion of skilled employees, the proportion of female employees, and perceptions about labour as a constraint. The model also controls for firm size by including dummy variables for small and large firms with medium sized firms as the reference point. Results from model (2) indicate that the higher the proportions of skilled workers, the higher the wage. In particular, a one point increase in the proportion of skilled workers is associated with wage increments of up to 0.3 percentage points. These results show that skilled labour attracts higher wages and are consistent with literature that documents the relationship between skills and wages[24].

In addition, results show that higher proportions of female employees are associated with a lower average wage per employee. This finding reflects a wage gap between male and female employees with female employees earning significantly less than their male counterparts for the same job or might imply that female employees do not progress to higher paying jobs within firms. These results are consistent with existing studies which document significant gender-wage gaps in African manufacturing firms[25].

Results further show that firms that identify labour as a binding constraint for doing business are more likely to pay higher wages. One potential explanation for this finding is that firms that struggle to identify the requisite labour for their operations, are likely to be more willing to pay higher wages to attract and keep labour. These firms are likely to engage in sectors that require

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[24] See Fox and Oviedo, 2008
[25] See Fafchamps et al., 2009

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specialised skills that are not easy to reproduce on the market and therefore command higher wages.

Table 2.1: The wage model

	(1) LWAGE	(2) LWAGE	(3) LWAGE	(4) LWAGE	(5) LWAGE
LLABPROD	0.619***	0.714***	0.698***	0.677***	0.659***
	(0.023)	(0.036)	(0.036)	(0.037)	(0.044)
SKILLED		0.340***	0.345***	0.333***	0.384***
		(0.128)	(0.126)	(0.126)	(0.128)
FEMWORK		-0.289**	-0.310***	-0.291**	-0.213*
		(0.118)	(0.118)	(0.117)	(0.116)
LMGREXP		-0.079*	-0.110**	-0.109**	-0.076*
		(0.043)	(0.046)	(0.045)	(0.044)
LABPERCEPTIONS		0.050**	0.052**	0.069**	0.059*
		(0.025)	(0.025)	(0.031)	(0.031)
SMALL		0.105	0.136*	0.104	0.120
		(0.080)	(0.081)	(0.080)	(0.079)
LARGE		-0.0126	-0.0171	-0.007	-0.014
		(0.094)	(0.096)	(0.094)	(0.095)
LAGE			0.071	0.058	0.067
			(0.043)	(0.042)	(0.041)
KCITY			0.147**	0.139**	0.166**
			(0.065)	(0.064)	(0.073)
EXPORTS			-0.0324	-0.0546	0.00752
			(0.081)	(0.081)	(0.083)
RETAINED				-0.041**	-0.036**
				(0.095)	(0.094)
LABREG				-0.041	-0.026
				(0.032)	(0.031)
LOUTAGE				-0.203***	-0.134***
				(0.038)	(0.040)
BRIBE				0.625	0.984
				(0.719)	(0.755)
LCAPINT				0.090**	0.087**
				(0.042)	(0.039)
COUNTRY EFFECTS					YES
Constant	1.239***	0.304	0.270	1.011**	0.502
	(0.207)	(0.394)	(0.393)	(0.445)	(0.478)
Observations	2014	1619	1619	1618	1618

Note: 1) The coefficients are tabulated; standard errors are in parentheses. 2) Significance levels: *** =significant at the 1% level, ** =significant at the 5% level, *=significant at the 10% level. 3) Country fixed effects are highly significant

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In addition, results show that higher proportions of female employees are associated with a lower average wages per employee. This finding reflects a wage gap between male and female employees

Model (3) builds on model (2) to include the natural logarithm of firm age, a dummy variable for firms located in the capital city, and a dummy variable for exporting firms. Results indicate that locating in the capital city is associated with higher wages. Model (4) builds on model (3) to include some business environment indicators that include firm perceptions about labour regulations, firm's experiences with electricity outages, and bribery. Results indicate that credit constrained firms are associated with lower wages per employee. The indicator for credit constraints is the proportion of internally generated resources used to finance the firms operations. In addition, firms that experience more outages per month are associated with lower average wages per employee. These results highlight the role of the business environment in the determination of wages.

Lastly model (5) builds on model (4) to include capital intensity estimated as the net book value of land machinery, vehicles and equipment per employee. The model also includes country fixed effects. Results show that capital intensity is positively associated with wages. Moreover, country fixed effects (results not shown) are highly significant indicating that there are country specific fixed effects that are important for wage determination across firms.

2.3 Conclusions

This chapter examined the effect of labour productivity on wages in Eastern Africa's manufacturing sector. This was done using a rich World Bank enterprise survey dataset covering 11 countries. In addition we examined the effects of firm characteristics, employee characteristics, as well as specific elements in the business environment. We address the potential endogeneity concerns by exploiting country-sector-size averages for labour productivity as plausible instruments. Our results indicate that labour productivity is associated with higher wages. In addition, wages are determined by employee characteristics, particularly skills, firm characteristics, particularly location and the business environment. In particular, results show that credit constrained firms and those firms that have to deal with more frequent outages are associated with lower wages. Lastly, the results show significant gender-wage gaps in African manufacturing firms. Moreover, there are significant country fixed effects that matter for wages. Improving wages

in the African private sector, therefore, requires a holistic approach that integrates skilling, improving labour productivity, and the business environment. Moreover, improving policies aimed at improving wages should tackle the large gender-wage gaps in the private sector.

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<center>**CHAPTER THREE**</center>

<center>**FINANCIAL CONSTRAINTS AND EMPLOYMENT GROWTH**</center>

3.0 Introduction.

Unemployment in the Eastern Africa region is a major concern, for example in Tanzania and Ethiopia the unemployment rates are 5.2 percent and 17.6 percent respectively[26]. The unemployment rate is worse for youths, for example in Uganda and Tanzania youth unemployment rate is 18.6 percent[27] and 21.4 percent[28] respectively[29]. Unemployment in the Eastern Africa region could be explained by both supply of skills and demand for skills. Supply of skills refers to the quality of skills development in the Eastern Africa region which determines the levels of skills that graduates bring to the labour market. Existence of a mismatch between skills supply and skills demand induces rigidities in transition to the labour market hence unemployment. Demand for skills on the hand refers to the availability of work among firms to the extent that a certain skill is worth being hired that is employment growth. While disregarding supply side of labour, this chapter explains the drivers of employment growth with particular emphasis on financial market constraints.

The importance of realized access to finance is that it frees up a firm to expand production capacity through: 1) exploring improved production technology by way of investing in R&D or acquisition of new and improved production technology; and 2) hiring more workers. Typically investment in R&D or merely adoption of new production technology which is common with firms in developing economies is likely to be an expensive capital investment for a firm to afford using retained earnings. As such absence of external financing is likely to result in adoption of myopic and inefficient production technology which may not only undermine firm productivity but also result in sluggish firm growth or transition from small size to medium size and finally large size[30]. Indeed, empirical evidence suggests that Africa's 'competitive advantage' in low technology

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[26] World Development Indicators, 2014 figures
[27] Uganda Bureau of Statistics (2016)
[28] World Development Indicators, 2014 figure
[29] Note that unemployment whether among youths or entire labourforce is a risk to regional stability and gains made this far in attempting to alleviate poverty in the ECA. As such it is pertinent to partly account for the high unemployment.
[30] Banerjee and Newman (1993); Okumu and Gonzalo (2014)

manufacturing sector is partly attributed to inaccessibility to finance[31]. With regard to hiring more workers (employment growth) as a way of expanding production capacity, it is imperative to note that employees earn a wage which by its nature is a recurrent expenditure. As such, absence of external financing to specifically finance working capital induces a reserved approach in staff recruitment which could potentially result in under-staffing and thus less than capacity utilisation of the production technology.

Therefore whether it is acquisition of new production technology or hiring more workers; absence of external financing has implications on employment growth. This chapter is henceforth concerned with how access to financial services among manufacturing firms in Eastern Africa region[32] countries affects employment growth.

The next subsection explores the context of financial industry within the Eastern Africa region after which the relationship between employment growth and financial market constraints is explained in the subsequent subsection.

3.1 Context of financial industry of in Eastern Africa.

Commercial bank coverage in among Eastern African countries is rather low. For example, other than Rwanda and Kenya which on average have 6.1 and 8.3 commercial banks per 100,000 adults that is higher than 4.7 commercial banks per 100,000 adults average for Sub-Saharan Africa (SSA, excluding high income) all the other countries have commercial bank coverage less than that of SSA excluding high income (figure 3.1). Note that much as Kenya does well compared to other Eastern African countries, it equally has a lower commercial bank coverage per 100,000 adults compared to the average for lower middle income countries (8.3 commercial banks per 100,000 adults) considering that Kenya is a LMI country. The low commercial bank coverage among Eastern African countries suggests low physical access to commercial bank financial services which is key in consumption of financial services and financial widening.

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[31] Harrison et al. (2014)

[32] For purposes of this report includes Burundi, Comoros, DRC, Eritrea, Ethiopia, Kenya, Madagascar, South Sudan, Tanzania and Uganda.

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**Figure 3.1**: Number of commercial banks per 100,000 adults
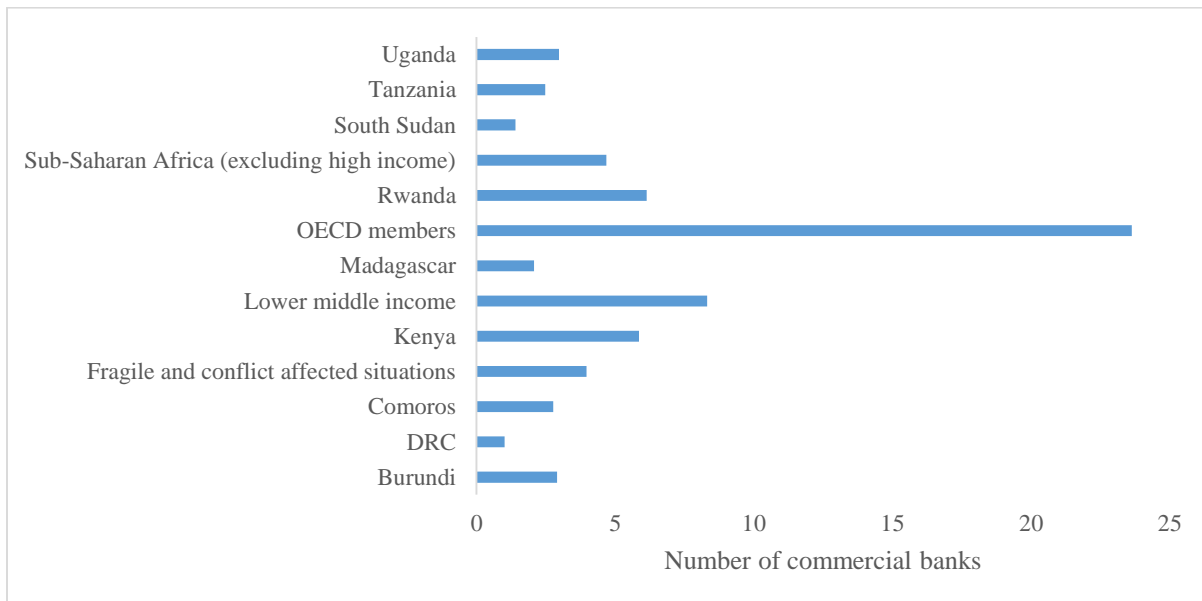
Source: World Development Indicators, reference year 2015

Low commercial bank coverage suggests limited financial inclusion. Implying limited access to financial services such as credit, savings, insurance and payment systems. Indeed, Low commercial bank coverage is worsened by the fact that only 24 percent of persons aged 15 years and above had a bank account by 2011 in SSA (excluding high income, see figure 3.2). Other than Kenya and Rwanda which are 42 percent and 32.8 percent of persons above 15 years of age with a bank account no other country had a figure higher than that for SSA (excluding high income). This suggests that options to enhance commercial bank coverage are relevant in the Eastern Africa region in a bid to enhance financial sector widening and utilisation of financial services to support private sector investment[33].

