

Registration, Job Growth, and Labor Productivity in Zambia

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I. Introduction: Measuring Job Growth and Labor Productivity in Zambia

Although Zambia has enjoyed decent economic growth, employment growth and labor productivity continue to stagnate. What explains economic growth without job growth? This paper addresses this seeming paradox through empirical analysis of employment decisions and labor productivity at the firm-level using the 2008 Zambia Business Survey (ZBS) and the 2011 World Bank Investment Climate Survey (ICS). The ZBS data provides insights into challenges for Zambian firms at the micro-level, particularly firms that are currently not registered and considered micro, small, or medium sized. The ICS survey provides information on how the challenges of Zambia's firms' compare to the challenges faced by other firms within sub-Saharan Africa (SSA). The results from the empirical analysis may provide policymakers with a better understanding and more information on what variables have particular influence on employment growth and labor productivity.

Zambia Business Survey 2008

The Private Sector Development Reform Programme, Zambia Business Forum, FinMark Trust, and World Bank worked in collaboration to collect data on Zambian businesses that could resolve policies that would contribute to stimulating Zambia's growth and prosperity. In 2008, they began implementing the Zambia Business Survey (ZBS) to collect data that would be used to recommend policies. This survey "is the first comprehensive, nationally representative survey of micro, small and medium-sized enterprises across all nine provinces" of Zambia.¹ The ZBS includes a large sample of small informal firms, which account for more than 80% of all private businesses in Zambia. This allows for important comparisons between small and large enterprises.

The ZBS is comprised of two individual surveys, the Micro, Small, and Medium Enterprise (MSME) and Large Enterprise (LE) survey. Both surveys covered urban and rural areas in

¹Conway P, Shah MK. Who's Productive in Zambia's Private Sector? Evidence from the Zambia Business Survey. World Bank 2010 June; 2

Zambia's nine provinces to collect data on business employment, costs, profits, structure, and finance. The MSME survey sampled 4,801 business respondents to represent small businesses employing no more than 50 employees. Its objective was to measure and identify significant characteristics that could contribute to firm productivity.

The LE survey sampled 161 businesses that employed more than 50 people. Its purpose was to "benchmark MSMEs against large businesses as well as identify factors that most affect the productivity and growth of these larger businesses."² While both surveys were comprised of similar questions and coded responses, each contained unique key identifying questions.

Previous studies using the ZBS include: "The Profile and Productivity of Zambian Businesses"; "The Business Landscape for Small MSMEs and Large Enterprises in Zambia"; "Demand-Side Analysis of Access to Financial Services for Businesses in Zambia"; "Segmenting the Market Into Powerful Pictures: Application of the Business Facilities Measure"; and "Who's Productive in Zambia's Private Sector? Evidence from the Zambia Business Survey". Each of these papers observed positive and negative factors that contribute to Zambian business productivity.

Researchers have found that large firms are significantly more productive than their small business counterparts. Conway and Shah's study found that MSME workers in the agricultural and service sectors only produced one-sixth of the work as those in LEs. MSME workers in manufacturing and retail only produced one-ninth of the work as workers in LEs.³ Based on these findings, it becomes clear that LEs are the country's economic driving force and produce the majority of the country's industrial output and agricultural exports. However, within Zambia, MSMEs spur economic growth through employment. While productivity remains low, MSMEs employ the bulk of Zambia's labor force (88%).⁴

Previous research theorized that the lack of infrastructure largely contributes to the low productivity within Zambia's MSMEs. While over 90% of LEs have access to basic infrastructure, such as roads and electricity, less than 20% of their MSME counterparts have

² World Bank. The Profile and Productivity of Zambian Businesses. World Bank 2010 June;1

³ Conway P, Shah MK. Who's Productive in Zambia's Private Sector? Evidence from the Zambia Business Survey. World Bank 2010 June; 7

⁴ World Bank. The Profile and Productivity of Zambian Businesses. World Bank 2010 June;3

similar access.⁵ Across all sectors, MSMEs with access to infrastructure were found to be 30% more productive than MSMEs without access to infrastructure.⁶ This issue becomes critical when looking into agriculture, the largest sector in Zambia. Agricultural business makes up 53% of all business in Zambia. An overwhelming 70% of all MSMEs in Zambia are considered agricultural, but the majority of MSMEs do not have access to water and electricity. Limited access to irrigation also means that these firms are forced to depend on natural rainfall, which is often inconsistent.⁷ Without infrastructure, these businesses are unable to transition from small-scale subsistence to larger commercialized farming.

Previous studies on firm productivity also found correlation between firm size and access to credit. 97% of LEs have access to formal financial services while only 11% of MSMEs claim the same.⁸ A major reason for this divide is that most of the financial institutions are located in urban areas whereas the majority of MSMEs are based in rural areas. With unreliable public transportation and poor roads in rural areas, it is extremely difficult for MSMEs to use formal financial services. As a result, 45% of LEs benefit from credit products compared to only 2.3% of MSMEs.⁹ An increase in roads and public transportation would increase the access of MSMEs to credit.

Finally, Conway and Shah found that the business owner's level of education had a positive correlation with productivity within the non-agricultural sectors.¹⁰ Nonagricultural firms owned by individuals who had completed secondary school were 26% more productive than firms with owners who had less education.¹¹ While many in Zambia are able to complete the lower levels of schooling in their respective districts, schools become scarcer as the education level increases. Like formal credit services, this issue can be mediated with better roads and public transportation in more remote areas of Zambia.

With ZBS data, the new research presented here focuses on three outcome variables: firms' decision to register, annual employment growth rate, and labor productivity measured by average

⁵ Raw Data collected for the ZBS

⁶ World Bank. The Profile and Productivity of Zambian Businesses. World Bank 2010 June;19

⁷ Raw Data collected for the ZBS

⁸ Ibid.

⁹ World Bank. The Profile and Productivity of Zambian Businesses. World Bank;2010 June;14

¹⁰ Conway P, Shah MK. Who's Productive in Zambia's Private Sector? Evidence from the Zambia Business Survey. World Bank 2010 June; 12

¹¹ Ibid.

annual output per worker. This study used four sets of explanatory variables—firm characteristics, respondent characteristics, access to infrastructure, and corruption measures—while controlling for province-level effects. With this specification, the researchers draw policy implications about how sector and province specific policy variables affect labor market outcomes. This research adds to existing studies by expanding knowledge about labor productivity and job growth. Uniquely, this research also looks at factors influencing business registration. To date, this could be the first study to consider the key explanations for why businesses register within Zambia.

Investment Climate Survey 2011

Comparable to the analysis based on ZBS data, the focus of the ICS analysis is on what characteristics impact employment growth and labor productivity in Zambia compared to other countries in SSA. This analysis also includes infrastructure and corruption measures. The goal is to see if Zambia, compared to other SSA countries, is more or less constrained by infrastructure and corruption problems.

The ICS was conducted by World Bank Enterprise Surveys. The benefit of the ICS data is that there are uniform investment climate indicators that are comparable across different economies, which allows researchers to assess the constraints to private sector growth and enterprise performance.¹² The ICS data is composed of eleven sections, ranging from the characteristics of businesses and the investment climate in which they operate to the transaction costs faced by firms.¹³

Aterido and Hallward-Driemeier (2010) used the ICS data to investigate how the availability of infrastructure, access to finance, the regulatory environment, and corruption affect patterns of employment growth.¹⁴ They compare SSA to other low-income regions to see if there is a regional difference. This is important because an environment in which firms can grow, also allows individuals to expand their employment opportunities and allows firms to move toward economies of scale. Under these conditions firms are able to use their inputs more efficiently

¹² World Bank. World Bank Enterprise Survey: Understanding the Questionnaire. World Bank;2007;2.

¹³ Ibid; 2.

¹⁴ Aterido R, Hallward-Driemeier M. The Impact of the Investment Climate on Employment Growth: Does Sub-Saharan Africa Mirror Other Low-Income Regions?. World Bank Working Paper 2010.

and therefore raise their productivity.¹⁵ Aterido and Hallward-Driemeier find that enterprises in SSA face greater hurdles in terms of infrastructure, finance, and corruption compared to other low-income regions.¹⁶ However, an interesting caveat of this study is that a weak investment climate does not necessarily negatively affect all firms in SSA. Their results indicate that employment growth for LEs suffers the most from a weak investment climate. A weak investment climate appears to have no effect on the employment growth of micro-enterprises. Aterido and Hallward-Driemeier found that employment growth in micro-enterprises actually grew and expanded regardless of the investment climate. On the other hand, productivity in these micro-firms is affected by a weak investment climate in which firms are forced to allocate resources inefficiently to make up for a lack of infrastructure and inputs.

In the ICS section of this report, the same general approach is being taken. The analysis will focus on investment climate factors such as infrastructure availability and governance issues in Zambia compared to the rest of SSA. The goal is to extrapolate whether Zambia is disproportionately affected by investment climate variables compared to its regional counterparts. The analysis directly looks at firm productivity as one of the dependent variables in addition to employment growth. By directly addressing productivity, this analysis will explore whether resources are being allocated inefficiently as proposed by Aterido and Hallward-Driemeier. One further distinction between the Aterido and Hallward-Driemeier study and this analysis is the focus on MSMEs. The ICS data indicates that a majority of firms in SSA are either micro/small (65%) or medium (26%) sized. LEs only represent 9% of the sample. Therefore, by controlling for MSMEs, the analysis will test if they remain unaffected by weak investment climates. This analysis will indirectly look at whether the affects of the investment climate play a larger role in employment growth and firm productivity as firms' grow in size. By focusing on MSMEs in Zambia and SSA this study will take the Aterido and Hallward-Driemeier analysis to a more contextual and narrow level of analysis.

Taken together, analysis of the ZBS and ICS data sets provide a holistic view of the Zambian labor market, while simultaneously identifying the economic and institutional factors that may constrain employment expansion and labor productivity.

¹⁵ Aterido R, Hallward-Driemeier M. The Impact of the Investment Climate on Employment Growth: Does Sub-Saharan Africa Mirror Other Low-Income Regions?. World Bank Working Paper 2010;10.

¹⁶ Ibid; 27.

II. ZAMBIA BUSINESS SURVEY: REGISTRATION, LABOR PRODUCTIVITY, & JOB GROWTH

Methodology and Limitations of the Zambia Business Survey Analysis

The ZBS study focused primarily on three important topics for policymakers – factors that influence business registration, productivity of the workforce, and the rate at which firms’ workforces grow. Chiefly, this study sought to answer the following questions:

1. What factors influence whether a firm in Zambia registers with the Patents and Company Registrar (or other government institution)?
2. What factors influence the productivity of Zambia’s workforce?
3. What factors influence the employment growth rate of Zambian firms?

Researchers used data from the Zambia Business Survey from 2008 to generate variables that measured access to infrastructure, experience with corruption, firm-level characteristics, firm-owner characteristics, output measures, and employment growth measures.

The Zambia Business Survey was conducted in 2008 with the goal of providing insight to policymakers on the performance and constraints within which businesses operate in Zambia.¹⁷ Two distinct surveys were conducted across all nine provinces of Zambia. The Micro-, Small-, and Medium-Sized Enterprise (MSME) survey focused on firms that employed 50 workers or less, which constitutes the vast majority of Zambian businesses. The MSME covered 4,801 firms. The Large Enterprise (LE) survey focused on firms that had more than 50 workers and covered 161 firms. There were several firms in each survey that did not meet the size requirements. 10 MSMEs and 27 LEs were dropped due to ineligibility. The final number of observations for the surveys were 4791 for MSMEs and 134 for LEs.

Using STATA statistical software package, researchers conducted discrete probit and linear regression. Starting with the basic ordinary least squares equation $Y = \alpha + \beta x + \varepsilon$, researchers relied upon multivariate regression, logarithm, and probit to approximate the effect of explanatory variables upon the dependent variables.

¹⁷ Conway P, Shah MK. Who’s Productive in Zambia’s Private Sector? Evidence from the Zambia Business Survey. World Bank 2010 June; 2

Key dependent variables were registration, worker productivity, and employment growth rate. The registration dummy variable captured firms who were registered with the Patents and Company Registrar (PACRO) as 1 and those who were not registered as 0. This study measured productivity as average annual output per worker in \$USD. The logarithm of productivity was taken to assist in interpretation of outcomes. To measure employment growth rate, this study used the annual percent change in number of full-time employees. Both models employed a variety of explanatory variables including firm-level attributes (F), respondent characteristics (R), access to infrastructure and banking (I), and experiences with corruption (C). Access and experience measures were generated as averages of all other firms in the same district and with the same size designation (MSME or LE) to control for firm specific biases in reporting and potential reverse causality issues (indicated by subscript sd in the model). Each model also contained control variables for province-specific effects (P). The productivity and employment growth models used a dummy variable to control for large businesses (L). Lastly, all three models clustered the standard error terms to control for correlation of error terms at province level (indicated by subscript p in the model). See Appendix 2 for a detailed description of the variables used and how they were generated.

Researchers used a discrete probit regression to analyze factors contributing to the probability that a firm would register. Discrete probit shows the change in probability that a dependent variable like registration will be 1 (in this case registered) due to a one unit change in the independent variable.

$$P(\text{Registration} = 1) = \alpha + F\beta + R\gamma + I_{sd}\delta + C_{sd}\eta + P\theta + \varepsilon_p$$

Using this model, the researchers were able to capture the effect that changes in the independent variable had on the probability that a firm would register. In addition to the discrete probit model, researchers analyzed descriptive statistics of responses to questions in which firm owners were asked what motivated them to register or why they had not registered their business. Data from the LE was not included in the registration model because all but two firms within the LE were registered. The small sample size of unregistered firms within the LE limited any analysis of factors negatively impacting registration for LEs.

Ultimately, conclusions made about what makes MSMEs more likely to register can have large implications for policy within Zambia. At present, over 90% of Zambian firms operate in the informal sector. The Government of Zambia does not receive tax revenues from informal firms, and employees of these businesses lack basic protections. By better understanding the circumstances within which firms register, the Government of Zambia can generate programs that help make it possible for more MSMEs to register and become part of the formal Zambian economy.

Researchers used ordinary least squares regression (OLS) to analyze the factors contributing to labor productivity and employment growth among both LEs and MSMEs in Zambia. OLS shows the approximate change in the dependent variable as a result of a 1 unit change in the independent variable.

$$Y = \alpha + F\beta + R\gamma + I_{sd}\delta + C_{sd}\eta + P\theta + \varepsilon_p$$

Average output per worker has an impact on how businesses in Zambia operate and how they view their employees. In addition, the rate at which Zambian firms add new employees matters because of Zambia's large unemployed workforce. Answers to questions regarding labor productivity and employment growth can help the Government of Zambia better foster an environment where businesses are both productive and offering new employment opportunities for Zambia's unemployed population.

The inferences drawn from this analysis have several limitations. First, the ZBS 2008 only provides a snapshot of firms in Zambia for a given year. This data is dated and does not account for possible changes within the Zambian business environment during and in the wake of the global financial crisis. Without longitudinal data, this research is limited to providing information about factors influencing registration, worker productivity, and employment growth for a given year. Second, the LE survey has a small number of observations, limiting the validity of inferences drawn from this data. Why were there so few large businesses surveyed? Are there really only 161 large firms in Zambia and nearly all of these registered? The researchers question the representativeness of this sample. In addition, the respondents in the LE are not the firm owners themselves, but a representative of the business. While the LE asked a screening question regarding the respondent's position within the business, responses to this question were

not provided in the data. This research, therefore, is unable to compare owners across all firm sizes.

Descriptive Statistics for the Zambia Business Survey¹⁸

Dependent Variables

This study employed three main dependent variables – registration, labor productivity, and employment growth.

Only 7% of the firms in the total sample were registered. The ZBS data shows a high correlation between business registration and the size of the business. While LEs have a nearly perfect registration rate (99%), only 5% of Zambian MSMEs operate in the formal sector. Unregistered MSMEs listed three major reasons for not registering; (1) 38% said their business did not make enough money, (2) 29% felt there was no need to do so, and (3) 25% did not know how to register their business. Overwhelmingly, 55% of respondents said that the ability to transmit their assets through inheritance was the number one reason they registered their business. Lastly, while 81% of LEs reported a government inspection within the last 12 months, only 3% of MSMEs received a visit from tax officials that year. This is most likely because such a high percentage of MSMEs are operating “off the grid” by not registering with the government.

Productivity of Zambia’s workforce varied greatly across firm size and province. On average, employees for MSMEs accounted for an annual output of \$3726 compared to workers in LEs who accounted for \$28.4 million annually. Workers for LEs on average were 7600% more productive than workers in MSMEs. Output varied greatly across provinces. For example, workers for LEs in Northwestern Province actually produced less than the average output per worker for MSMEs in Zambia.

Similar to labor productivity, MSMEs have significantly lower average employment growth rates compared to LEs, 1% versus 44%. Central, Copperbelt, and Western provinces experienced zero employment growth for their MSMEs, yet Copperbelt boasted 61% employment growth for LEs. Coupled with labor productivity, LEs in Copperbelt province appear to be performing the best out of all other firms in Zambia.

¹⁸ See Appendix 2 for descriptive tables of ZBS data.

Explanatory Variables

This study used four levels of independent variables to explain variances in the dependent variables – corruption scores, access to infrastructure scores, firm-level characteristics, and respondent characteristics.

In 2008, Transparency International praised President Mwanawasa for his anti-corruption political agenda.¹⁹ Analyzing data from the ZBS 2002 and 2008, they found corruption indicators illustrated the country’s success “in cracking down on high level corruption from the previous government”.²⁰ In 2002, 46% of businesses stated that government corruption posed a “major obstacle” to doing business. In the 2008 ZBS, only 12% reported corruption as a “major obstacle”.

At the province level there are wide differences in experiences and perceptions of corruption. Generally, LEs experienced higher rates of corruption, both with utilities connections and government officials. Their perceptions of corruption as an obstacle to doing business are consistent with experiences with corruption. . Central Province reported no experience with corruption and 80% of respondents reported that corruption posed no obstacle to doing business. Meanwhile, Southern Province experienced the highest rates of government corruption and 90% of respondents thought that corruption impeded their business. However, for the same province, high percentages of MSMEs (43%) reported that corruption posed no obstacle to doing business. Among MSMEs, Northwestern Province is also interesting. The province reported frequent experiences with government corruption, yet firms did not think that corruption was an obstacle for their businesses. This may suggest that LEs suffer more negative effects from experiences with government corruption than do MSMEs. Optimistically, except for LEs in Eastern province, few firms in either survey reported that corruption posed a “very severe obstacle”.

This study divided infrastructure into two categories: access to utilities and communication services and access to banking/ credit institutions. LEs reported nearly perfect access to utilities, communication, and credit. However a sparse 12% of MSMEs had access to these inputs and all of those were located in urban areas. Only 10% of MSMEs had access to banking and credit institutions, while all LEs had access to these same services.

¹⁹ Transparency International. The Overview of Corruption in Zambia. Transparency International 2008.

²⁰ Ibid; 2.

Firm-level characteristics used within this study included age, size, setting, and sector.

Throughout the provinces, the average firm age ranged from 7 to 11 years. Older businesses were located in highly populated provinces while younger businesses were dispersed in sparsely populated provinces. In addition, when comparing MSMEs to LEs, there was a significant age difference. The average age of a small business in Zambia is 9 years, but the average age for large businesses is 16 years.

As discussed previously, the ZBS divides its sample into two surveys. MSMEs are firms that have 50 or fewer full-time employees, and LEs are firms that have more than 50 full-time employees. However, it would be faulty to assume that firms within the MSME or LE category are identical across all sizes. Despite the 50 employee cutoff, on average MSMEs had 2 full-time employees (including the owner). 95% of all MSME firms in the study had 6 or fewer full-time employees. In contrast, the size of LEs varied significantly across provinces. On average LEs in Zambia had 124 full-time employees. Northern Province had the smallest LE firms, with an average of 73 full-time employees. Eastern province had the largest LE firms, with an average of 178 full-time employees.

The majority of MSMEs (73%), while comparatively few LEs (12%), are located in a rural setting. This corresponds with agricultural businesses which make up respectively 54% and 16% of MSMEs and LEs in Zambia, respectively. LEs had a high percentage of manufacturing firms (23%) compared to MSMEs (5%). However, MSMEs had a high percentage of wholesale firms (33%) compared to LEs (8%).

This study used two measures to control for respondent characteristics – education and gender.

The ZBS data shows that the average MSME owner has a lower secondary grade education which includes 8th and 9th grade. Most LE respondents had completed their secondary schooling and/or some university training. This education would put their mathematical, reading, and writing skills higher than those acquired by small business owners.

63% of respondents in the MSME survey were male, compared 77% of respondents in the LE survey. In both cases, women were an overwhelming minority.

Registration Results and Findings

The registration model reveals several statistically significant results (see Figure 1.1 and 1.2). The variables that are statistically significant with positive impacts on the likelihood of a MSME to register are “male,” “primary education,” “graduate education,” and “government corruption.” The variables that have negative impacts on registration are “rural,” “agriculture,” and “corruption with utilities connection.” Also, firm age has a significant effect on registration, but this effect varies over time.

Rural and agriculture MSMEs are by far the least likely to register in Zambia. Rural MSMEs are 6% less likely to register than firms in the urban areas. Firms that are in the agricultural sector are 2% less likely to register than nonagricultural firms. Of course, MSMEs operating in the agriculture sector are likely to be rural (and vice versa). These firms may not be registering because of high transaction costs associated with becoming registered because there is little government presence and accountability in remote areas.

Several respondent characteristics were also significant. First, firms with male owners experienced a 1% increase in the probability of registering compared to firms with female owners. Second, “primary education” and “graduate education” were statistically significant. Compared to owners with no formal education, firm owners who had completed primary school were 1% more likely to register and firm owners with a graduate degree were 8% more likely to register. While those who received secondary education through a university degree were not significantly more likely to register their businesses, this lack of statistical significance could be due to a variety of factors. Most notably, as mentioned in previous studies, there could actually be pockets of educated persons “hiding” out in the informal sector because the benefits of registration do not outweigh the costs.²¹

“Firm Age” has a statistically significant quadratic relationship with registration, see Figure 2. New businesses have an increasing probability of registration until they reach around 28 years old. After this age, the probability of registering the business decreases. This is good news for Zambia, as 95% of MSMEs are 28 years or younger.