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[33]Beck, Demirguc-Kunt and Peria (2007)

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**Figure 3.2:** Account holding among persons aged above 15 years
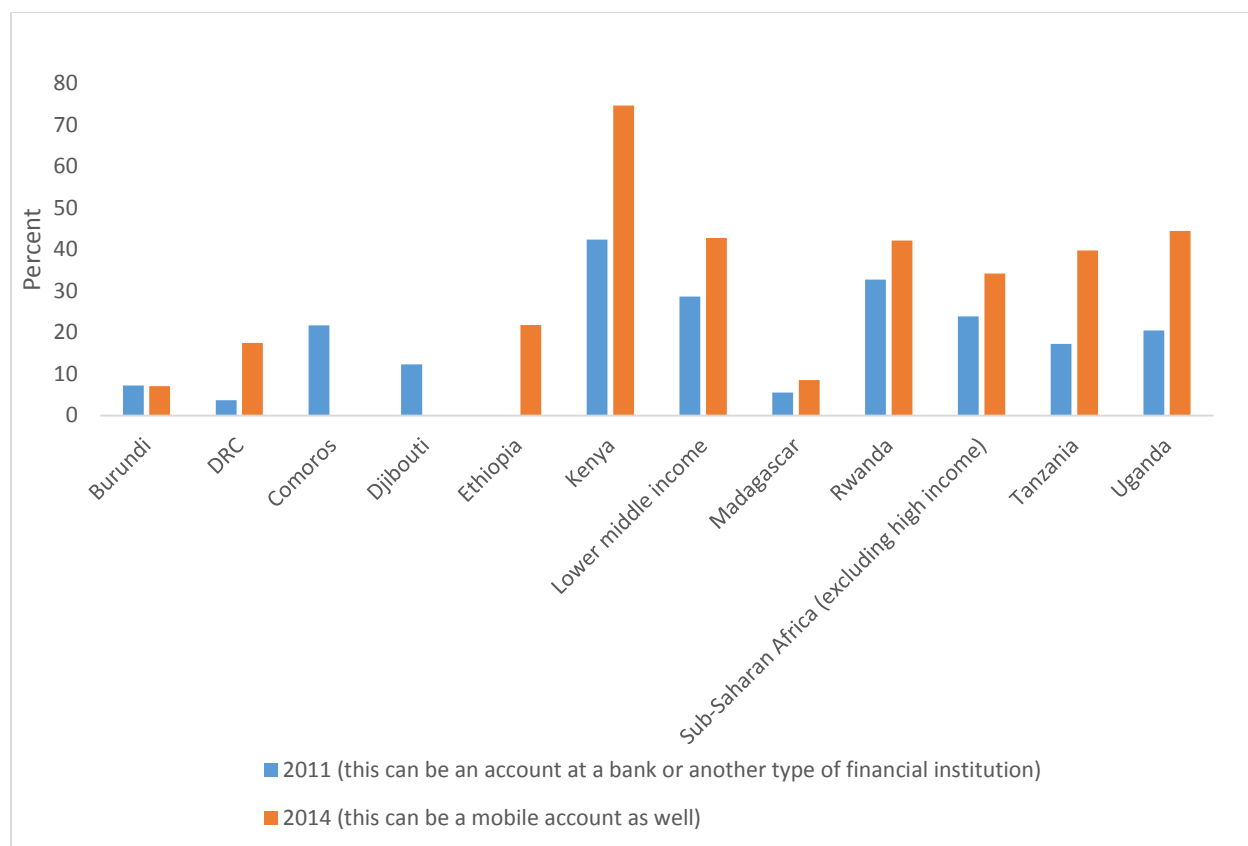
Source: Demirguc-Kunt et al., 2015, Global Financial Inclusion Database, World Bank.

However, the effect of low commercial bank coverage in Eastern Africa region is offset by the increased use of mobile banking in financial payments. Mobile banking which was first launched in Africa in 2007 in Kenya has since transformed the financial payments industry in Eastern Africa region. Indeed, today 58.4 percent, 35.1 percent, 32.4 percent and 18.1 percent of persons over the age 15 years are using Mobile money services in Kenya, Uganda, Tanzania and Rwanda respectively which is higher than the 11.5 percent average for SSA (excluding high income) and 2.5 percent mobile money usage among persons above 15 years of age in LMI countries. Even then, the DRC and Madagascar which have 9.2 percent and 4.4 percent of persons above 15 years of age using mobile money are still lower than the SSA (excluding high income) although higher

than the LMI average of 2.5 percent mobile money usage among persons above 15 years of age. Note that mobile banking usage partly accounts for the increase in fraction of adults that have bank accounts this is because there is increasingly synergies between mobile money service providers and commercial banks the effect of which is that financial tractions on one's commercial bank account can effectively be undertaken with the use of a basic phone.

Figure 3.3: Mobile money usages among persons over 15 years of age
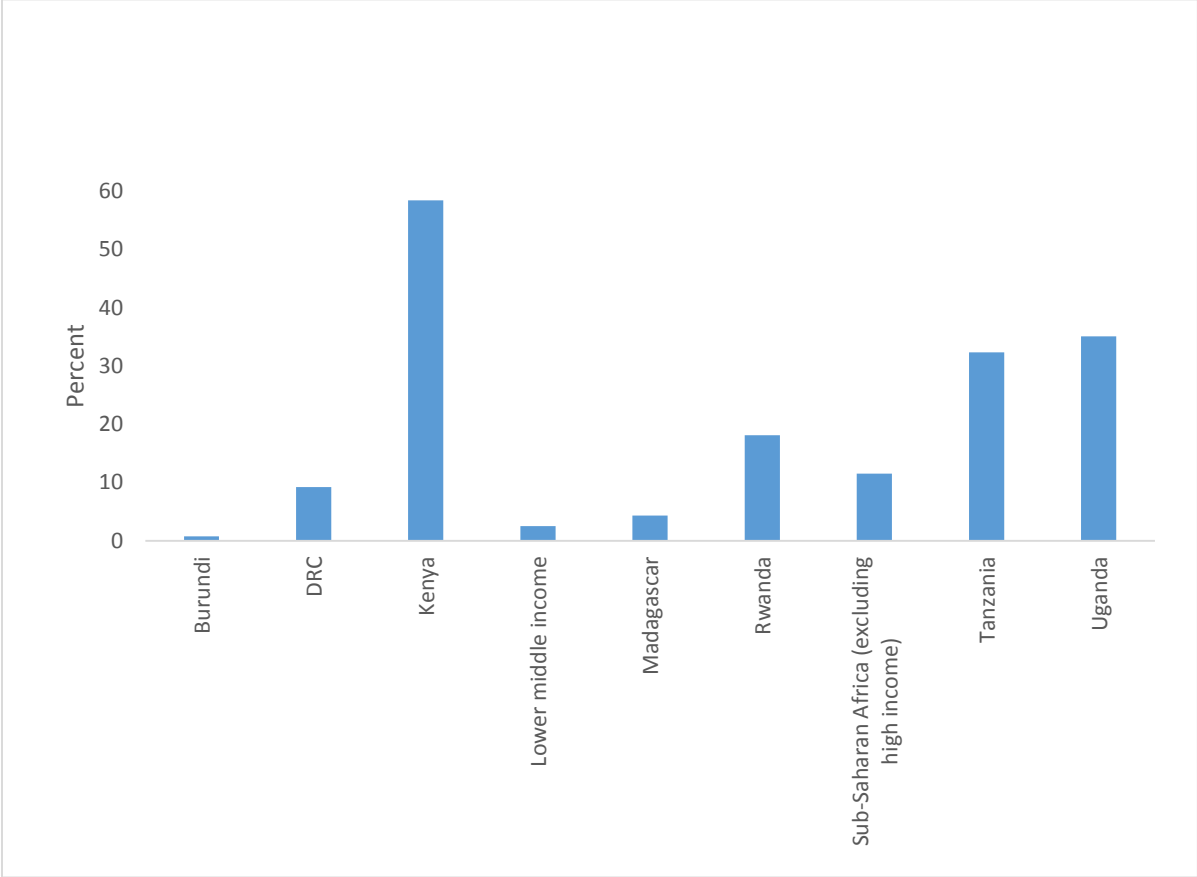
Source: World Development Indicators, reference year 2014

That said, mobile banking innovation has widened the access to financial services especially under circumstances of poor commercial bank coverage due to unfavorable public infrastructure which necessitates the use of mobile banking[34]. Indeed, through innovations such as effecting transactions on the mobile phone through a telecom companies that work in partnership with commercial banks has allowed access to commercial banks without necessarily physically walking

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[34] Mothobi and Grybowski (2017)

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into a commercial bank building. For instance it is possible that one can deposit money on their mobile money platform and thereafter transfer it to their bank accounts. Similarly, one can withdraw money from their bank accounts through their mobile phone using their respective mobile money platforms. With advent of mobile banking therefore, there is a likelihood of increased savings which if exploited could be linked to investment through availing credit to investment which is the essence of commercial banking albeit at lower cost to users of the mobile banking.

However, the very best of mobile banking technology will enhance financial deepening and widening when consumers of financial services are able to apply for loans and perhaps have their loans evaluated using the mobile banking platform. Perhaps what is key is to ensure that the regulatory rigor that we are accustomed to in commercial bank sector should equally follow suit in the era of mobile banking this is especially so as mobile banking which is typically through telecom companies are supervised by respective country telecom agencies while commercial banks are supervised by respective country central banks.

Besides mobile banking through mobile phones, agency banking is equally taking shape in Eastern Africa region. Indeed, as of 2016 agency banking took effect in Kenya while in Uganda it is expected to effectively start this year, 2017. Agency banking implies that a third party can undertake activities such as: cash withdrawal, bills payment, cash deposits, funds transfer, balance enquiry, document collection for debit and credit cards, loan applications and account opening forms, collection of bank correspondence and mail; and even mobile banking services on behalf of a commercial bank. This link mobile banking enhances financial widening and thus reducing the transaction cost of engagements between customers and commercial banks.

In spite of the innovations in the financial sector, both commercial bank and domestic credit to the private sector is still low compared to the SSA (excluding high income) average. Other than Kenya and Djibouti where commercial bank credit to the private sector is 34.6 percent and 30.5 percent respectively of GDP which are higher than the SSA (excluding high income), 28.9 percent of GDP (figure 3.). Even then, all countries in the Eastern African region have a lower domestic credit to the private sector as a percent of GDP compared to that SSA (excluding high income), 45.7 percent of GDP. Furthermore, Burundi, Tanzania, South Sudan, Madagascar and DRC have lower

Domestic and Commercial bank credit to the private than that of fragile and conflict affected situations which average 20 percent and 19.6 percent of GDP respectively. Private sector credit from formal financial institutions could partly attributed to preference for government paper which is deemed less risky as compared to extending loans to the private sector.