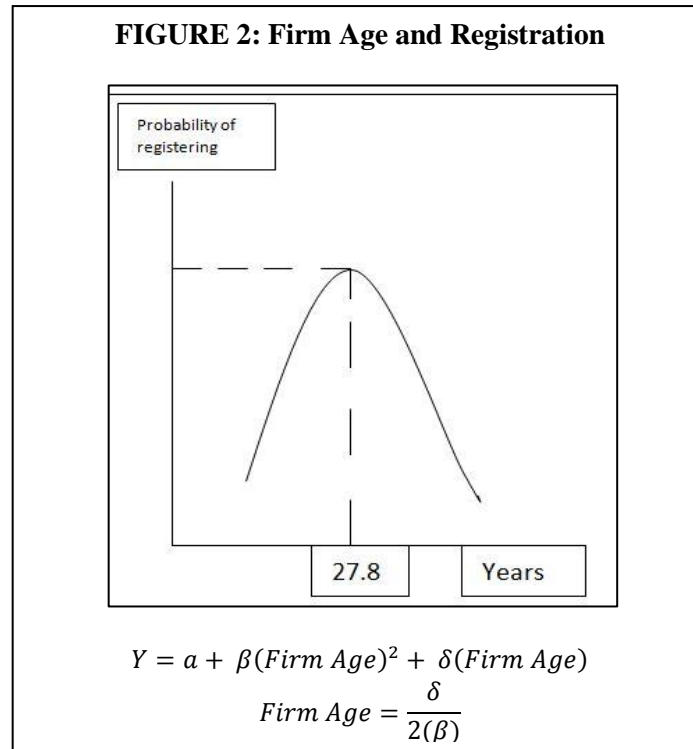
²¹ Amin M. Labor Productivity in the Informal Sector: Necessity vs. Opportunity Firms.” World Bank Enterprise Surveys 2009; Note 17.

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FIGURE 1.1: REGISTRATION		1	2	3	4	5
Access to Infrastructure	- Banking/Credit/Insurance (Mean)	0.20**	0.15**	0.06	0.05	0.02
		[0.09]	[0.07]	[0.05]	[0.05]	[0.03]
Access to Infrastructure	- Utilities & Communications (Mean)	-0.06	-0.07*	-0.03	-0.03	-0.001
		[0.04]	[0.05]	[0.05]	[0.05]	[0.04]
Experience with Corruption	- Utilities Connection		-0.21	-0.14	-0.13	-0.22*
			[0.26]	[0.18]	[0.18]	[0.12]
Experience with Corruption	- Government		0.08*	0.02	0.01	0.05*
			[0.05]	[0.04]	[0.03]	[0.03]
Firm Characteristics	-Large			0.0007***	0.0007***	0.0005**
				[0.0002]	[0.0002]	[0.0002]
	- Age			0.0007***	0.0007***	0.0005**
				[0.0002]	[0.0002]	[0.0002]
	- Age Squared			-1.0e-05*	-1.0e-06**	-9.0e-06**
				[0.00]	[0.00]	[0.00]
	- Size			0.00001	0.00002	0.00002
				[0.00005]	[0.00005]	[0.00005]
	- Size Squared			-0.06***	-0.06***	-0.06***
				[0.02]	[0.02]	[0.01]
- Rural			-0.02***	-0.02***	-0.02***	
			[0.004]	[0.005]	[0.002]	
- Agriculture			-0.004	-0.003	-0.004	
			[0.008]	[0.009]	[0.008]	
- Manufacturing			-0.004	-0.003	-0.004	
			[0.004]	[0.004]	[0.003]	
- Wholesale			0.0007***	0.0007***	0.0005**	
			[0.0002]	[0.0002]	[0.0002]	
Respondent Characteristics	- Male				0.01***	0.01***
					[0.003]	[0.003]
	- Primary Education				0.01	0.01**
					[0.005]	[0.005]
	- Secondary Education				-0.004	0.002
					[0.006]	[0.007]
Vocational Education				0.002	0.01	
				[0.02]	[0.02]	
-University Education				0.0005	0.009	
				[0.01]	[0.02]	
-Graduate Education				0.05*	0.08**	
				[0.04]	[0.06]	

FIGURE 1.2: REGISTRATION		1	2	3	4	5
Province Dummies	- Luapula					-0.01** [0.003]
	- Lusaka					-0.02**** [0.003]
	- Southern					-0.02**** [0.003]
	- Eastern					0.01** [0.005]
	- Northern					0.001 [0.003]
	- Northwestern					-0.02**** [0.002]
	-Western					-0.02**** [0.002]
	-Central					-0.01**** [0.002]
	Note: Robust standard errors are used, clustered at the province level; Copperbelt province omitted due to colinearity. * p<0.10; ** p<0.05; *** p<0.005					

Experience with corruption could also play a large role in business registration. The model shows that for every 1 unit increase in the district’s utilities connection corruption score, the probability that an MSME will register decreases by 22%. In addition, the district’s average experience with government corruption is also significant. Opposite of the utility corruption variable, if there is a 1 unit increase in the district’s government corruption score, the likelihood of an MSME registering *increases* 4.7%. Both of these variables are only marginally significant, at the 90% confidence level. These corruption measures might also suffer from reverse causality. Logically, firms that are not registered lack property rights and are more likely to engage in petty corruption to obtain utilities and communications services. On the other hand, the government is likely to have fewer interactions with informal businesses, leaving fewer opportunities for MSMEs that are not registered to become victims of government corruption.



Labor Productivity Results and Findings

The OLS regression on the log of output per worker yielded many statistically significant results. The only relevant statistically significant variable that positively impacts output per worker was respondents who had a university degree. Variables that had negative impacts on output per worker include firm size, rural setting, male respondents, and respondents with a graduate degree. Other statistically significant, but less important, variables include a control variable for LEs and a few province control variables.

Relative to respondents with no education, university-educated respondents worked or owned firms that had about \$1.30 (un-logging the coefficient of 0.263) higher output per worker annually. One would also expect that respondents at any level of education to experience higher outputs than those with no education. The most probable explanation as to why not all levels of education had a significantly positive impact on worker productivity is that the respondents are a mixture of firm owners (for MSMEs) and random employees (for LEs). The education variables only capture the impact that education of one random employee might have on total output per worker, rather than the impact that the owner's or total workforce's education has on productivity. This might also be the reason why the regression results show that respondents

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FIGURE 3.1: Labor Productivity (LOG)		1	2	3	4	5
Access to Infrastructure	- Banking/Credit/Insurance (Mean)	5.06*** [0.996]	4.32*** [1.013]	0.74 [1.708]	0.91 [1.64]	0.38 [0.98]
	- Utilities & Communications (Mean)	1.58 [1.051]	0.96 [1.03]	-0.27 [0.96]	-0.30 [0.92]	1.92 [1.37]
Experience with Corruption	- Utilities Connection		-5.24 [3.68]	-3.45 [3.41]	-3.56 [3.38]	0.01 [2.57]
	- Government		2.55 [1.67]	2.23 [1.39]	2.25 [1.35]	0.08 [1.02]
Firm Characteristics	- Large			12.60*** [1.38]	12.88*** [1.34]	11.25*** [1.74]
	- Age			-0.005 [0.01]	-0.004 [0.01]	-0.005 [0.01]
	- Age Squared			0.0001 [0.00]	0.0001 [0.00]	0.0001 [0.00]
	- Size			-0.11*** [0.012]	-0.11*** [0.012]	-0.11*** [0.011]
	- Size Squared			0.0003*** [0.00]	0.0003*** [0.00]	0.0003*** [0.00]
	- Rural			-0.32** [0.11]	-0.32** [0.11]	-0.15* [0.07]
	- Agriculture			0.03 [0.09]	0.02 [0.09]	0.02 [0.09]
	- Manufacturing			-0.04 [0.15]	-0.04 [0.15]	-0.02 [0.14]
	- Wholesale			-0.06 [0.10]	-0.06 [0.10]	0.002 [0.09]
Respondent Characteristics	- Male				-0.10 [0.06]	-0.12* [0.05]
	- Primary Education				0.09 [0.11]	0.02 [0.1]
	- Secondary Education				0.21 [0.12]	0.09 [0.08]
	Vocational Education				0.07 [0.2]	-0.01 [0.15]
	- University Education				0.32 [0.18]	0.26* [0.12]
	- Graduate Education				-0.45 [0.23]	-0.70* [0.38]

FIGURE 3.2: Labor Productivity (LOG)		1	2	3	4	5
Province Dummies	- Luapula					-0.02 [0.19]
	- Lusaka					1.25*** [0.12]
	- Southern					0.62*** [0.15]
	- Eastern					1.10*** [0.19]
	- Northern					-0.04 [0.17]
	- Northwestern					0.85*** [0.15]
	-Western					0.13 [0.17]
	-Central					1.64*** [0.22]
Note: Robust standard errors are used, clustered at the province level; Copperbelt province omitted due to colinearity.* p<0.10; ** p<0.05; *** p<0.005						

with graduate education worked for firms that had \$2.02 (0.702 unlogged) less output per worker than those firms with respondents who had no education.

The rural variable also had a negative coefficient that was statistically significant. Rural firms produced \$1.16 (0.149 unlogged) less per worker per annum than urban firms. This finding should not be a surprise. The majority of rural firms are involved in agriculture and agricultural sales are considerably lower than most urban industries.

More interestingly, male respondents reported \$1.12 (0.115 unlogged) lower labor productivity than female respondents. One reason could be that male-headed firms are more likely to register (as shown in the registration section). This suggests that regulatory burdens (which are heavy in Zambia) reduce firms' output. Furthermore, registered firms are likely to employ more workers which could further reduce output per worker given regulatory burdens.

Lastly, firm size was statistically significant and negative. For every additional full-time employee, output per worker per year decreases by \$1.12 (0.109 unlogged). Two explanations for this could be labor regulations and an oversaturated labor market. First, and as mentioned

above, Zambia has very burdensome labor regulations. Firms encounter significant costs for every unit of labor employed. As such, it is possible that for some firms in this study each additional labor unit costs more than each worker produces. Secondly, the labor market (especially in the informal sector) may be oversaturated. Over-employment relative to a firm's production function will cause a decrease in output per worker. The results here suggest that the majority of firms in this sample are either at their peak employment capacity or are over-employed relative to their respective production functions. This could also help explain the very low employment growth rate for MSMEs.

Among the control variables, some interesting relationships emerge as well. Large firms have the greatest effect on output per worker but suffer from many statistical issues. The regression shows that LEs have approximately \$76,650 higher labor productivity compared to MSMEs, when controlling for other effects. This result reflects findings in the descriptive section of this report but appears astronomical relative to the other findings. While the size variable showed that each additional full-time employee decreased labor productivity, large firms – which are defined by their number of full-time employees – have uniquely higher labor productivity. As discussed previously, there are approximately 3 LEs for every 100 MSMEs in this survey, yet 99% of LEs are registered versus 5% of MSMEs. Is increased labor productivity correlated with firm size or registration? These regressions results suggest that registration is actually influencing the productivity of the labor force within these LEs.

Other unobserved variables could also be affecting output per worker. Several of the large firms in the survey were involved in resource extraction, and their overall output in terms of sales was considerably higher than MSMEs. In addition, several large manufacturing and wholesale firms boasted very large returns in 2008. The nature of the work affects output per worker, not just the size. Additionally, LEs in this survey are generally wealthier firms that can employ technology in their work, and this technology increases output per worker. More detailed analysis of the role that firm size, registration, and access to technology would shed a better light on the effect that each of these components has on labor productivity.

Job Growth Results and Findings

The employment growth rate regression model reveals several statistically significant results. The variables that are statistically significant with positive impacts on the annual employment

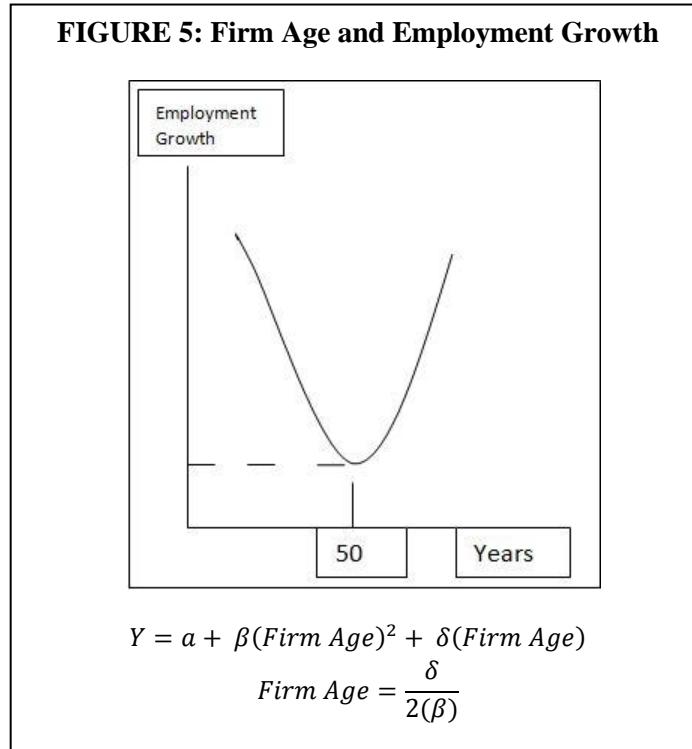
FIGURE 4.1: EMPLOYMENT GROWTH		1	2	3	4	5
Access to Infrastructure	- Banking/Credit/Insurance (Mean)	0.19* [0.1]	0.26 [0.14]	0.45** [0.16]	0.44** [0.17]	0.27 [0.15]
	- Utilities & Communications (Mean)	0.26*** [0.05]	0.28** [0.08]	0.37*** [0.07]	0.39*** [0.08]	0.29** [0.12]
Experience with Corruption	- Utilities Connection		-0.14 [0.31]	-0.31 [0.24]	-0.3 [0.25]	0.06 [0.25]
	- Government		-0.18* [0.08]	-0.14* [0.06]	-0.13* [0.07]	-0.29* [0.13]
Firm Characteristics	- Large			-0.14 [0.42]	-0.1 [0.41]	0.12 [0.35]
	- Age			-0.008** [0.002]	-0.01** [0.002]	-0.008** [0.002]
	- Age Squared			0.00008** [0.00002]	0.00008** [0.00002]	0.00008** [0.00002]
	- Size			-0.001 [0.003]	-0.001 [0.003]	-0.002 [0.003]
	- Size Squared			0.00 [0.00]	0.00 [0.00]	0.00 [0.00]
	- Rural			0.04 [0.03]	0.04 [0.03]	0.06 [0.04]
	- Agriculture			-0.007 [0.03]	-0.01 [0.03]	-0.008 [0.03]
	- Manufacturing			0.08 [0.06]	0.08 [0.06]	0.08 [0.06]
	- Wholesale			0.06* [0.03]	0.06* [0.03]	0.06* [0.03]
Respondent Characteristics	- Male				0.02 [0.03]	0.02 [0.03]
	- Primary Education				-0.06 [0.09]	-0.06 [0.09]
	- Secondary Education				-0.06 [0.08]	-0.06 [0.08]
	Vocational Education				-0.13* [0.07]	-0.12 [0.07]
	- University Education				-0.04 [0.09]	-0.04 [0.1]
	- Graduate Education				-0.1 [0.11]	-0.1 [0.11]

FIGURE 4.2: EMPLOYMENT GROWTH		1	2	3	4	5
Province Dummies	- Luapula					0.15*** [0.04]
	- Lusaka					0.05** [0.02]
	- Southern					-0.02 [0.01]
	- Eastern					0.01 [0.02]
	- Northern					-0.05*** [0.01]
	- Northwestern					0.01 [0.01]
	- Western					-0.05*** [0.01]
	- Central					0.02 [0.02]
Note: Robust standard errors are used, clustered at the province level; Copperbelt province omitted due to colinearity.* p<0.10; ** p<0.05; *** p<0.005						

growth rate are “wholesale” and “utilities and communication service.” The variable that had negative impacts on the employment growth rate was “government corruption.” Firm age also had significant impacts on employment growth rate, but these effects are mixed.

Average access to utilities and communication services within the district was positively correlated with employment growth. For every 1 unit increase in access to utilities and communication services within the district, firms experienced a 29% increase in employment growth rate. With access to utilities and communications, firms can take advantage of staying open longer hours and reaching economies of scale and scope. Conversely, the average experience with government corruption within the district has a negative impact on employment growth. As the government corruption score increases by 1 unit, employment growth decreases by 29%. This is likely because government bribes and unofficial levies burden businesses. Strikingly, increases in district-wide government corruption can negate the increased employment growth rate firms receive from having access to utilities and communication services.

At the firm-level, “wholesale” firms had 6% higher employment growth rates compared to other sectors. Wholesale firms also boasted the highest labor productivity compared to other sectors. This data suggests that wholesale is the fastest growth and most productive sector within Zambia.



Lastly, the model shows that a firm’s age has a mixed impact on its employment growth rate. Employment growth rates *decrease* during the first 50 years that a firm is open. Firms that are older than 50 years experience *increasing* growth rates over time. With 95% of Zambian firms younger than 28 years old, this might mean that Zambian firms have simply not reached the maturity threshold at which they can begin adding new employees rapidly.

3. INVESTMENT CLIMATE SURVEY: ZAMBIA IN A REGIONAL CONTEXT

Methodology and Limitations of the Investment Climate Survey Analysis

This model will follow a simple ordinary least squares regression model: $Y = \alpha + \beta x + \varepsilon$. Employment growth and labor productivity represent dependent (Y) variables on the left-hand side of equation. Employment growth was generated with the Davis-Haltiwanger’s method [See Appendix 6 for specification]. Labor productivity was logged in order to facilitate

interpretations. On the right hand side of the equation, independent variables included Zambia (Z), firm-level attributes (F), infrastructure conditions (I) and governance characteristics (G). Within the firm-level attributes, firm age was squared because of the assumption of a non-linear relationship. For all the infrastructure and governance variables, the average response of all the other respondents with that sector (s) was calculated to control for endogeneity. Error terms were clustered to control for correlation by country (c). See Appendix 6 for a detailed description of the ICS variables used. The final regression model was:

$$Y = \alpha + Z\beta + F\gamma + I_s\delta + G_s\eta + \varepsilon_c$$

Initial examination of the data revealed several important trends. First, less than 10% of the sample firms were experiencing employment growth. Small enterprises grew at a significantly higher rate (around 15%) than larger ones. Second, governance issues – especially bribes and corruption – had significant negative impacts on both employment growth and labor productivity. Infrastructure variables, such as internet and power outages, also affected the two key labor outcomes. Third, firms in Zambia generally performed better in employment and productivity than those in other African countries. Lastly, Zambian firms seemed to be more constrained by power loss and corruption.

There are several limitations to this study. First, the ICS data had a large amount of missing observations. Second, due to the possibility of endogeneity, this study tried to rely heavily upon quantitative measures. The “unavoidable” subjective responses were converted into sector averages to mitigate this short-coming while providing a grasp on sector-specific performance. Lastly, the ICS only provides survey data from firms within a given year. Without panel data across several years, this study can only make inferences about Zambia’s performance within 2007. In addition, data were collected from comparative countries during other years between 2006 and 2009. This may bias certain comparisons made here.

Job Growth Results and Findings

Figure 6.1 provides the regression results for the impact of firm characteristics, infrastructure, and governance variables on employment growth. Initially, Zambia appears to be experiencing positive employment growth relative to the other nations in the sample, but while controlling for infrastructure and governance issues, this relationship becomes *negative*. Overall, when

controlling for the investment climate, Zambian firms are experiencing 4.1% slower employment growth compared to their counterparts in SSA.

Firm age and firm size were significantly correlated with employment growth. This reveals that a firm's stability and experience are important for employment growth within SSA; however, their coefficients are quite small. So while the net impact of firm age and size might be significant, their actual impact on employment growth is moderate.

FIGURE 6.1: EMPLOYMENT GROWTH		1	2	3	4
	Zambia	0.047***	0.007***	-3.46**	-4.1***
Firm Characteristics	Age of Firm		0.002***	-.017***	-0.017***
	Age of Firm ²		1.08e-06***	8.73e-06***	8.71e-06***
	Small Firm		0.036	-0.046	-0.047
	Medium Firm		0.02***	-0.08***	-0.08***
	Foreign Owned		0.024	0.005	0.006
	Female Owned		0.018	0.002	0.002
Infrastructure	Power Loss Occurrences			0.12	0.11
	Losses from Power Outages			0.37**	0.38**
	Water Loss Occurrences			-0.07	-0.15
	Internet Loss Occurrences			-0.27***	-0.26***
	Losses from Transit			1.48**	1.63**
Governance	Bribes				-5.45***
	Gifts (Informal Payments)				3.39
	Government Regulation				0.06
	Frequency of Inspections				0.067
p < 0.1 = * p < 0.05 = ** p < 0.01 = ***					

Of the infrastructure terms, losses resulting from power outages, internet outages, and losses from transit all affect employment growth. Both losses from power outages and from transit have a positive relationship with employment growth. This could be explained by the relationship between firm size and access to infrastructure established in the ZBS section of this report. Firms that are larger have higher employment growth rates and have greater access to infrastructure; therefore, they are more likely to experience losses from internet outages and transit problems.

Finally, of the governance variables, “bribes” was significant and negatively affected employment growth. Bribes could reduce the capital pool for many of these businesses. Fortunately, this is a fungible problem that the government could tackle through policies.