Figure 3.4: Domestic credit to the private sector as percent of GDP
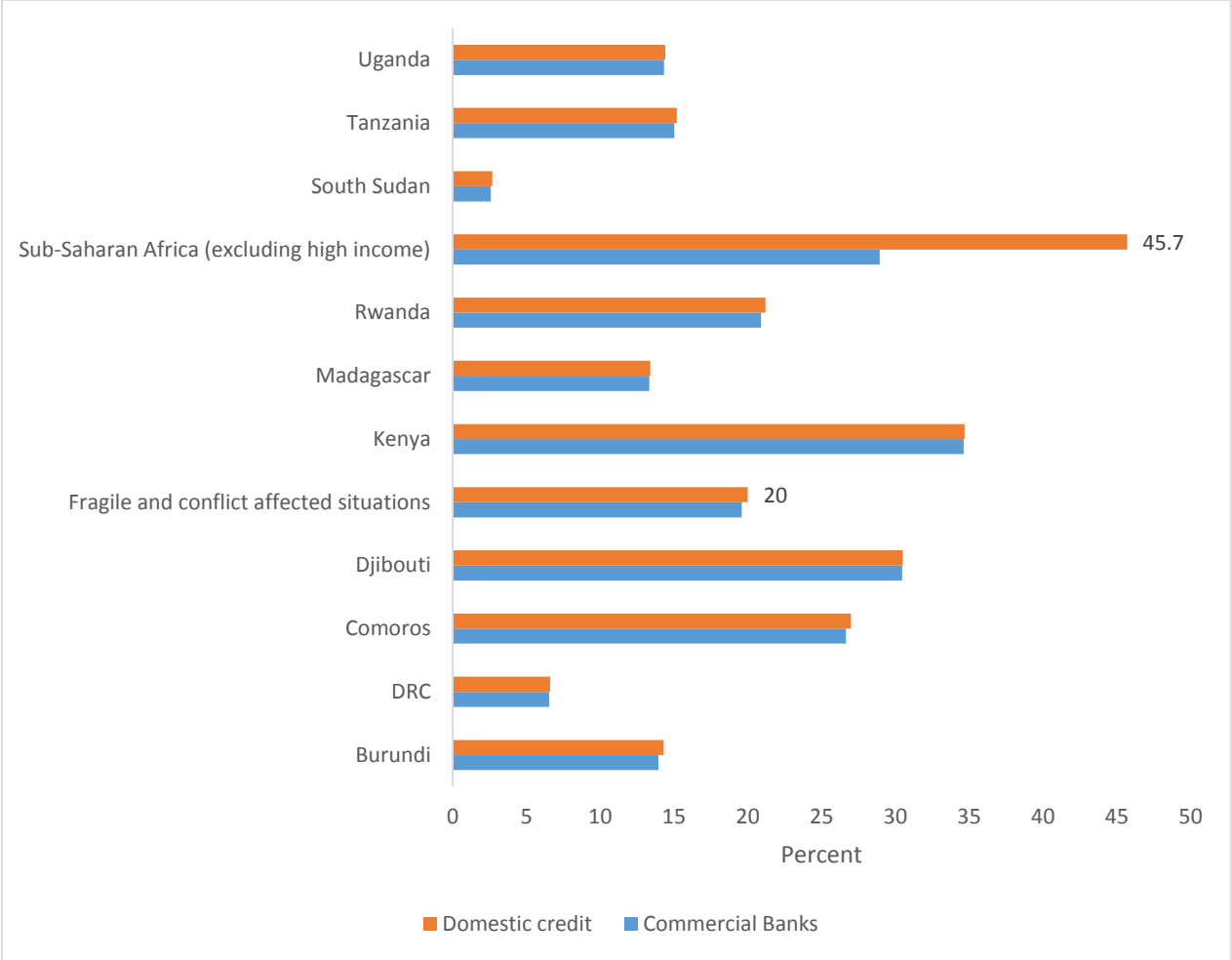
Source: World Development Indicators, reference year 2015

Low private sector credit as a percent of GDP is not helped by high interest rate spread. Uganda, Rwanda, South Sudan, Madagascar, Djibouti, Comoros and DRC all have an interest rate spread higher than 7.9 percent for Fragile and Conflict countries (figure 3.5). Worse still the interest rate spread for Madagascar 37.1 percent is higher than that of Fragile and Conflict countries.

Furthermore, other than Kenya and Tanzania, all the countries have a higher interest rate spread than that of LMI countries, 6.8 percent. The interest rate spread signals a high cost of financial institutions extending credit to the private sector.

Figure 3.5: Interest rate spread
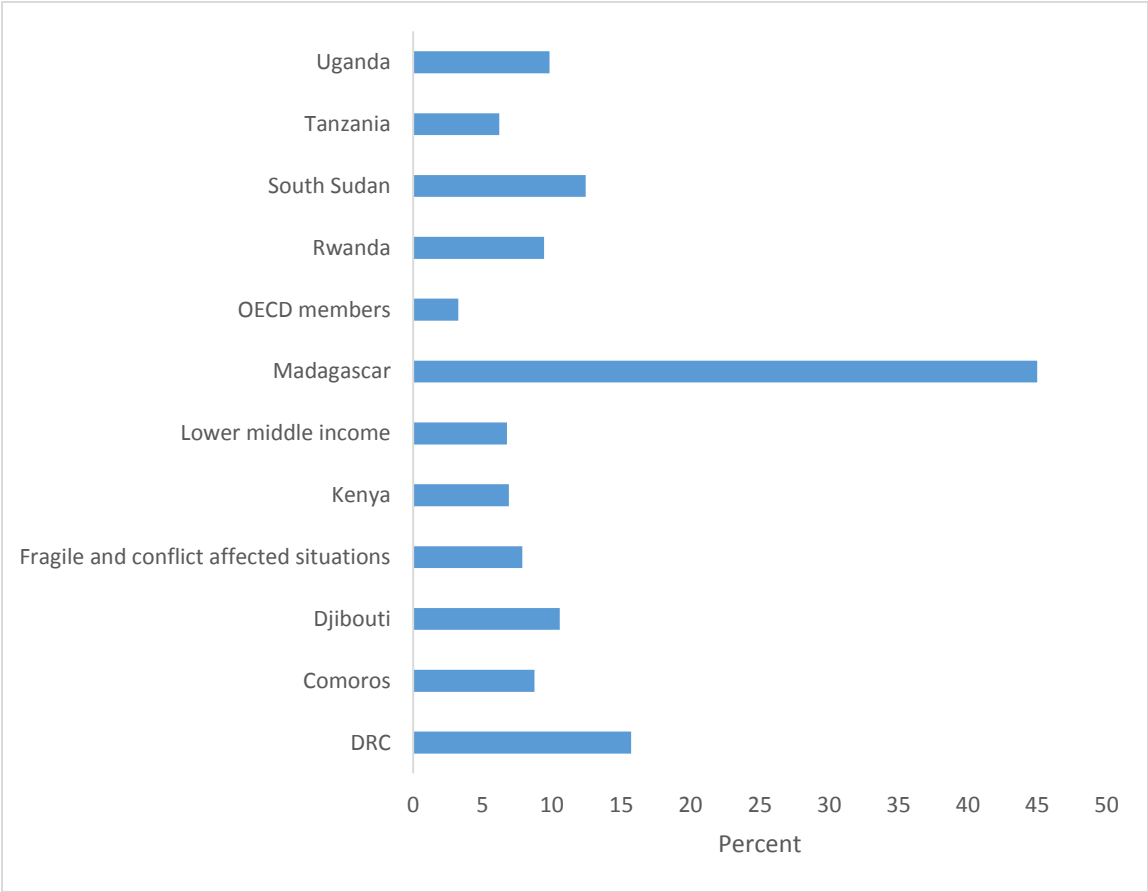
Indeed, the doing business getting credit indicators generally suggest a dim credit infrastructure hence the high cost of credit. For example the depth of credit information is generally lucking to the extent that other than Kenya, Tanzania, Rwanda and Uganda with a depth of credit information of 7, 8, 8 and 7 respectively suggesting relatively high quality credit information all other countries depict low credit information quality (table 3.1). The generally low depth of credit information

suggests weak mechanisms of accessing credit information both in scope and quality through either public or private credit registries. The low depth of credit information is indeed consistent with the fact that both public and private credit registry of adults is low. For example besides Rwanda and Comoros where the public credit registry coverage of adults is 7.4 percent and 7.9 percent respectively, for all other countries coverage is below the SSA (excluding high income) average of 4.9 percent. Furthermore, other than Comoros, all countries have a lower public registry coverage than the 7.8 percent average of LMI countries. With regard to private credit bureau coverage, other than Kenya and Rwanda where 25.8 percent and 16.6 percent respectively of adults are covered all other countries have adult coverage lower than the SSA (excluding high income) average of 7.7 percent. The low adult public and private credit registry coverage suggests cumbersomeness in lending institutions to access information about a borrower's repayment history, outstanding debts and debt default. Worse still other than Rwanda with a strong score of 11, all other countries have a weak with regard to strength of legal rights index. This implies that collateral and bankruptcy hardly protect the rights of borrowers and lenders in the market place thereby incapacitating credit facilitation. The such a dim doing business getting credit indicators suggests that the cost availing credit is rendered expensive and thus the apparent relatively high interest rate spread which further constrains credit utilisation.

Table 3.1: Doing Business getting credit indicators

Country	Depth of credit information index[35]	Public credit registry coverage[36]	Private credit bureau coverage[37]	Strength of legal rights index[38]
Burundi	0	4	0	2
DRC	0	0.7	0	6
Comoros	2	7.9	0	6
Djibouti	0	0.4	0	1
Eritrea	0	0	0	0
Ethiopia	0	0.2	0.0	3
Kenya	7	0	25.8	7
Madagascar	0	3	0	3
Rwanda	8	7.4	16.6	11

[35] 0=low to 8=high
[36] Public credit registry coverage (% of adults)
[37] Private credit bureau coverage (% of adults)
[38] Strength of legal rights index (0=weak to 12=strong)

| South Sudan	0	0	0	2
Tanzania	8	0	6.5	5
Uganda	7	0	6.6	6
Fragile and conflict affected situations	1.1	3.7	1.2	4.6
Lower middle income	4.6	7.8	0	4.9
Sub-Saharan Africa (excluding high income)	2.4	4.9	7.7	5

Source: World Development Indicators, reference year 2016

Firm-level context of the financial sector in Eastern Africa

Indeed credit utilisation among firms is seemingly low averaging 33 percent[39]. A disaggregation across small, medium and large firms, 20 percent, 47 percent and 54 percent them have some form of credit from financial institutions. A look at country disaggregation, in Uganda, Madagascar, Tanzania, DRC, Djibouti and Eritrea there is an increased reliance on firm retained earnings or internal funds. Indeed, 29 percent, 24 percent, 28 percent, 10 percent, 22 percent and 14 percent of firms in Madagascar, Tanzania, Djibouti, DRC, Eritrea and Uganda respectively rely on firm retained earnings or internal funds to finance firm investments (see figure 3.6).

**Figure 3.6**: Percentage of firms with a credit line

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[39] Owing to absence of data on Somalia, South Sudan and Comoros these are excluded.
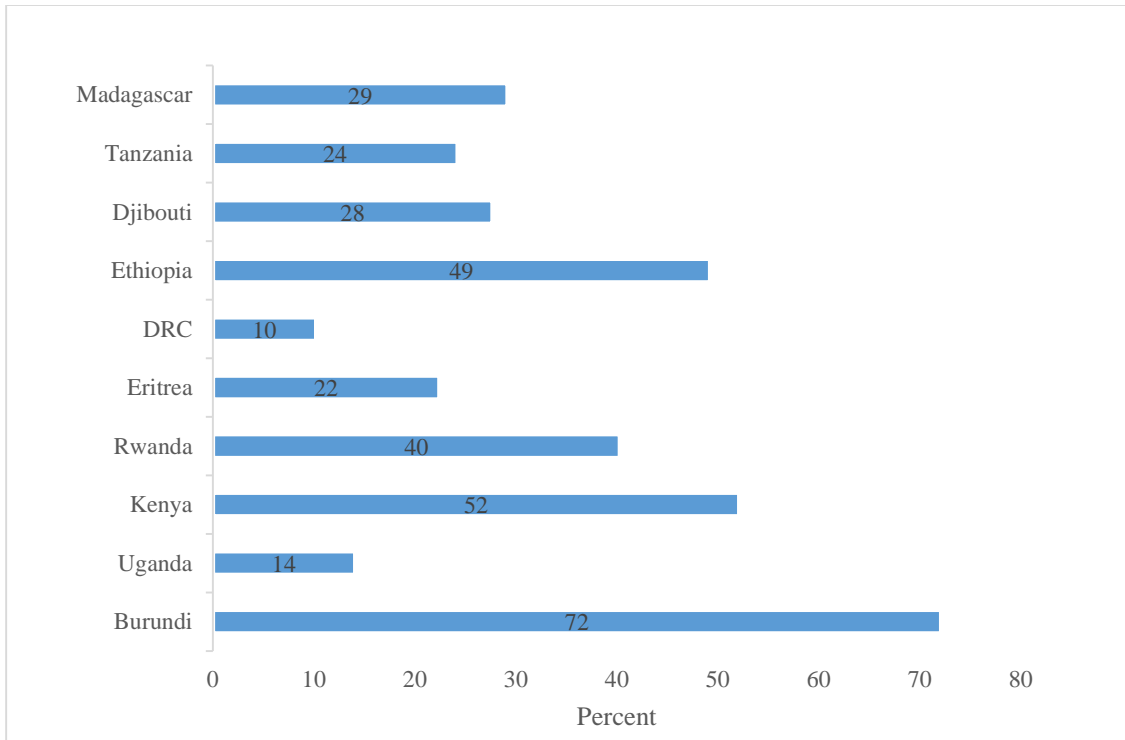
Source: Enterprise surveys

Firm credit is typically attained from private commercial banks. Other than Eritrea where 91 percent of firms reported to be accessing credit from state owned financial institutions for all other countries firm credit is largely received from private commercial banks. Indeed, for DRC with 68 percent of the firms reporting to have accessed credit from private commercial banks is the lowest with the highest being Burundi where 100 percent of the firms reported to have accessed credit from private commercial banks. Otherwise generally, state-owned financial institutions and non-bank financial institutions play a limited role in extending credit to firms when compared to private commercial banks.