FIGURE 6.2: EMPLOYMENT GROWTH		5	6	7
Zambia		1.23	-56.40***	-66.27***
Firm Characteristics	Age of Firm	-0.017***	-0.01***	-0.017***
	Age of Firm ²	8.73e-06***	8.71e-06***	8.70e-06***
	Small Firm	-0.045	-0.046	-0.047
	Medium Firm	-0.078***	-0.077***	-0.077***
	Foreign Owned	0.005	0.008	0.007
	Female Owned	0.002	0.001	0.002
	Infrastructure	Power Loss Occurances	0.12	
Power Loss (Int. Var.)		2.76***		3.46***
Losses from Power Outages		0.39		0.40***
Losses from Power (Int. Var.)		-4.58***		-3.83***
Water Loss Occurances		-0.10**		-0.2
Water Loss (Int. Var.)		4.29***		4.54***
Internet Loss Occurances		-0.26***		-0.25***
Internet Loss (Int. Var.)		-24.68***		-33.65***
Losses from Transit		1.54		1.67**
Losses from Transit (Int. Var.)	-0.03**		-0.19	
Governance	Bribes		-5.61***	-5.7***
	Bribe (Int. Var.)		16.4***	15.53***
	Gifts (Informal Payments)		3.24	3.27
	Gifts (Int. Var.)		16.8***	22.63***
	Government Regulation		0.08	0.07
	Government Reg. (Int. Var.)		-1.4	-1.81***
	Frequency of Inspections		0.06	0.069
	Frequency of Insp. (Int. Var.)		-1.07***	-0.69**
p < 0.1 = * p < 0.05 = ** p < 0.01 = ***				
Note: Int. Variable = Variable * Zambia				

In Figure 6.2, the model included infrastructure and governance interactive variables. While the effects from firm age, size, internet outages, and losses from power outages on employment growth remain constant, their effects on Zambian firms are much more pronounced. Power and water outages for Zambia have larger coefficients, which indicates that compared to firms in

other SSA countries, Zambian enterprises experience a greater *positive* effect from power outages. This may appear counter-intuitive, but one possible explanation could be that Zambian firms experience fewer net power and water outages compared to firms in other SSA countries. In contrast, other findings like losses from power and internet outages are more pronounced in terms of their negative effect on employment growth. This is especially true for firms in Zambia, where the decrease in employment growth associated with these losses is considerably higher.

The impact of gifts and bribes are negative for all sub-Saharan African firms but strangely enough positive in Zambia. Unlike the ZBS findings, this shows that government corruption within Zambia has a positive impact on employment growth. This finding points to problems in governance in terms of avoiding red-tape, cutting costs, or finding methods to pay off government officials to get ahead. More targeted research is necessary to reveal the extent of the relationship between government corruption and employment growth in Zambia.

Labor Productivity Results and Findings

Figure 7.1 provides the regression results for the impact of firm characteristics, infrastructure, and governance variables on labor productivity. Coefficients reported in this section are logged due to the high values that some of them present when unlogged. Chief among these findings is that Zambian firms are more productive by \$11 per worker per annum than other SSA firms.

Key findings from this regression relate to firm age, firm size, and foreign ownership. Similar to the ZBS study, there is a quadratic relationship between firm age and labor productivity; however, for SSA firms in general, this relationship is reversed. This indicates that initially, firms experience decreasing labor productivity, but after they reach maturity their labor productivity begins to increase. Firm size has a negative effect on labor productivity. MSMEs experience lower output per worker, most likely due to smaller economies of scale. Finally, foreign-owned firms are more productive by \$0.57 per worker compared to domestic firms. One possible explanation for this is that foreign firms have more capital and technology, which allows their workers to be more productive compared to their domestic counterparts. Another possible explanation is that foreign owned firms have better managerial and production techniques which translate into higher labor productivity.

When controlling for infrastructure variables, the number of power outages and losses due to power outages are statistically significant. As the number of power outages increases, labor productivity decreases by about \$0.40 per worker. However, the coefficient for the losses caused by power outages is positive. This would seem to say that as losses from power outages increases, so does labor productivity.

FIGURE 7.1: LABOR PRODUCTIVITY		1	2	3	4
Zambia		0.085***	-0.086***	2.44	11.2**
Firm Characteristics	Age of Firm		0.009***	0.009***	0.009***
	Age of Firm ²		-4.95e-06***	-4.97e-06***	-4.92e-06***
	Small Firm		-0.682***	-0.679***	-0.668***
	Medium Firm		-0.294***	-0.291***	-0.293***
	Foreign Owned		0.574***	0.571***	0.571***
	Female Owned		-0.062	-0.06	-0.038
	Infrastructure	Power Loss Occurrences			-0.472**
Losses from Power Outages				1.34**	1.37**
Water Loss Occurrences				-0.442	-0.238
Internet Loss Occurrences				0.144	-0.075
Losses from Transit				0.833	0.474
Governance	Bribes				10.2**
	Gifts (Informal Payments)				7.79
	Government Regulation				-2.02***
	Frequency of Inspections				0.684***
p < 0.1 = * p < 0.05 = ** p < 0.01 = ***					

Several of the governance scores are statistically significant. As senior management spends more time dealing with regulations, labor productivity decreases. This finding is quite interesting. While dealing with cumbersome paperwork, senior managers are unable to monitor their employees and prevent shirking, thus productivity decreases. Conversely, as bribery increases, labor productivity increases by \$10.2 per worker. Lastly, the frequency of inspections by tax officials also has a positive relationship with labor productivity. With every extra inspection, labor productivity increases by \$0.68 per worker. These last two results are also probably being driven by some other unobservable factors.

Figure 7.2 reports the results of the three regression models using interactive variables. The first regression looks at firm characteristics and infrastructure variables. The second regression

includes firm characteristics, and governance variables. The final regression includes all the independent variables chosen for this analysis. As with the original labor productivity regressions, Zambian firms appear to be \$125.9 per worker per annum more productive than other SSA firms. The statistical significance and coefficient signs of the firm characteristic variables remain the same as in Figure 7.1.

FIGURE 7.2: LABOR PRODUCTIVITY		5	6	7
	Zambia	-11.6**	140.6***	125.9***
Firm Characteristics	Age of Firm	0.009***	0.009***	0.009***
	Age of Firm ²	-4.96e-06***	-4.96e-06***	-4.87e-06***
	Small Firm	-0.679***	-0.673***	-0.669***
	Medium Firm	-0.292***	-0.298***	-0.295***
	Foreign Owned	0.569***	0.571***	0.568***
	Female Owned	-0.06	-0.039	-0.038
	Infrastructure	Power Loss Occurrences	-0.467**	
Power Loss (Int. Var.)		-9.85***		-11.1***
Losses from Power Outages		1.25**		1.29**
Losses from Power (Int. Var.)		16.1***		14.7***
Water Loss Occurrences		-0.449		-0.223
Water Loss (Int. Var.)		0.033		-0.379
Internet Loss Occurrences		0.113		0.067
Internet Loss (Int. Var.)		-31.5***		-15.8***
Losses from Transit		0.761		0.419
Losses from Transit (Int. Var.)		-1.19		-0.725
Governance	Bribes		11.2***	10.8**
	Bribe (Int. Var.)		-36.1***	-26.1***
	Gifts (Informal Payments)		8.46	8.25
	Gifts (Int. Var.)		-52.9***	-53.6***
	Government Regulation		-2.06***	-2.07***
	Government Reg. (Int. Var.)		1.56***	0.562
	Frequency of Inspections		0.664***	0.679***
	Frequency of Insp. (Int. Var.)		5.70***	3.58***
p < 0.1 = * p < 0.05 = ** p < 0.01 = ***				
Note: Int. Variable = Variable * Zambia				

Using the interaction terms for infrastructure, once again the number of power outages and the total losses due to power outages are statistically significant; however, the coefficients on these variables are much larger. What this reveals is that power outages and the losses incurred

because of power outages have a bigger impact on labor productivity within Zambia compared to other SSA countries. With each additional power outage, labor productivity decreases by \$9.85 per worker per annum for Zambian firms. On the other hand, as the total losses caused by power outages increases, labor productivity in Zambia increases by \$16.1 per worker per year. In addition, each additional loss in internet access decreases labor productivity in Zambia by \$15.8 per worker annually. Interestingly, for SSA, internet loss has no effect on labor productivity. All of the governance variables except for “gifts” are statistically significant, but the signs on the coefficients reveal mixed impacts on labor productivity. The interactive term reveals that Zambia experiences decreases in labor productivity as a result of government bribes. Compared to other SSA firms, firms in Zambia were \$26 per worker per year less productive because of government bribes. The interactive term of having to give a gift is also statistically significant with a negative coefficient. Thus, firms in Zambia are \$53 per worker annually less productive due to gift giving compared to other SSA firms. The last two interactive variables – the amount of time spent on regulations and the number of inspections – are both statistically significant. This reveals that as time spent on regulations and the number of inspections increases firms within Zambia are more productive by \$1.56 per worker and \$5.70 per worker per year, respectively.

These regression results are very robust, with an R-squared value of 0.60. This indicates that between firm characteristics, infrastructure and governance variables, 60% of the total variance in labor productivity is explained. These robust results do indicate that policy interventions into infrastructure and governance issues can have a significant impact on improving labor productivity.

4. POLICY RECOMMENDATIONS

Business Registration

Firm-level analysis conducted using the ZBS data identified several significant factors that contribute to firm registration or lack thereof. From these findings, the authors of this report recommend the following policies.

Targeting rural and agriculture firms

The results of this study indicate that rural and agriculture firms are less likely to register compared to urban firms in other sectors. Many agriculture firms in Zambia engage in

subsistence farming. Creative registration policies that are specifically crafted to meet the needs of subsistence farmers could yield a higher registration rate among rural farmers.

Reductions in red-tape and regulatory costs

The results of this analysis suggest that over one-fourth of Zambian firms fail to register because they do not generate enough income for registration. The adverse effects of labor regulations potentially expose themselves in the regression findings. Educated entrepreneurs in Zambia face tough choices – launch their firms within the formal or informal sector, or emigrate and start a business elsewhere. The bottom line for the entrepreneur is a balance sheet of costs for registration and potential business output. The same can be said for hiring new employees, whereby firm owners must weigh the costs of adding an additional unit of labor against the potential output from that employee.

Entrepreneurs (even the educated ones, as this study has shown) who do not see the financial benefits of registration are likely to launch their firms in the informal sector. Those who do not see the benefits of conducting business within Zambia will have a large incentive to emigrate in search of more favorable business climates. The loss of an educated entrepreneurial class could have serious ramifications for Zambia's economy. Educated entrepreneurs can establish the kind of high value-added firms that Zambia needs to grow its economy.

The ICS section of this report shows that as entrepreneurs spend more time on government regulations, the productivity of their labor force decreases. Labor regulations must be limited and coupled with a wide array of governance reforms until the benefits of registering a firm far outpace those for remaining in the shadow economy. Other governance reforms are a subject for other papers, but if the Zambian government began with the reform and reduction of the regulatory framework for labor, educated entrepreneurs will remain in Zambia and participation in the formal sector will increase.

Expanding education to grassroots entrepreneurs

The results of this study also indicated that over one-fourth of Zambian entrepreneurs did not understand the process by which to become registered. Simple training programs for MSME entrepreneurs at the grassroots level would provide the basic knowledge necessary to convert informal enterprises into formal ones. Coupled with regulatory reform that makes registration

more affordable for MSMEs, these training programs should increase the proportion MSMEs that are registered within Zambia.