Figure 3.7: Type of financial institution from which firms acquired credit.

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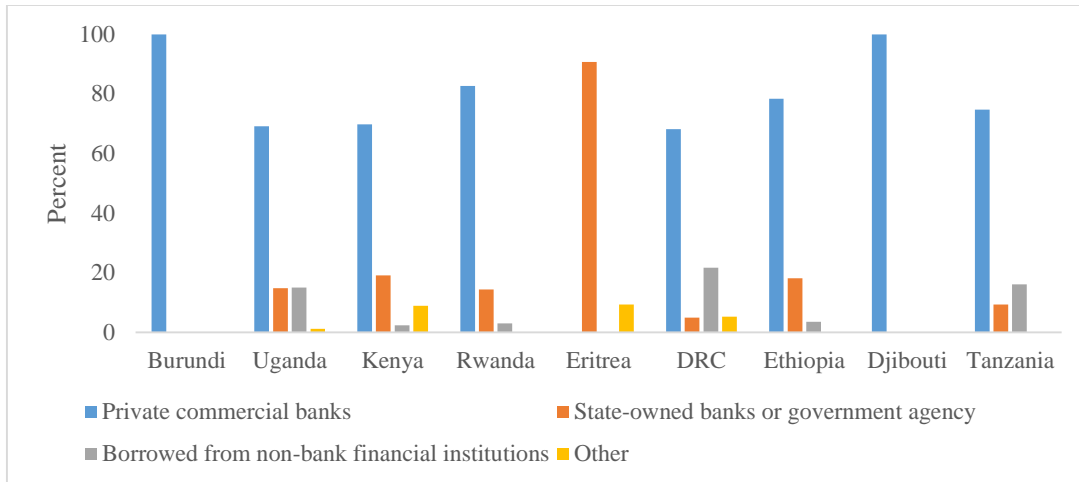
Source: Enterprise Surveys. Note: 1) Other includes moneylenders, friends and relatives among others. 2) Non-bank financial institutions include microfinance institutions, credit cooperatives, credit unions and finance companies.

On average 63 percent of the firms wish to have credit but cannot effectively access it and thus are credit constrained[40]. Indeed other than Djibouti and Eritrea where 33 percent and 29 percent respectively of the firms are credit constrained, in all the remaining countries at least 65 percent of the firms are credit constrained (figure 3.8). A disaggregation across firm size, indicates that 71 percent, 68 percent and 72 percent of small, medium and large firms respectively are credit constrained.

Figure 3.8: Percentage of credit constrained firms

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[40] A firm is credit unconstrained if it did not need credit and thus did not apply for a loan. Furthermore a firm is credit unconstrained if it was able to apply for a loan[40]. However, a firm was deemed credit constrained if a firm did not apply for a loan because of the following main reasons: 1) complicated application procedures for loans; 2) interest rates being unfavorable; 3) very high collateral requirements; 4) insufficient loan maturity; 5) insufficient loan size; 6) it is necessary to make informal payments; 7) a firm did not think that the loan would be approved; and 8) others. Therefore the variable is define is '0' if a firm is credit unconstrained otherwise '1'
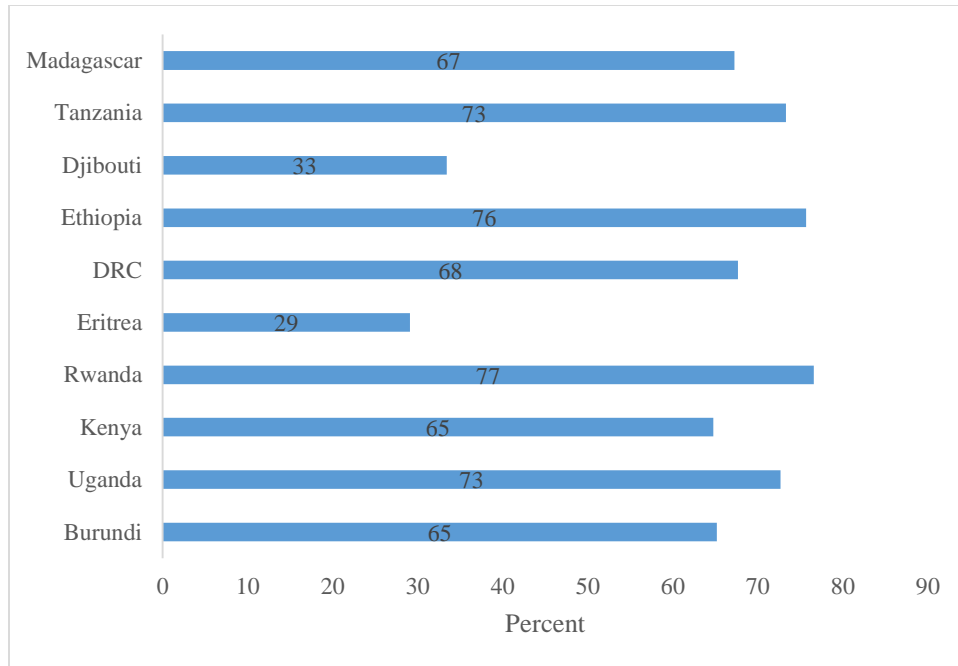
Source: Enterprise surveys

High interest rates and cumbersome application procedures largely account for firms being credit constrained. Tanzania, Madagascar and DRC have the highest number of firm that are constrained as a result of high interest rates. Indeed, 20.7 percent, 27.1 percent and 21.4 percent of credit constrained in Tanzania, Madagascar and DRC respectively report cumbersome application procedures as the main for them forfeit the credit market (see figure 3.9). On the other hand, 27 percent, 25 percent and 18.6 percent of firms in Uganda, Tanzania and Madagascar reported high interest rates as the main reason for being excluded from the credit market. High collateral is problem in Tanzania and Ethiopia while bribery is a hindrance in Uganda, and Burundi.

Figure 3.9: *Reasons for not applying for new lines of credit*
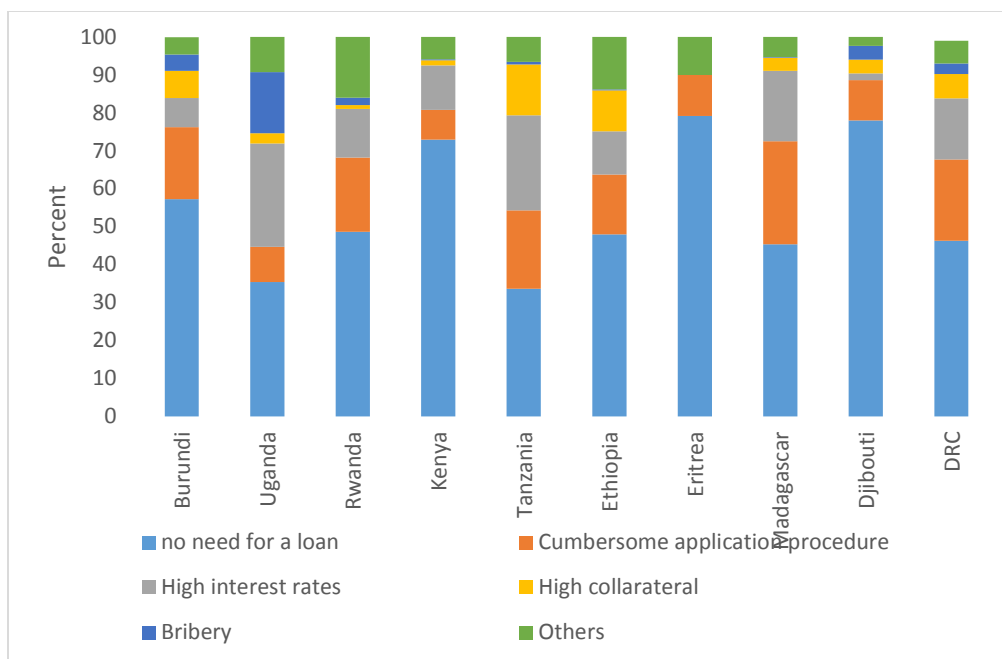
Source: Enterprise Surveys

3.3: The relationship between financial constraints and employment growth.

From the characterization of the financial sector it is evident: 1) commercial bank coverage per 100,000 adults is low; 2) mobile banking is an important vehicle to facilitate the inclusion of the unbanked into the formal financial system; 3) commercial banks take a lions' share of domestic credit to the private sector; 4) 63 percent of firms are credit constrained; 5) high interest rates, cumbersome credit application procedures, high collateral requirements and bribery partly account for firms being credit constrained. Given the aforementioned understanding of the financial sector, the subsequent analysis is a discussion of the relationship between financial constraints and employment growth with reference to table 3.2. Results in table 3.2 are estimated using equation 3.1 which relates employment growth (Employgro) in firm i and in country c.

$$\text{Employgro}_{ic} = \beta_o + \beta_1 \text{FI}_{ic} + B_2 \text{Small}_{ic} + B_3 \text{Large}_{ic} + B_4 \text{Young}_{ic} + B_5 \text{Older}_{ic}$$
$$+ B_6 \text{Fownership}_{ic} + B_7 \text{Gownership}_{ic} + B_8 \text{Mcity}_{ic} + B_9 \text{Electricity}_{ic}$$
$$+ B_{10} \text{Bureaucracy}_{ic} + B_{11} \text{Bribe}_{ic} + B_{12} \text{Export}_{ic} + B_{13} \text{Hschool}_{ic} + B_{14} \lambda_{ic} + \varepsilon_{ic}$$

(3.1)

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Where all the variables are as defined in appendix 5.1 Glossary of terms and acronyms. Note that *FI* is a vector of variables that captures access to external financing that is over draft, credit line, credit, credit constrained, credit access, finance and retained earnings. Equation 3.1 controls for other economywide business environment factors such as electricity which is a proxy for the quality of public infrastructure. The assumption is that the quality of electricity supply cannot very different from for example the nature of road infrastructure. Bureaucracy captures the smoothness with which firms access government services such as tax payment, courts of law, electricity or water connection. The easier with which firms can access government services the lower is the likelihood of red tape or better still courts of law fairly adjudicating where disputes arise. While bribe captures the extent to which access to government services involves payment of unofficial fees otherwise a firm is excluded. Note that choice of objective measures of economywide business environment indicators is because they are less they less endogenous to employment growth (measure of firm performance) than subjective measures[41]. We control for firm specific characteristics such as firm age (young and older), firm ownership (Gownership and Fownership), size (small and large), export status (Export) and location (Mcity). Finally we also control for fixed effects where each country has a dummy [λ]. Below is a discussion of the results as seen in table 3.2.