Targeting younger firms

This study also found that MSMEs younger than 28 years old are more likely to register in Zambia than are older firms. Programs designed to provide information on the registration process should target firms during these first 28 years. During these first 28 years, owners of MSMEs appear to be on the fence about registration and its benefits. By targeting these firm owners specifically (which fortunately make up about 95% of Zambian firms), education programs have the greatest likelihood of pushing these firm owners to the “registered” side of the fence.

Labor Productivity & Employment Growth

While Zambian firms appear to have higher labor productivity than other countries in SSA, Zambia’s employment growth rate is 4% slower. Firm-level analysis and cross-country analysis produced several policy implications on how to improve labor productivity and employment growth rates within Zambian. Based on these results, the authors recommend the following policies.

Increase Agriculture Yields

Given that Zambia’s rural firms have less output per worker than urban firms, and most rural firms are involved in agriculture, improving agricultural productivity is a natural policy option to pursue. Zambia’s government should implement agricultural programs that focus on crop diversification, physical capital enhancement, livestock for cultivation, low-cost inputs and irrigation techniques, and rural credit access. Collaboration with regional partners and the University of Zambia to introduce improved seed varieties and new technologies would also greatly increase agricultural yields and the labor productivity of Zambian farmers.

Training programs should encourage farmers to work in cash crops and animal husbandry to augment their subsistence staple crops. This can provide more year-round work for farmers and alleviate the problems of underemployment during “lean” seasons. More crops should mean that additional (unused) land can become productive. It should also mean that farmers can earn

surplus profits that can improve their welfare and be reinvested into their farms to further enhance production. Crop diversification is also a form of insurance against one crop failing.

The Zambian Government must ensure that new and affordable technology is available to the rural population. This technology should include laborsaving devices like small tractors, mechanical seeders, animal-operated steel plows, etc. Assuming this technology is available, agricultural training programs should focus on ensuring that subsistence farmers know how to use and maintain these technologies. Introduction of these technologies will also produce more employment opportunities for mechanics who could specialize in maintenance of agriculture machinery. New mechanization techniques or the ability to use work animals can allow Zambian farmers to cultivate more land (land that was previously unused) and increase production as a result. New technology can also make up for the supply shortfall of workers during the rainy season. This will increase planting capabilities which will increase production assuming no natural disasters. With work animals, the government will need to ensure that livestock feed is made affordable and abundant so that farmers can access this input when needed.²²

An additional way for the government to help is to ensure that there is widespread availability of affordable fertilizers and improved seed varieties. Training programs should focus on getting farmers to use these inputs. Fertilizers can also allow for more land to be cultivated. Instead of farmers exhausting small parcels of land through intensive cultivation and shifting to new land when plots becomes fallow, farmers can use fertilizers and manure to extend and increase the productive capacities of their land parcels. As population expands, unused land can be cleared and come into production. Where excess land has disappeared due to rapid population growth, the need for fertilizer is even greater as there is now no new land to shift to if a parcel becomes fallow. Furthermore, if soil quality and erosion are becoming a larger aggregate problem in Zambia, then the use of fertilizer will need to have an increasingly important role to rectify these problems. Also, better seeds will increase the produce yields.²³

As Zambia's population grows so will its towns. As such, the monetary economy will begin to penetrate rural areas, and the availability of credit should increase. Agricultural training should

²² Todaro MP, Smith SC. *Economic Development*. Boston: Pearson Addison Wesley;2009;448.

²³ Ibid; 448-9

incorporate financial literacy into its curriculum as well. It should teach farmers how to access credit and use it to invest in advanced production techniques and technology and how to budget for increasing land taxes. It should also teach farmers how to recognize what the real market prices are for their goods and how to appropriately reinvest their profits into their farms.²⁴

Finally, training needs to focus on the importance of irrigation. Given that many Zambian farmers rely on rain for irrigation, irrigation infrastructure can reduce the risk of drought and increase long-run productivity. This policy will depend on collaboration between the government, local leadership, and the University of Zambia to build irrigation infrastructure and to train local communities on how to divert irrigation channels to their land parcels and how to properly flood their fields.²⁵

Improving access to and reliability of infrastructure

Results from this study also found that issues with access to and the reliability of infrastructure play key roles in labor productivity and employment growth. The Government of Zambia should focus on promoting the expansion of internet access throughout the country, which has been shown to greatly improve labor productivity and employment growth rates. In addition, policymakers should work toward stabilizing the electrical grid to provide more reliable electricity for Zambian firms. The results of this study showed that the number of power losses has a negative impact on labor productivity. In addition, net losses in income due to power outages has a negative effect on Zambian employment growth rates. Zambian labor productivity and employment growth rates are more susceptible to losses due to power outages than other countries in SSA.

Fighting against government corruption

The results of this study also found that Zambian firms experience losses in labor productivity and employment growth from government corruption that are relatively high compared to other countries in SSA. Zambia's government must actively work to cut down on petty bribes and gifts that have been shown to have a detrimental effect on the labor productivity of Zambian firms.

²⁴ Ibid; 448

²⁵ Ibid; 449

5. RECOMMENDATIONS FOR SURVEY DESIGN AND RESEARCH

Zambia Business Survey

- The Large Enterprise survey was conducted using random respondents who worked within the business, whereas the MSME surveyed firm owners specifically. To make comparisons between the two types of firms, it would be best to only survey firm owners in both the LE and MSME.
- Data collection methods – particularly the dates and how firms were selected – are very unclear, making research using the ZBS data difficult to validate.
- Knowledge-based questions about the general regulatory environment within Zambia. How much do firm owners know about requirements, procedures, and costs?
- The ZBS can be a useful tool in mapping the overall business environment within Zambia. Collecting data at regular intervals for time-series comparison can tell researchers and policymakers much more about Zambia’s investment climate over time.

Investment Climate Survey

- There are significant issues with missing data points within the ICS. When conducting surveys in developing countries, data collection is difficult. Perhaps the survey should be amended or rephrased to make data collection easier.
- More specific questions on different categories of labor regulations that measure specific costs (monetary and time) would make the assessment of the regulatory environment and its impact on overall output and employment decisions more effective.

Recommendations for Future Research

- A comprehensive assessment of the perceptions of Zambian business owners regarding labor regulations and the investment climate in Zambia should be conducted using ZBS and ICS. This could complement this study and provide qualitative insights into what is on the minds of Zambia business owners.
- A comprehensive assessment of the Zambian business environment using the Doing Business Indicators and either the ICS or ZBS would also be helpful in determining the role that the

regulatory environment within in Zambia plays in determining employment and labor productivity trends.

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APPENDIX 2: EXPLANATION OF ZAMBIA BUSINESS SURVEY VARIABLES

FIGURE 8: DESCRIPTIVE STATISTICS ZBS 2008 MSME	Central	Copperbelt	Eastern	Luapula	Lusaka	Northern	North Western	Southern	Western	Zambia
Average Access to Infrastructure										
Banking/Credit/Insurance (Mean)	0.07	0.10	0.14	0.12	0.12	0.09	0.06	0.08	0.09	0.10
Utilities & Communications (Mean)	0.07	0.09	0.07	0.09	0.12	0.05	0.31	0.16	0.09	0.12
Average experience with corruption										
Utilities Connection (Mean)	0.00	0.02	0.01	0.00	0.01	0.01	0.00	0.01	0.05	0.01
Government (Mean)	0.09	0.05	0.07	0.07	0.13	0.11	0.07	0.06	0.04	0.08
Firm Characteristics										
Firm Age (Mean Years)	8.6	11.1	8.3	6.7	7.5	6.8	8.4	11.0	8.9	8.8
Size (Mean)	2.2	2.4	2.1	2.1	2.1	1.8	1.9	2.3	2.1	2.1
Rural (%)	77.4	65.9	67.4	80.2	73.1	34.7	75.0	76.9	87.9	72.9
Agriculture (%)	52.6	62.5	45.0	32.3	46.6	42.3	65.3	66.0	55.7	54.0
Manufacturing (%)	4.5	7.4	5.2	3.2	6.0	4.0	3.2	4.1	4.1	4.5
Wholesale (%)	30.0	27.1	39.9	30.8	44.3	29.1	21.4	29.3	41.7	32.5
Firm Owners' Characteristics										
Male (%)	66.5	66.6	68.7	73.6	64.5	65.6	53.2	54.6	67.9	63.1
Education (Average Level Achieved)	Lower Secondary	Lower Secondary	Upper Primary	Lower Secondary	Lower Secondary	Lower Secondary	Lower Secondary	Lower Secondary	Lower Secondary	Lower Secondary
Owner's Age (Mean)	41.4	40.3	41.5	41.6	39.0	36.0	39.3	38.0	42.3	39.8
Dependent Variables										
Registered (%)	2.6	3.7	10.3	3.2	4.4	8.9	2.3	5.6	3.8	4.9
Annual Output Per Worker (Mean)	1695.6	1472.8	584.9	1213.1	6744.7	30372.3	1438.2	672.4	407.8	3725.9
Employment Growth Rate (Mean %)	0.0	0.0	0.1	0.1	0.1	0.2	0.1	0.1	0.0	0.1
N = 4791										

Registration, Job Growth, and Labor Productivity in Zambia

FIGURE 9: DESCRIPTIVE STATISTICS ZBS 2008 LE	Central	Copperbelt	Eastern	Luapula	Lusaka	Northern	North Western	Southern	Western	Zambia
Average Access to Infrastructure										
Banking/Credit/Insurance (Mean)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Utilities & Communications (Mean)	0.92	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.99	0.92
Average experience with corruption										
Utilities Connection (Mean)	0.00	0.00	0.25	.	0.07	.	0.33	0.07	0.09	0.00
Government (Mean)	0.00	0.06	0.36	0.00	0.19	0.22	0.41	0.59	0.20	0.00
Firm Characteristics										
Firm Age (Mean Years)	11.6	22.7	21.8	8.3	15.5	8.7	3.0	14.6	16.3	11.6
Size (Mean)	104.2	163.4	177.5	76.3	111.4	73.0	139.3	122.9	124.5	104.2
Rural (%)	66.7	3.5	100.0	0.0	1.5	66.7	0.0	12.5	11.9	66.7
Agriculture (%)	77.8	3.5	25.0	33.3	9.0	66.7	0.0	25.0	16.4	77.8
Manufacturing (%)	0.0	41.4	25.0	0.0	23.9	0.0	0.0	18.8	23.9	0.0
Wholesale (%)	0.0	17.2	0.0	0.0	6.0	33.3	0.0	6.3	8.2	0.0
Firm Owners' Characteristics										
Male (%)	88.9	86.2	100.0	66.7	74.6	66.7	66.7	68.8	77.6	88.9
Education (Average Level Achieved)	Master's Degree	Some University	Vocational	College Diploma	Some University	Vocational	Master's Degree	College Diploma	Some University	Master's Degree
Dependent Variables										
Registered (%)	100	100	100	100	100	100	100	87.5	98.51	100
Annual Output Per Worker (Mean)	1612607	1.20E+08	9111653	4535297	1.12E+07	18105.41	1479	561949	2.84E+07	1612607
Employment Growth Rate (Mean %)	0.03	0.61	0.01	1.09	0.50	1.23	0.21	0.10	0.44	0.03
N = 134										

Average Access to Infrastructure

IC1 (averageothersic1): each value is the average of all other observations' access to banking infrastructure within the district; formed using the following questions from the ZBS:

J1a: Thinking about how you run the business, which statement best applies to you?

- *I have a personal bank account that I do use for the business*
- *I have a business bank account only*
- *I have both a personal and a business bank account*

Ka3_1 to K3_6, K3_8 & K3_11: What is your experience of loans for your business – have it

- *From bank*
- *From microfinance institution*
- *From a building society*
- *From other financial institution*
- *From an employer*
- *From government*
- *From donor/ NGO*

M1: Have you ever bought any insurance product/ policy for the business?

IC2 (averageotheric2): each value is the average of all other observations' access to utilities infrastructure within the district; formed using the following questions from the ZBS:

C1: Does the business currently use electricity for its day-to-day operations?

C4: Does the business have one or more operational landline telephones?

C6a: Do you have access to the internet?

Average Corruption Experience

Corruption1 (averageothercorr1): each value is the average of all other observations' corruption experience (with utilities companies) within the district; formed using the following questions from the ZBS:

C10b_1: Was a gift or informal payment asked for electrical connection?

C10b_2: Was a gift or informal payment asked for water connection?

C10b_3: Was a gift or informal payment asked for landline phone connection?

Corruption 2 (averageothercorr2): each value is the average of all other observations' corruption experience (with government officials) within the district; formed using the following questions from the ZBS:

P8_9: Which of these does the business pay: unofficial levies by the government?

P9d: Over the last 12 months was the business visited by, inspected by, or required to meet with tax officials? In any of these visits, inspections, or meetings, was a gift or informal payment expected?

Firm Level Characteristics

Firm Age: the age of the business in 2008 when the survey was conducted; generated using question **A3** which asks “In which year did the business begin operations in Zambia?”

Firm Age Squared = firm age variable squared

Firm Size: total number of full-time employees - including paid, unpaid, and paid in-kind; sum of responses to questions **D2a** and **D2c** for LE and **D2a**, **D2c**, and **D2e** for MSME.

Firm Size: firm size variable squared

Large: dummy variable for firms included in the LE survey, in which LE = 1 and MSME = 0.

Rural: dummy using EA identification particulars question #5 or “setting” in the original ZBS small dataset in which rural = 1 and urban = 0.

Agriculture: dummy using question **A9** which asks: “What sector does the business mainly operate in” where agriculture = 1 and all others = 0.

Manufacturing: dummy using question **A9** which asks: “What sector does the business mainly operate in” where manufacturing = 1 and all others = 0.

Wholesale: dummy using question **A9** which asks: “What sector does the business mainly operate in” where wholesale = 1 and all others = 0.

Firm Owner Characteristics

Male: dummy using variable **Gender** from the original ZBS small data which shows “gender of selected respondent” where male = 1 and female = 0.

Education: categorical level data which identifies the respondent’s level of education using question **E1**, “What is your highest level of education?” This variable was divided into dummy variables for categories of education: primary, secondary, vocational, university, graduate, and no education.

Age: respondent’s self-reported age from screening question #3. Firms were limited to those owned by persons 16 years or older.

Dependent Variables

Registered: dummy using question **P2** which asks: “Is the business registered with the Patents and Company Registrar (PACRO), or other government institution responsible for commercial registration?” where yes = 1 and no = 0.

Worker Output: average annual output per worker. Calculated using the average annual income in \$USD (questions **O1**, converted to annual and \$USD where necessary; conversions to \$USD were made using the year-end exchange rate from ZMK) and the total number of workers (sum of questions **D2**, plus one for the respondent, where part-time workers are weighted at ½ and full-time workers are weighted at 1).

$$Productivity = \frac{total\ annual\ sales\ \$USD}{total\ full - time + \frac{1}{2} (total\ part - time)}$$

Employment Growth Rate: average annual full-time employment growth as a percentage. Calculated using total number of employees when the business started (question **D1**), the total number of full-time employees in 2008 (see **firm size**), the age of the firm (see **firm age**).

1. $Employment\ Growth = \frac{(Firm\ Size) - (Initial\ Fulltime)}{Firm\ Age}$
2. $Employment\ Growth\ Rate = \frac{Employment\ Growth}{Initial\ Fulltime}$

APPENDIX 3: DETERMINANTS OF REGISTRATION ZBS 2008 MSME

FIGURE 10: SELF-REPORTED REASONS FOR AND AGAINST REGISTRATION ZBS 2008 MSME	Central	Copperbelt	Eastern	Luapula	Lusaka	Northern	Northwestern	Southern	Western	Zambia
MSME firm registered (%)	2.6	3.7	10.3	3.2	4.4	8.9	2.3	5.5	3.8	4.9
Reasons for not registering (%)										
_Does not know how to	32.9	33.3	29.7	28.8	20.3	23.7	16.7	16.0	32.3	25.1
_Not able to comply with requirements	6.4	6.7	14.9	5.4	11.1	7.0	12.8	6.9	7.1	8.5
_It costs too much	4.4	11.7	4.9	3.1	14.2	2.2	3.0	7.4	2.0	7.0
_It is too complicated	4.6	5.6	6.5	1.4	7.8	4.8	5.1	4.5	3.0	5.1
_It does not make enough money	43.9	33.1	38.2	24.1	40.0	30.7	39.7	40.4	34.7	36.7
_Business does not need to be registered	27.3	20.3	26.4	35.9	30.4	50.7	24.2	35.9	6.7	28.7
Reasons having registered(%)										
_To gain access to customers	24.0	14.3	7.1	0.0	26.1	33.3	0.0	4.4	0.0	15.0
_To gain access to aid programs	28.0	20.4	7.1	0.0	10.1	0.0	0.0	0.0	0.0	10.7
_To gain access to financing	8.0	18.4	7.1	5.7	10.1	16.7	60.0	0.0	0.0	12.0
_For moral/ethical reasons	12.0	2.0	7.1	2.9	7.3	16.7	20.0	4.4	0.0	6.4
_Too large to remain unregistered	16.0	10.2	0.0	34.3	17.4	16.7	10.0	56.5	0.0	20.5
_Because I learned of the procedures to register	0.0	0.0	7.1	0.0	1.5	0.0	0.0	0.0	0.0	0.9
_To transmit assets through inheritance	64.0	42.9	71.4	54.3	59.4	33.3	40.0	52.2	100.0	54.7
_It is legal requirement	4.0	0.0	0.0	0.0	2.9	16.7	0.0	4.4	0.0	2.1

APPENDIX 4: PERCEPTIONS OF CORRUPTION ZBS 2008 LE

FIGURE 11: SELF-REPORTED CORRUPTION EXPERIENCES AND PERCEPTIONS, ZBS 2008 LE	Eastern	Lusaka	Southern	Northern	Northwestern	Luapula	Central	Copperbelt	Zambia
Do you think corruption presents a major obstacle to doing business? (%)									
- No Obstacle	25.0	33.3	10.0	25.0	33.3	33.3	80.0	44.4	35.4
- A minor obstacle	25.0	19.8	60.0	25.0	33.3	33.3	20.0	30.6	28.0
- A moderate obstacle	0.0	18.5	30.0	0.0	0.0	33.3	0.0	8.3	15.5
- A major obstacle	25.0	18.5	0.0	25.0	33.3	0.0	0.0	16.7	15.5
- A very severe obstacle	25.0	6.2	0.0	0.0	0.0	0.0	0.0	0.0	3.7
- Don't know	0.0	3.7	0.0	0.0	0.0	0.0	0.0	0.0	1.9
Corruption constitutes... (%)									
- The most serious obstacle to doing business	0.0	4.9	0.0	0.0	0.0	0.0	0.0	8.3	4.3
- The second most serious obstacle to doing business	0.0	7.4	5.0	25.0	33.3	0.0	0.0	5.6	6.8
- The third most serious obstacle to doing business	0.0	11.1	0.0	25.0	0.0	0.0	0.0	0.0	6.2
Which of these, if any, does the business pay? (%)									
- Unofficial levies by the government	25.0	9.9	35.0	0.0	33.3	0.0	0.0	2.8	11.2
Over the last 12 months, was the business visited by, inspected by, or required to meet with tax officials? (%)	50.0	81.5	75.0	100.0	100.0	66.7	100.0	80.6	81.4
- Was a gift or informal payment expected/requested?	0.0	1.5	33.3	0.0	0.0	0.0	0.0	3.5	5.3
* Note: The large business survey did not include any firms from Western Province									

APPENDIX 5: PERCEPTIONS OF CORRUPTION ZBS 2008 MSME

FIGURE 11: SELF-REPORTED CORRUPTION EXPERIENCES AND PERCEPTIONS, ZBS 2008 MSME	Eastern	Lusaka	Southern	Northern	North Western	Western	Luapula	Central	Copperbelt	Zambia
	Do you think corruption presents a major obstacle to doing business? (%)									
- No Obstacle	20.6	21.6	42.6	58.3	32.5	11.7	15.2	45.6	39.8	34.4
- A minor obstacle	15.4	11.1	14.6	7.9	15.9	18.3	9.1	6.3	5	10.7
- A moderate obstacle	24.4	11.2	11.4	6.4	9.6	11.3	27.3	8.3	6.9	12.1
- A major obstacle	26.1	19.6	6.9	2.4	3.8	11	15.2	20.5	8.5	12.6
- A very severe obstacle	5.1	11.9	2.7	7.9	10.4	3.3	9.7	8.1	3.6	6.4
- Don't know	4.8	4.5	4.7	8.6	4.4	3.7	1.5	1.9	5.1	4.5
Corruption constitutes... (%)										
- The most serious obstacle to doing business	7.4	7.2	4.2	3.3	5.2	2.7	3.3	10.4	2.3	5.1
- The second most serious obstacle to doing business	17	10.1	6.3	4.1	5.5	4.3	18.5	10.7	3.1	8.2
- The third most serious obstacle to doing business	11.4	8.6	5	4.5	4.4	3.3	7.6	9.1	7.9	7.2
Which of these, if any, does the business pay? (%)										
- Unofficial levies by the government	4.2	6.5	4.4	11.4	5.8	3.7	10.3	7.2	12.2	16.9
Over the last 12 months, was the business visited by, inspected by, or required to meet with tax officials? (%)	1.0	7.7	3.7	0.5	1.7	3.3	2.4	2.8	2.9	3.1
- Was a gift or informal payment expected/requested?	20.0	4.7	27.6	100.0	0.0	20.0	0.0	12.5	14.3	14.3

APPENDIX 6: EXPLANATION OF INVESTMENT CLIMATE SURVEY VARIABLES

FIGURE 13: DESCRIPTIVE STATISTICS ICS				
	Variable	Description	Mean	Std. Dev.
Infrastructure	nopower	Number of power outages experienced in a typical month	9.089738	8.403138
	losspower	Losses in the last fiscal year due to power outages	4.386867	3.144203
	nowater	Number of water shortages incidents in a typical month	1.084132	1.233585
	nointernet	Number of internet connection outages in an average month	1.062292	3.621193
	losstransit	Average cargo loss, breakage or spoilage in transit	.6595036	.48562
Governance	bribe	Whether firms have to pay bribe to get things	1.554108	1.106384
	gift	Whether gift are required during the requested inspections	1.208158	.3525505
	govreg1	Time senior management spends dealing with government officials and regulations	6.467866	3.206006
	govreg2	Frequency of inspection by tax officials	3.038328	2.642485
Characteristics	size	Number of full-time permanent employees in the last fiscal year	1.443808	.6589571
	firmage	Last fiscal year-year of establishment	25.49609	156.1725
	foreignown	Whether the firm is foreign-owned	.129066	.3352847
	femaleown	Whether the largest owner is female	.0079731	.1788047
DV	empgrowth	Average employment growth by year	.4436352	.6953783
	productivity	Labor productivity, in logarithmic scale	14.44591	2.27368
	Number of observation N=14,326			

Average Access to Infrastructure

Infrastructure Independent Variables: each value is the average of all other observations' access to utilities infrastructure within each sector;²⁶ formed using the following variables from the ICS:

- C7:** Number of power outages experienced in a typical month
- C9a:** Losses in the last fiscal year due to power outages (% total sales)
- C16:** Incidents of water shortage per month
- C26:** Frequency of unavailability of internet connection in an average month during the last fiscal year
- D11:** Average cargo loss, breakage or spoilage in transit (%)

²⁶ List of sectors, if necessary.