Employment growth is associated with firm use of overdraft. From table is evident that firms that use overdraft facilities exhibit employment growth. An overdraft is typically a flexible financial facility that a firm can access to abate temporal financial stress. Overdraft facility implies that a firm has a guarantee to a quick financing fix in the event of working capital shortages. While overdraft are short term in nature, they allow firms to focus more on long term strategic direction as short problems are easily fixable from the flexibility that overdrafts avail hence positive employment growth.

Having an overdraft and a credit line enhances employment growth. While having a credit line is positively related with employment growth; it is however, insignificant. Note however, that a combination of both an overdraft and credit line is shown to be associated with positive employment growth. This could suggest that a likelihood of a potential complementarity between

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41 Bigsten et al. (2003)

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overdraft and credit line. First is that having an overdraft and successfully managing implies that a firm has positive reviews from the financial sector hence increasing the likelihood of acquiring a credit facility. Secondly, where a firm is temporarily in a financial squeeze that it is unable to undertake all its obligations such as paying for wages and firm inputs besides financing credit, then an overdraft comes in handy to fill the short term liquidity shortage. The alternative situation which is the absence of an overdraft facility then most likely a firm would have to forfeit other financial obligations to finance its loan obligations which could compromise production and employment growth prospects.

High interest rates have the potential of deterring employment growth. To be credit constrained is shown to be associated with negative employment growth albeit being an insignificant relationship. However, a comparison between firms that do not need a loan to those that need a loan but are excluded because of high interest rates it is evident that under such circumstances, employment growth is compromised. The aforementioned result suggests that indeed being credit constrained distorts a firm's prospects and thus the likelihood of employment growth. This result is consistent with cross country empirical literature which argue that increasing the real interest rate compromises the employment rate while increasing unemployment[42].

The preceding discussion clearly shows that increasing access to and utilisation of financial services such as credit is pertinent for employment[43]. The importance of financing to firm growth is attributed to its ability to enable a firm expand its production potential. This could be through financing innovation that is expected to bring on new and improved production technology or by buy new and improved production technology. Similarly, financing can allow firm expand its human capacity though hiring new staff which could equally expand the production capacity of a firm. Either way whether financing has the potential of enhancing the productive potential of a firm and in doing so expanding the employment opportunities[44].

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[42] Feldman (2013)

[43] This is consistent with findings by Fowowe 2017; Dinh et al. 2012; Aterido et al. 2011 and Ayyagari et al. 2008.

[44] OECD (2006).

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Finally, table 3.1 indicates that economywide business indicators such as electricity, bureaucracy and bribe payment are inversely related to employment growth although the relationships are insignificant.

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Table 3.2: Relationship between financial constraints and employment growth

	(Model 1) Employment growth	(Model 2) Employment growth	(Model 3) Employment growth	(Model 4) Employment growth	(Model 5) Employment growth	(Model 6) Employment growth	(Model 7) Employment growth
Retained earnings	-0.02 (0.0356)						
Credit line (1=YES)		0.02 (0.0259)					
Credit							
1			0.002 (0.0275)				
2			0.06$^+$ (0.0360)				
Over draft				0.05$^+$ (0.0278)			
Credit constraint (1=YES)					-0.03 (0.0234)		
Finance (0=No obstacle)							
1=Minor obstacle						0.001 (0.0317)	
2=Moderate obstacle						-0.009 (0.0316)	
3=Major obstacle						-0.04 (0.0328)	
4=Very severe obstacle						0.01 (0.0419)	
Credit access (1)							
2							-0.01 (0.0298)
3							-0.06$^+$ (0.0334)
4							-0.06 (0.0410)
5							0.003 (0.109)
6							0.05 (0.0953)
7							0.008

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
							(0.0512)
8							-0.10
							(0.0968)
Small (1=YES)	-0.01	-0.02	-0.005	-0.005	-0.01	-0.01	-0.01
	(0.0323)	(0.0333)	(0.0335)	(0.0322)	(0.0324)	(0.0332)	(0.0335)
Large (1=YES)	0.02	0.01	0.02	0.02	0.02	0.01	0.02
	(0.0302)	(0.0304)	(0.0303)	(0.0306)	(0.0302)	(0.0312)	(0.0305)
Young (1=YES)	0.02	0.02	0.02	0.03	0.01	0.01	0.01
	(0.0431)	(0.0418)	(0.0429)	(0.0437)	(0.0437)	(0.0445)	(0.0433)
Older (1=YES)	-0.04$^+$	-0.05*	-0.04$^+$	-0.05*	-0.04$^+$	-0.05$^+$	-0.04$^+$
	(0.0241)	(0.0247)	(0.0242)	(0.0247)	(0.0241)	(0.0249)	(0.0243)
Fownership (1=YES)	0.01	0.03	0.02	0.01	0.01	0.02	0.01
	(0.0314)	(0.0328)	(0.0316)	(0.0325)	(0.0316)	(0.0331)	(0.0316)
Gownership (1=YES)	-0.04	-0.04	-0.03	-0.02	-0.04	-0.05	-0.04
	(0.0687)	(0.0718)	(0.0687)	(0.0715)	(0.0684)	(0.0717)	(0.0680)
Mcity (1=YES)	0.02	0.02	0.02	0.02	0.02	0.01	0.03
	(0.0220)	(0.0220)	(0.0223)	(0.0220)	(0.0219)	(0.0219)	(0.0226)
Hschool	-0.02	-0.02	-0.02	-0.01	-0.02	-0.02	-0.02
	(0.0138)	(0.0141)	(0.0138)	(0.0129)	(0.0138)	(0.0140)	(0.0139)
Electricity (1=YES)	-0.008	-0.007	-0.009	-0.03	-0.007	-0.0001	-0.009
	(0.0376)	(0.0384)	(0.0376)	(0.0362)	(0.0375)	(0.0373)	(0.0375)
Bureaucracy	-0.0001	-0.0002	-0.00007	0.0001	-0.0001	-0.00003	-0.00008
	(0.00105)	(0.00106)	(0.00105)	(0.000990)	(0.00104)	(0.00106)	(0.00106)
Bribe	-0.0002	0.0005	-0.0002	-0.0008	-0.000010	-0.0003	-0.000004
	(0.00250)	(0.00270)	(0.00244)	(0.00238)	(0.00244)	(0.00250)	(0.00247)
Export (1=YES)	0.010	0.02	0.006	0.02	0.01	0.02	0.007
	(0.0291)	(0.0298)	(0.0291)	(0.0286)	(0.0289)	(0.0298)	(0.0293)
Constant	0.2**	0.2**	0.2**	0.2*	0.2**	0.2**	0.2**
	(0.0833)	(0.0803)	(0.0796)	(0.0798)	(0.0804)	(0.0789)	(0.0807)
N	1487	1434	1487	1421	1487	1433	1487
R^2	0.029	0.034	0.031	0.032	0.029	0.030	0.032
adj. R^2	0.016	0.021	0.018	0.019	0.017	0.015	0.016

Note: 1) All models are Pooled OLS with standard errors adjusted for clusters using unique firm identifiers. 2) Standard errors in parentheses. 3) Significance levels: $^+ p < 0.10$, $^* p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$. 3) Country fixed effects are controlled for although not shown. 4) All results do not include South Sudan, Rwanda, Djibouti and Eritrea. 4) Creditaccess is categorized as 1"no need for a loan" 2"application procedures for loans" 3"interest rates are not favorable" 4"collateral requirements are too high" 5"size of loan or maturity are insufficient" 6"it is necessary to make informal payments" 7"did not think it would be approved" 8"other".

3.4 Conclusion.

Abating financial market externalities are key to reducing the interest rate spread implying lower borrowing rates. This could involve strengthening financial market infrastructure that increase the cost of credit extension to firms. For example, strengthening the legal framework to protect the interests of both borrowers and lenders could guarantee optimal exit options for creditors and borrowers in the event of credit default or even bankruptcy. This is because while it is important for enterprises to survive; it is also important for creditors to stay in business. In that regard bankruptcy laws ought to carefully strike a balance in supporting both the business survival firms and creditors. For example, as of 2016 in terms of resolving insolvency Distance to Frontier indicator shows that they range between 30.52 (Burundi) and 48.2 (Djibouti)[45]. Besides, the Recovery rate (cents on the dollar) is still low ranging between 11.4 percent (Madagascar) and 38.4 percent (Uganda)[46]. This suggests that there are apparent weaknesses within the legal framework regarding liquidation which results in costly and time consuming insolvency proceedings. As such strengthening and making efficient the regulatory framework involving bankruptcy is paramount. For example, the newly adopted Insolvency Act 2015 in Kenya created an environment that allows insolvent firms to be functional while at the same negotiations with creditors is on-going. Such a window protects both entrepreneur and a creditor.

Furthermore, creating a conducive environment to attract private players to capture information about firms regarding their credit history such as credit defaults, outstanding credit obligations and credit repayments. Increased competition in the private credit registry market could bring costs of offering such services to lending institutions which in turn lowers the cost of credit. In the near to medium term however, it is imperative that public credit registry are established in the absence of private credit registry firms. Alternatively where there exists private registry firm(s) with limited coverage of firms for example in Kenya, Rwanda, Tanzania and Uganda, governments can set up public credit registry bureaus to compliment the private credit registry firms.

While cumbersome application procedures and high collateral are associated with negative employment growth albeit being insignificant, this does not suggest ignoring interventions to abate

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[45] Comoros, South Sudan, DRC and Eritrea have no data, Doing Business, 2016.
[46] Comoros, South Sudan, DRC and Eritrea have no data, Doing Business, 2016.

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both of them. Typically, collateral in Eastern Africa region means land; however it is largely unregistered. For example in Uganda it is estimated that only 20 percent of land is registered while the average for SSA countries is 10 percent for sub-Saharan African countries[47]. Besides in an environment of a weak regulatory framework leading to overlapping land ownership and in some instances overlapping tenure systems not to mention weak land registry[48] induces high transactions costs and risk which in some ways under values land as collateral while at the same time increasing the price for credit. In that regard, perhaps intervening in the land market through: 1) enabling sustainable registration of land; 2) strengthening the registry framework around land; and 3) smoothening the legal framework on land to abate overlapping tenure systems could abate cost of evaluating land and in the associated with using land as collateral.

Note the cumbersomeness of application procedures could be related to request for information relating evidence of ownership of collateral. With only 10 percent of land registered implies inability to access credit. To therefore to partly abate the cumbersomeness associated with proof of ownership of collateral it imperative that land registration is economywide with effective mechanisms put in place to ensure ease of verification of land ownership rights.

Finally mobile banking has been such a revelation in financial markets of Eastern Africa region; this however, has to be harnessed to transit from simple payments or transfer of money from the phone to a bank account to actual assessment of credit viability of a borrower to the extent of credit acquisition. This is especially as the commercial bank coverage per 100,000 adults is rather low suggesting physical inaccessibility of banking services. With the mobile phones though physically inaccessibility is deemed null and void rather what then becomes apparent is financial deepening using the mobile phone.

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[47] Sebudde et. al., (2015)
[48] ibid

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CHAPTER FOUR

SKILL CONSTRAINTS AND FIRM PERFORMANCE

4.0 Introduction

Like public goods, the quality of labour is equally a cooperant factor which determines the ability of a firm to utilize its production technology. To the extent that the closer to the technological frontier the production technology is, the more skilled labour ought to be. For example, the kind production workers needed to run a jaggery[49] plant may not need to be as sophisticated as those required to operate a sugar mill. This is because while a jiggery plant does not separate molasses[50] from sugar, a sugar mill does indeed have both sugar and molasses as different products. Furthermore, when a manufacturer seeks to expand the number of products beyond sugar and molasses from the sugar mill, he or she might opt for electricity and ethanol production with sugarcane bagasse[51] and molasses as inputs respectively. To however, add electricity and ethanol to sugar again implies that more sophisticated production workers will be needed.

Note that while the aforementioned example involves product additions to a manufacturers set of products, what is important is that the production technology turns out to be equally sophisticated. In essence, the example may apply to a manufacturer that does not necessarily introduce a new or improved product but rather enhances the production technology in order to attain efficiency gains that may come with more sophisticated production workers. In that regard, the skill characteristics of labour is important in the performance of a firm. This chapter therefore gives an account of how skill constraints affects firm performance. Firm performance is proxied by capacity utilization and labour productivity while skill constraints is proxied by: 1) fraction of skilled production workers; 2) fraction of university graduates; 3) fraction of high school graduates; and 4) whether a firm invests in stuff reskilling.

The following subsection is characterization of the labourforce skills characteristics of firms in the Eastern Africa region.

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[49] Jaggery is a product which is a combination of sugar and molasses.
[50] Molasses is a viscous product which is a by-product from refining sugarcane or sugar beets into sugar.
[51] Bagasse is the dry pulpy residue left after the extraction of juice from sugarcane.

4.1 Context of skills in Eastern Africa region

Firms have a higher fraction of high school graduates compared to university graduates. Typically the high levels of education attainment imply higher skills levels and therefore the ease with which labour interacts with production technology to enhance firm performance[52]. To therefore have more full time workers that completed high school as compared to university graduates could suggest low production technology requiring less sophisticated personnel or the need for reskilling where the production technology is high enough to warrant reskilling (see figure 4.1). Note that where the production technology is primitive, then it may not be necessary to hire highly skilled personnel as this would not result in productivity gains as compared to when the production technology is relatively sophisticated[53].

Figure 4.1: Share of permanent full time workers who completed High School and University education (percent) and fraction of firms that engaged reskilling of permanent full time workers (percent)

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[52] Nelson and Phelps (1966)
[53] Nelson and Phelps (1966)

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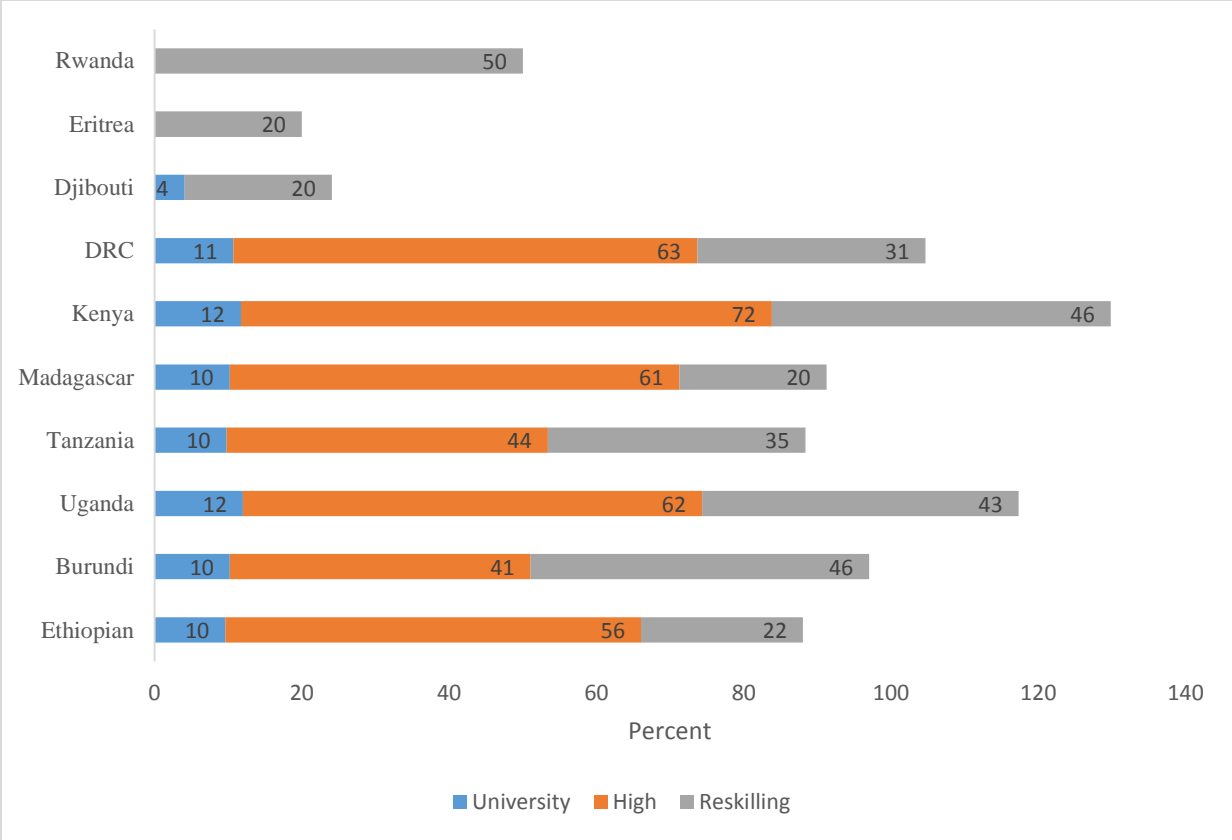
Source: Enterprise Surveys, Note firms in both Eritrea and Rwanda did not have information on level of skilling among its permanent workers.

Even with fairly similar worker educational attainment output per worker varies across countries suggesting differences in skill levels. For example in all countries the fraction of university graduates among firms is between 10 and 12 percent; however, the average output per worker[54] in Kenya which is estimated at 172,423.2 is higher than that of DRC and Uganda 69,785.2 and 151,987 respectively (figure 4.2). Put differently firms in Kenya are on average 1.7 and 8.4 times more productive than those in DRC and Uganda respectively. The higher output per worker in Kenya is in spite of the fact that firms in DRC and Uganda have 11 percent and 12 percent University graduates which is comparable to the 12 percent in Kenya. This could suggest that: 1) the production technology employed by firms in both Uganda and DRC is low to the extent that having similar educational characteristics (fraction of University graduates employed by a firm)

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[54] Which is defined as the ratio of firm sales in US Dollars divided by the firm employment in the current year in each country

results in significantly lower output per worker compared to that of firms in Kenya; 2) having relatively similar educational attainment may not necessarily imply similar skills sets; and 3) business environment in could play out differently in Kenya, Uganda and DRC in the way they affect output per worker.

Figure 4.2: Output per worker and educational attainment of full time, permanent workers.
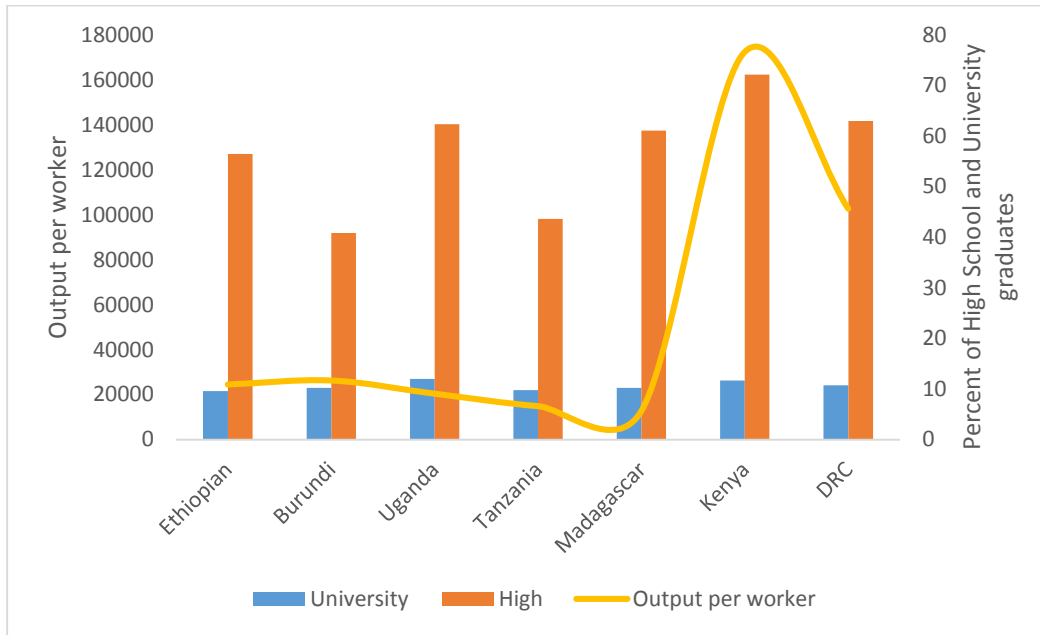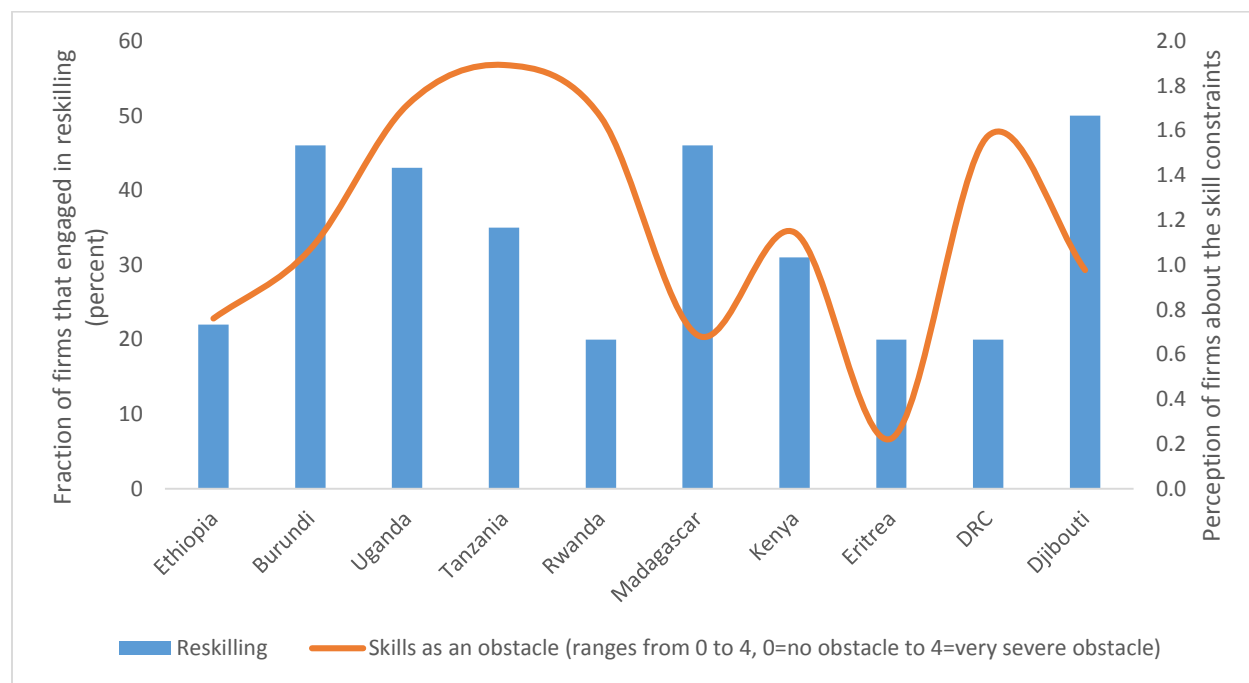

Source: Enterprise Surveys

The overwhelming evidence of firms reskilling their full time, permanent workers suggests that the workers are not sufficiently skilled or the quickly changing production technological environment necessitating reskilling. Indeed while Uganda and Tanzania have the highest fraction of skilled production workers, firms there complain most about skills as an obstacle (figure 4.3). To complain about labour skills suggests that there ought to be some effort in terms of reskilling. In that regard, the worker could be a university or high school graduate; however, in the absence of a unique skill then it is prudent that a firm engages in re-skilling of the worker. Perhaps that explains why 43 percent and 35 percent of the firms in Uganda and Tanzania respectively engage in reskilling of full time permanent workers.

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Figure 4.3: Skilled production workers as a fraction of the number of permanent, full-time employees and firm perception of labour skills as an obstacle.
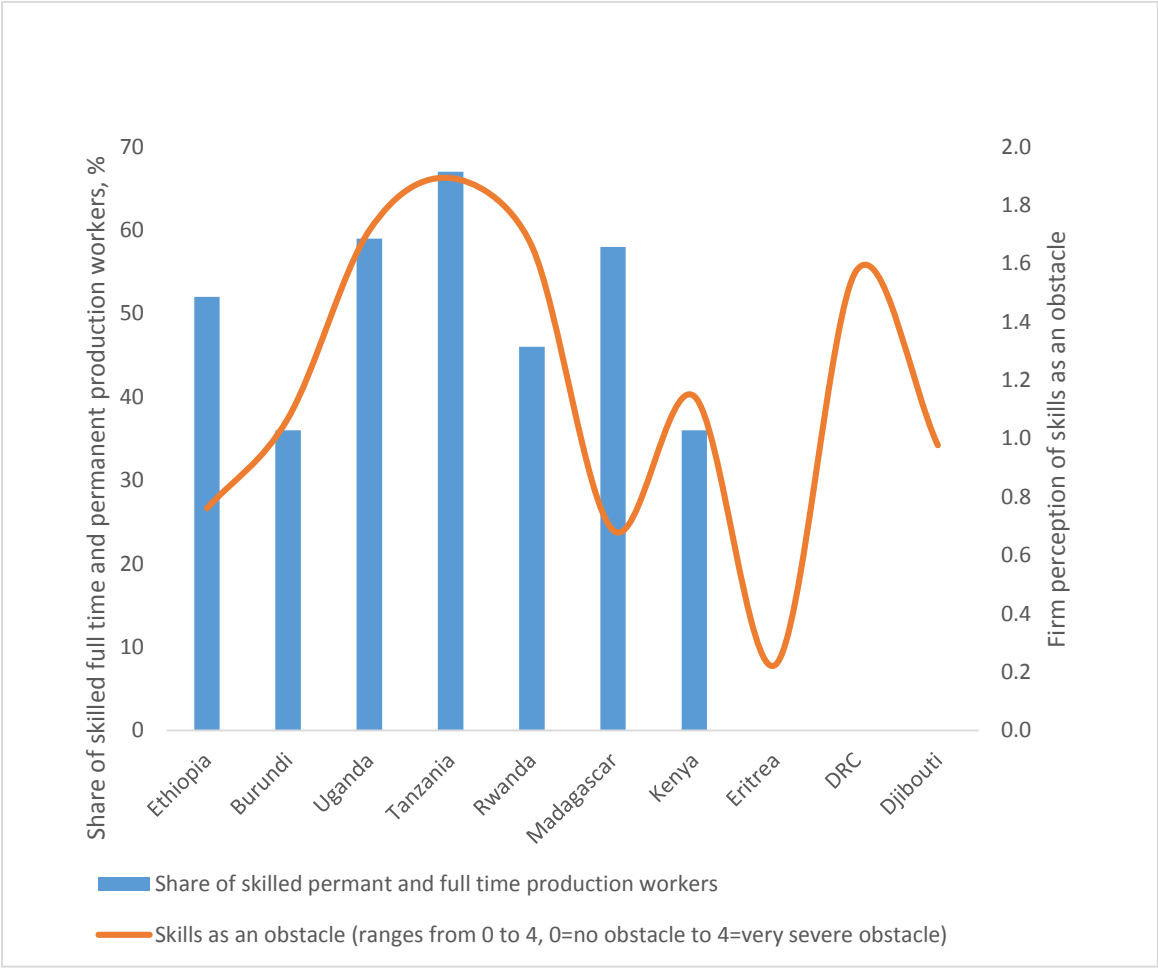
Source: Enterprise Surveys, Note: Eritrea, DRC and Djibouti had no information on the share of skilled permanent and full time production works.
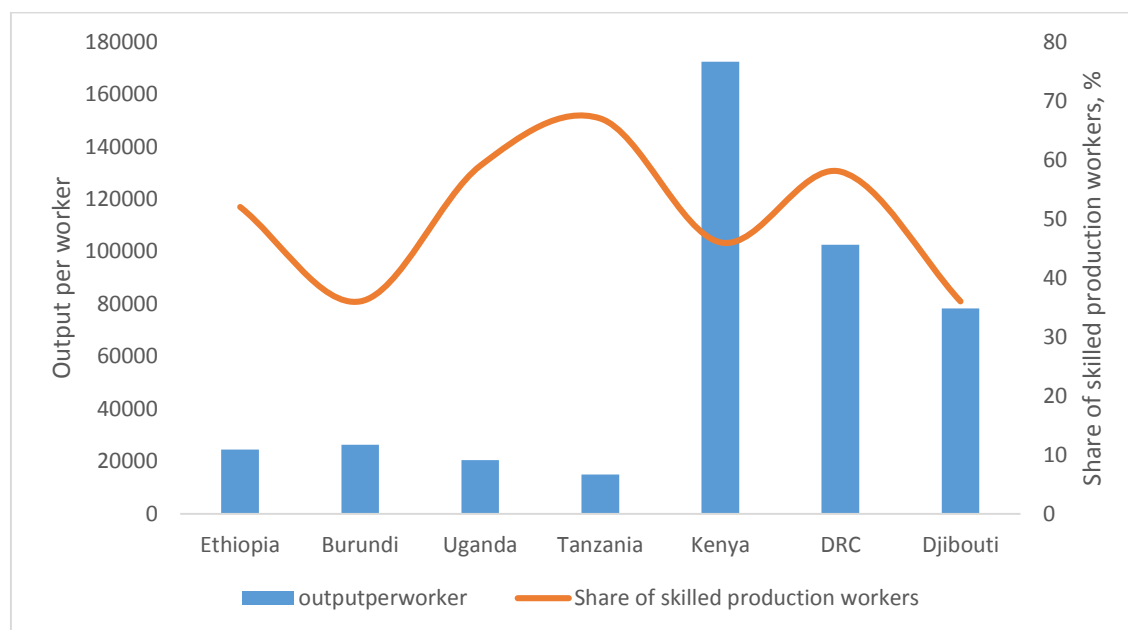
Figure 4.4: Reskilling and firm perception of labour skill constraints (0=no obstacle to 4 very severe obstacle)

Source: Enterprise Surveys

Lower output per worker irrespective of the share of skilled production workers further partly suggests weak skilling mechanisms. A look at figure 4.5, suggests that the average share of skilled production workers among the countries is 50.6 percent of which Kenyan firms reported an average share of skilled workers lower than the average of all the countries, 46 percent. However, firm output per worker in Kenya dwarfs that of Uganda, Tanzania, Ethiopia and DRC where firms reported the share of skilled production workers as 59 percent, 67 percent, 52 percent and 58 percent. This suggests that: 1) the apparently skilled workers in the aforementioned countries need reskilling; 2) the production technology may not be cooperant enough to optimize the skill potential of production worker; and 3) the business environment may not be pro-productivity. Note however that the engagement in reskilling of full time permanent workers perhaps signals the inadequacy in skills among production workers.

Figure 4.5: Output per worker and share of skilled production workers.

4.3 Skills and firm performance.

Having contextualized the skill characteristics that firm employ in the Eastern Africa region, this subsection explores the effect the skills environment on firm performance. Firm performance is measured by labour productivity and capacity utilisation. Specifically, labour productivity (LLABPROD) empirical model estimated is;

$$LLABPROD_{ic} = \beta_o + \beta_1 SI_{ic} + B_2 Small_{ic} + B_3 Large_{ic} + B_4 Young_{ic} + B_5 Older_{ic} + +B_6 Mcity_{ic}$$
$$+ B_7 Electricity_{ic} + B_8 Bureaucracy_{ic} + B_9 Bribe_{ic} + B_{10} Export_{ic}$$
$$+ B_{11} Retained_{ic} + B_{12} \gamma_{ic} + \varepsilon_{ic}$$

(4.1)

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$$\text{Capacity}_{ic} = \beta_o + \beta_1 XI_{ic} + B_2 \text{Small}_{ic} + B_3 \text{Large}_{ic} + B_4 \text{Young}_{ic} + B_5 \text{Older}_{ic} + + B_6 \text{Mcity}_{ic}$$
$$+ B_7 \text{Electricity}_{ic} + B_8 \text{Bureaucracy}_{ic} + B_9 \text{Bribe}_{ic} + B_{10} \text{Export}_{ic}$$
$$+ B_{11} \text{Creditconstrained}_{ic} + B_{12} \theta_{ic} + \varepsilon_{ic}$$

(4.2)

Where equation 4.1 explains the relationship between labour productivity of firm i and in country c while controlling for skill constraints and other variables. Specifically, SI is a vector of skill variables such as: University which measures the fraction of a firm's labour force employed that had a university degree; Hschool which measures the fraction of a firm's full time and permanent workers who completed High School; Reskilling which measures whether a firm undertook formal training programs for full time and permanent employees and it takes a value of "1" if yes otherwise "0"; and Skills which measures the extent to which firms perceive skills to be a constraint and it takes values of 0, 1, 2, 3, 4 for no obstacle, moderate obstacle, major obstacle and very severe obstacle respectively. Other control variables are as defined in appendix 5.1 Glossary of terms and acronyms and chapter three. Otherwise we control for country fixed effects where each country has a dummy $[\gamma]$. The subsequent estimated labour productivity models are as in table 4.1.

On the other hand equation 4.2 explains the relationship between capacity utilisation (capacity) of firm i and in country c while controlling skill constraints and other variables. Specifically, capacity utilisation is the logarithm of a firms' output produced as a proportion of the maximum possible if using all the resources available. While XI is a vector of skill variables such as: University which measures the fraction of a firm's labour force employed that had a university degree; and Shareskilled is the number of full time and permanent employees who were skilled production workers at end of last fiscal year as a fraction of the number of permanent and full-time production workers of a firm at end of last fiscal year. Other control variables are as defined apriori. Otherwise we control for country fixed effects where each country has a dummy $[\theta]$. The subsequent estimated capacity utilisation models are as in table 4.2.

Below is a discussion of the relationship between firm performance and skills constraints with reference to tables 4.1 and 4.2.

Having both university and high school graduates enhances labour productivity. The positive association between labour productivity and workers having completed high school education perhaps suggests that workers are a good fit for the kind of production technology being employed by the firms. Furthermore, having workers with university education equally enhances labour productivity. With both high school and university graduates enhancing labour productivity suggests: 1) absence of educational mismatch to the extent that university graduates are over-educated or over-qualified for the kind of tasks that firms offer; 2) high school graduates are not under-educated for the kinds of tasks that firms offer; and 3) both university and high school level educational attainments allow for ease of worker adjustment to the production technologies available to them.

Higher fraction of skilled production workers is associated with increased capacity utilisation. Capacity utilisation which is the ratio of actual production to production potential of a firm is shown to increase the higher is the fraction of skilled production workers. Higher skilled production workers suggests amenability of production workers to the production technology to the extent that the potential of a production technology is optimized. This result is consistent with an earlier study in Tanzania where having a high fraction of workers with skills was shown to enhance firm performance[55].

Reskilling is associated with efficiency gains. Indeed, from the Eastern Africa region dataset, it is evident that reskilling is associated with improvements in labour productivity. Which consistent with an earlier study in Tanzania which highlight the positive effect of reskilling on firm productivity[56]. Note however that the ability of reskilling to result in labour productivity gains partly depends on the firms appropriately identifying: skills gap and the tertiary institution that can impart the skills. Besides it is important that a firm equally identifies the workers that are well motivated to undertake reskilling.

The business environment is distortionary to firm performance. For example corruption, credit constraints and quality of public services are shown to be deleterious to firm performance. Indeed,

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[55] Tan et al., (2015).
[56] Ibid

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corruption which is captured by bribery is shown to undermine both capacity utilisation and labour productivity. Bribery is an informal tax that eats into profits of firms which could have potentially been invested in enhancing the efficient operation of the firm through for example acquisition of new production technologies. Indeed, evidence shows that under corrupt regimes, firms in transitional African economies are argued to respond by contracting investment in Research and Development[57] and expansion of production activities[58]. This finding is consistent with empirical evidence which argues that corruption is distortion to firm productivity[59].

With regard to the quality of public services as reflected by the electricity outages, capacity utilisation is undermined among firms that experienced electricity load shading. The effect of electricity outages it may lead to: 1) production shut down; 2) wastage of production raw materials in the absence of a standby generator; 3) increased production costs towards fuel to run generators which may potentially require resources reallocation within a firm; and 4) worker redundancy yet wages have to be paid among others. With such unforced production inefficiencies capacity utilisation is expected to be compromised.

Finally, financially constraints are associated with undermined labour productivity and capacity utilisation. The use of retained earnings by firms partly suggests exclusion from the credit markets leading to employment of less inefficient production technologies. Worse still exclusion from the credit could partly imply still inability to fairly compliment the available labour skills with appropriate production technology. Also limited access to the credit markets has the potential of undermining firm investment innovations[60]. Evidently, firms that use retained earnings to pursue their investment decisions are associated with lower labour productivity. Similarly firms that are credit constrained firms are shown to be associated with lower capacity utilisation[61].

4.4 Conclusions.

Policies for better education, employment and skills ought to be explored. The empirical analysis indicates that both education attainment and reskilling enhance firm performance as measured by

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[57] Athanasouli and Goujard (2015)

[58] De Rosa et al., (2013)

[59] Bbaale et al. (2017).

[60] OECD (2006)

[61] Fowowe (2017)

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labour productivity and capacity utilisation. However, while higher educational attainment enhances firm performance it is imperative that the skilling regime is flexible to the changing production technologies especially so as firms are investing in reskilling of workers. By engaging in reskilling of workers suggests skill gaps among workers. This could partly imply that: 1) skills development curriculum is elastic to the variations in production spaces; and 2) trainers actively participate in the production space to ensure that they are update with the labour market skill requirements and changes in technologies.

Note however, the extending policy recommendations is quite limited because the available data is silent on the nature of skill sets that is technical or soft skills besides clearly identifying the available skill gaps. As such the results of this write up limited the extent of specific policy discussion.

Table 4.1: Labour productivity and firm skill characteristics

	(Model 1) Labour productivity	(Model 2) Labour productivity	(Model 3) Labour productivity	(Model 4) Labour productivity
Skills (0=no obstacle)				
1=minor obstacle	0.138			
	(0.104)			
2=moderate obstacle	0.104			
	(0.124)			
3=major obstacle	0.178			
	(0.143)			
4=very severe obstacle	-0.0766			
	(0.166)			
University		0.241$^+$		
		(0.135)		
Hschool			0.129**	
			(0.0395)	
Reskilling				0.319***
				(0.0920)
Electricity	-0.168	-0.108	-0.0619	-0.126
	(0.121)	(0.131)	(0.134)	(0.120)
Retained	-0.482***	-0.432**	-0.464**	-0.416**
	(0.133)	(0.140)	(0.142)	(0.131)
Bureaucracy	-0.00141	0.0000780	-0.000565	-0.00190
	(0.00328)	(0.00346)	(0.00348)	(0.00320)
Bribe	-0.0212$^+$	-0.0202$^+$	-0.0200$^+$	-0.0193$^+$
	(0.0109)	(0.0109)	(0.0107)	(0.0109)
Small (1=YES)	-0.994***	-1.035***	-1.021***	-0.969***
	(0.131)	(0.133)	(0.133)	(0.130)
Large (1=YES)	-0.324**	-0.343**	-0.294*	-0.296*
	(0.123)	(0.125)	(0.125)	(0.121)
Young (1=YES)	-0.191	-0.154	-0.203	-0.153

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	(0.158)	(0.159)	(0.162)	(0.152)
Older (1=YES)	0.0927	0.125	0.116	0.0965
	(0.0867)	(0.0919)	(0.0932)	(0.0856)
Mcity	0.140	0.0963	0.0881	0.130
	(0.104)	(0.102)	(0.102)	(0.101)
Export (1=YES)	0.227^{*}	0.215^{+}	0.219^{+}	0.195^{+}
	(0.113)	(0.119)	(0.120)	(0.115)
Constant	10.14^{***}	9.525^{***}	9.556^{***}	9.979^{***}
	(0.219)	(0.399)	(0.290)	(0.212)
N	1616	1533	1495	1637
R^2	0.263	0.266	0.269	0.272
adj. R^2	0.253	0.258	0.261	0.263

Note: 1) All models are Pooled OLS with standard errors adjusted for clusters using unique firm identifiers. 2) Standard errors in parentheses. 3) Significance levels: $^{+} p < 0.10$, $^{*} p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$. 3) Country fixed effects are controlled for although not shown. 4) All results do not include South Sudan; Models, 2 and 3 do not include Rwanda and Eritrea while Model 3 does not include Djibouti.

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Table 4.2: Capacity utilisation and firm skill characteristics

	(Model 1) Capacity utilisation	(Model 2) Capacity utilisation
Shareskilled	0.0273$^+$	
	(0.0141)	
University		0.0108
		(0.0159)
Electricity (1=YES)	-0.0700***	-0.0628***
	(0.0186)	(0.0187)
Credit constrained	-0.0217$^+$	-0.0217$^+$
	(0.0113)	(0.0113)
Bureaucracy	-0.0000812	-0.000126
	(0.000437)	(0.000416)
Bribe	-0.00210$^+$	-0.00218*
	(0.00108)	(0.00110)
Small (1=YES)	-0.0434**	-0.0377*
	(0.0158)	(0.0156)
Large (1=YES)	-0.0421**	-0.0402**
	(0.0150)	(0.0149)
Young (1=YES)	-0.0364*	-0.0443*
	(0.0185)	(0.0190)
Older (1=YES)	0.0109	0.00951
	(0.0120)	(0.0120)
Mcity	0.0201	0.0201
	(0.0129)	(0.0129)
Export (1=YES)	-0.00534	-0.00542
	(0.0132)	(0.0132)
Constant	0.704***	0.687***
	(0.0294)	(0.0492)
N	1484	1528
R^2	0.163	0.153
adj. R^2	0.154	0.143

Note: 1) All models are Pooled OLS with standard errors adjusted for clusters using unique firm identifiers. 2) Standard errors in parentheses. 3) Significance levels: $^+ p < 0.10$, $^* p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$. 3) Country fixed effects are controlled for although not shown. 4) All results do not include South Sudan, Rwanda and Madagascar while Model 4 does not include Djibouti respectively.

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5.0 Appendix

5.1 Glossary of terms and acronyms.

Bribe is the percentage of total annual sales paid in informal payments to government officials.

Bureaucracy captures the percentage of senior management time spent in dealing with government officials.

Capacity utilisation is the logarithm of a firm's output produced as a proportion of the maximum output possible if using all the resources available (capacity utilization).

Credit constrained, a firm is credit unconstrained if it did not need credit and thus did not apply for a loan. Furthermore a firm is credit unconstrained if it was able to apply for a loan[1]. Note however, that we are not able to measure whether a firm had a successful loan application although we can tell that a firm was able to apply for credit. This because information about the outcome of the most recent application for a line of credit or loan had no observations. That is why we opted only for the main reasons for not applying for new loans or new lines of credit to capture credit constrained firms except firms that did not need a loan. However, a firm was deemed credit constrained if a firm did not apply for a loan because of the following main reasons: 1) complicated application procedures for loans; 2) interest rates being unfavorable; 3) very high collateral requirements; 4) insufficient loan maturity; 5) insufficient loan size; 6) it is necessary to make informal payments; 7) a firm did not think that the loan would be approved; and 8) others. Therefore the variable credit constrained is defined as '0' if a firm is credit unconstrained otherwise '1'.

Credit access captures the main reason for not applying for new loans or new lines of credit. The variable is defined as 1"no need for a loan" 2"application procedures for loans" 3"interest rates are not favorable" 4"collateral requirements are too high" 5"size of loan or maturity are insufficient" 6"it is necessary to make informal payments" 7"did not think it would be approved" 8"other". The reference variable is no need for credit (1).

Credit complementarity measures existence of complementarity between firm having a bank overdraft or any other line of credit from a financial institution. Credit takes on a value of 0; 1; and 2 if a firm has: does not have any form of credit; either an overdraft or a line of credit or loan from

a financial institution; and both an overdraft and a line of credit or loan from a financial institution respectively. The Credit variable implicitly has an element of complementarity to the extent that it is able to measure whether is firm performance affected more when a firm uses either overdraft from a financial institution or a line of credit or loan from a financial institution or both an overdraft from a financial institution and a line of credit or loan from a financial institution. No having any kind of credit "0" is the reference variable.

Credit line is a binary variable which measures whether a firm has a line of credit or loan from a financial institution taking on a value of 1 if yes otherwise 0.

DRC Democratic Republic of Congo

Electricity measures whether a firm experienced power outages in last fiscal year prior to the survey. It takes a value "1" if yes otherwise "0".

Employgro is defined as the difference between employment in the current year and employment three years ago divided by the average employment between the current year and employment three years ago. Our definition of employment growth is aimed at bounding employment growth between -2 and 2 which allows to ameliorate the effect of outliers (Davis and Haltiwanger 1992).

Export measures whether a firm exports any fraction of its sales both directly and indirectly. It takes a value "1" if yes otherwise "0".

Finance is a subjective measure of the degree to which access to finance is an obstacle to the current operations of this establishment. It is defined as 0"no obstacle" 1"minor obstacle" 2"moderate obstacle" 3"major obstacle" and 4"very severe obstacle".

Foreign ownership captures whether a firm is foreign owned or not (government and domestic owned). It takes a value of "1" if at least 10 percent of the firm is foreign owned otherwise "0".

Government ownership captures whether a firm is government owned or not (foreign owned and domestic owned). It takes a value of "1" if at least 10 percent of the firm is government owned otherwise "0".

Hschool measures the fraction of a firm's full time permanent workers who completed high school.

ISIC International Standard Industrial Classification.

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KCITY is a Dummy variable =1 if firm is located in capital city

Large captures whether a firm employs greater than 100 employees. It takes a value "1" if yes otherwise "0".

LCAPINT Natural logarithm of capital intensity estimated as the net book value of land machinery, vehicles and equipment per employee.

LLABPROD is the natural logarithm of labour productivity computed as the total annual sales for any given firm divided by the number of full time workers at the end of the previous fiscal year

LMI Lower Middle Income

LOUTAGE is the Natural logarithm of number of outages experiences by a firm in a particular month.

LWAGE is the natural logarithm of average firm wages per employee computed as the average labour cost including compensation for wages, salaries, bonuses, and social security expressed in United States Dollars. Missing values are replaced with median values by size-country category

Mcity measures whether a firm is located in a city with a more than a million persons. It takes a value "1" if yes otherwise "0".

OECD Organisation for Economic Co-operation and Development.

Older captures whether the age of a firm age greater than 15 years. It takes a value "1" if yes otherwise "0".

Overdraft measures whether a firm has an overdraft facility. An overdraft facility is a flexible account that allows firms to draw upon in the event their account balance becomes negative. The firm will incur fees or are subject to interest payments if they exercise this option. Therefore the variable is define is '0' if a firm is has no overdraft otherwise takes a value of '1' if yes.

R&D Research and Development

Reskilling measures if a firm undertook formal training programs for permanent, fulltime employees. It takes a value of "1" if yes otherwise "0".

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Retained captures the proportion of a firm's working capital that is the funds available for day-to-day operations, that was financed from internal funds.

Small captures whether a firm employs less than 20 employees. It takes a value of "1" if yes otherwise "0".

SMEs Small and Medium Scale Enterprises.

SSA Sub Saharan Africa

UBOS Uganda Bureau of Statistics.

University measures the fraction of a firm's labor force employed that had a university degree.

WBES World Bank Enterprise Survey

Young captures whether the age of a firm is less than 5 years. It takes a value of "1" if yes otherwise "0".

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