Average Corruption Experience

Governance Independent Variables: each value is the average of all other observations' corruption experience (with utilities companies) within the sector; formed using the following variables from the ICS:

- J1a:** Whether firms have to pay bribe to get things done (0=NA, 1= Strongly Disagree, 2=Disagree, 3=Agree, 4=Strongly Agree)
- J5:** Whether gift are required during the requested inspections (0=NA, 1=Yes, 2=No)
- J2:** Time senior management spends dealing with government officials and regulations (%)
- J4:** Frequency of inspection by tax officials

Firm Characteristics (IV)

Firm Size: dummy using variable **Size** from the original ICS data, which shows the number of full-time employees in the last fiscal year (1=small (<20), 2=medium (20-99), 3=large (100 and over)).

Firm Foreign Ownership: dummy using variable **b2b** in the original ICS data, which shows whether the respondent is a private domestic individual/company or organization. (2=Yes, 1=No).

Firm Female Ownership: dummy using variable **b3b** from the original ICS data, which asks "Is the largest owner female?" (1=Yes, 2=No)

Firm Age: numerical variable using **b5** from the original ICS data, which asks "In what year did this establishment begin operations in this country?" **Firm age** equals to the year of survey subtracted by its year of establishment.

Firm Age Squared = firm age variable squared

Dependent Variables

Employment Growth is created using the Davis-Haltiwanger's method to convert the percent change growth rates into the absolute difference ratios.²⁷ The unweighted average rates of employment growth were calculated using the following formula:

$$\text{Employment growth} = \frac{(L_t - L_{t-s})}{\frac{1}{2}(L_t + L_{t-s})} \quad (1), \text{ in which:}$$

L_t (using **L1**): Number of full-time permanent employees of the establishment at time t ²⁸

²⁷ Aterido R, Hallward-Driemeier M. The Impact of the Investment Climate on Employment Growth: Does Sub-Saharan Africa Mirror Other Low-Income Regions?. World Bank Working Paper 2010;10.

²⁸ In this dataset, t indicates the last fiscal year. The difference between t and $(t-s)$ in most of the cases is 3 years. The average rates of growth were between [-2; 2], which could help to mitigate the impacts of large outliers.

L_{t-s} (Using **L2**): Number of full-time permanent employees of the establishment at time $(t-s)$

Labor Productivity: Value added per worker, measured by the total annual sales (in US\$) divided by the number of full-time permanent employees. This variable was normalized into logarithmic scale.

Labor Productivity = $\log \left(\frac{D_t}{L_t} \right)$, in which:

D_t (Using **D2**): Total annual sales in year t

L_t (Using **L1**): Number of full-time permanent employees of the establishment at time t

APPENDIX 7: TEMPLATE FOR CURRENT LABOR POLICY AND REGULATIONS AND SUMMARY OF POLICY HISTORY

This document summarizes the current policies regarding employment in Zambia by categorizing labor regulations in the following five areas: employment protections, child labor and age restrictions on employment, compensation and benefits, occupational health and safety, and dispute resolution. Summaries of current policy, including demographic groups and industries, are included where available.

Employment Protections

Various regulations exist for protecting the rights of formal sector employees in Zambia. The majority of these regulations are outlined in the Employment Act and the Minimum Wages and Conditions of Employment Act. Limitations on the use of contracts; duration of work day; vacation, sick and maternity leave; severance pay; and conditions for dismissal are included in these acts. Though the informal sector is not explicitly excluded from these acts, proving the various employer/employee relationships they depend on is very difficult. It should also be noted that the government has made it clear that the Minimum Wages and Conditions of Employment Act only applies to vulnerable employees, most of whom are in the informal sector²⁹. This makes the scope of the legislation opaque and its true effects limited.

1. Use of Contracts and Terms to be Specified in Contracts (e.g. duration, specific tasks, notification period for termination, wages, working hours, probation and leave provisions)

Chapter 268: The Employment Act. Part IV: Oral Contracts of Services. Section 20: Termination by notice.

- After six months' continuous service, an employee is entitled to a holiday with full pay at the rate of two days in respect of each period of one month's service.

2. Duration of Work Day

Chapter 276: The Minimum Wages and Conditions of Employment Act. Subsidiary Legislation: Section 3 – Minimum Wages and Conditions of Employment (General) Order. Order by the Minister Statutory Instrument 119 of 1997. Section 4 Hours of work – Normal weekly hours of work for any employee shall not exceed 48 hours.

3. Leave for Illness; Annual Vacation; Maternity (or Paternity) Leave

Chapter 268: The Employment Act. Part III: Contracts of Service Generally. Section 15: Holidays with pay.

- After six months' continuous service, an employee is entitled to a holiday with full pay at the rate of two days in respect of each period of one month's service. (Could also pay wage for the accumulated leave)

Chapter 268: The Employment Act. Part III: Contracts of Service Generally. Section 15A: Maternity leave: 12 weeks with full pay.

Chapter 276: The Minimum Wages and Conditions of Employment Act. Subsidiary Legislation: Section 3 – Minimum Wages and Conditions of Employment (General) Order. Order by the Minister Statutory Instrument 119 of 1997.

- Sick Leave: Paid sick leave at full pay during the first 3 months (with medical certificate from a registered medical practitioner or medical institution designated by the employer). Thereafter at

²⁹ United Nations Development Programme. 2007. "Legal Empowerment of the Poor – Labour Rights in Zambia. Accessed at: http://www.undp.org/legalempowerment/reports/National%20Consultation%20Reports/Country%20Files/26_Zambia/27_5_Labor_Rights.pdf.

half pay for the next 3 months. Female employee shall be granted leave of absence without loss of pay to enable her to nurse her sick child who has been hospitalized and shall not be deducted from the employee's accrued leave days.

- Maternity Leave: 90 days.

4. Severance Pay Requirements

The Minimum Wages and Conditions of Employment (General) Order, 1994 (MWG)

- Makes provision for employees whose services have been terminated to obtain severance pay benefits. Where workers in the private sector not covered by collective agreements are dismissed for operational reasons, under *clause 7* of the MWG, they are entitled to two weeks' pay for each complete year of service.

Minimum Wages and Conditions of Employment (Shop Workers) Order, 1994 (MWS)

- Workers employed in any shop or business or connected with the business of any shop, who are declared redundant after having served a minimum period of six months, are entitled to at least two months' notice and redundancy benefits of two months' pay for each completed year of service (*clause 14*, MWS).

5. Conditions for Dismissal (e.g., worker ability, redundancy, role of tenure)

Chapter 268: The Employment Act. Part IV: Oral Contracts of Services. Section 26B: Termination by redundancy.

- Employer shall provide notice of not less than 30 days to the representative of the employee and inform number of employees to be affected, and the period within which the termination is intended
- Employee shall be entitled to such redundancy payment as agreed, and shall be paid the redundancy benefits not later than the last day of duty of the employee. If employer cannot pay the redundancy benefits on the last day of duty of the employee, the employer shall continue to pay the employee full wages until the redundancy benefits are paid.
- Not applied to bankruptcy or compulsory liquidation employer, casual employee, fixed term employee, and employee on probation.

6. What Size Firm is Subject to Regulations?

Chapter 268: any person, or any firm, corporation or company, public authority or body of persons who or which has entered into a contract of service to employ any person, and includes any agent, representative, foreman or manager of such person, firm, corporation, company, public authority or body of persons who is placed in authority over such person employed;

Employment Act, Cap. 512 (EA) of 1965

- All firms. If they use daily paid workers they excluded from provisions regulating termination of employment under *sec. 19(iii)* of the EA, as are casual workers engaged for a short period. Moreover, an employer who has been declared bankrupt is exempted from the legal obligations in relation to termination of employment.

Year (and Month?) of Changes or Adjustments (Starting with most recent change)	Key Changes to Employment Protection Policy, Which Industries, Firms (size) or Population (Demographic) were Affected	References: Legal or Policy Documents, Official Memoranda, Policy Reports or Academic Papers
1997	Section 15, subsection 5 About pay wage for the accumulated leave of the Holidays that they did not take.	Amended by No. 28 of 1971 and Act No. 15 of 1997

Child Labor and Age Restrictions on Employment

The acts outlining employment protections, along with The Employment of Young Persons and Children Act, place employment restrictions on child labor and age. Though these acts have been ratified, child

labor is still widespread, particularly in the informal economy (United Nations Development Programme, 2007).

1. Minimum age for Employment?

Chapter 268: The Employment Act. Part III: Contracts of Service Generally. Section 12 Minimum contractual age is under the age of 15 years. (With some exception in subsection (3))

2. Restrictions on Activities for Employment of Underage Children?

Chapter 274: The Employment of Young Persons and Children Act. Part II: Employment of children.

- No child shall be employed in any public or private industrial undertaking or in any branch thereof.
- A child aged between 13-15 years may be lawfully engaged in light work. (Section 4A)
- Part III: Employment of Young Person. No person shall employ a young person under age of 16 years in an industrial undertaking, unless such young person is either (a) employed under a contract of apprenticeship, or (b) in possession of a certificate signed by a Labour Officer authorizing such employment.

3. Mandatory Retirement Age?

Chapter 276: The Minimum Wages and Conditions of Employment Act. Subsidiary Legislation: Section 3 – Minimum Wages and Conditions of Employment (General) Order. Order by the Minister Statutory Instrument 119 of 1997. Mandatory retirement age 55 years

Compensation and Benefits

The Minimum Wages and Conditions of Employment Act and the National Pension Scheme Act are the primary documents detailing compensation and benefits for Zambian workers. The Industrial and Labour Relations Act establishes parameters for collective bargaining.

1. Minimum Wage Requirements?

Chapter 276: The Minimum Wages and Conditions of Employment Act. Subsidiary Legislation: Section 3 – Minimum Wages and Conditions of Employment (General) Order. Order by the Minister Statutory Instrument 119 of 1997.

Chapter 276: The Minimum Wages and Conditions of Employment Act. Subsidiary Legislation: Section 3 – Minimum Wages and Conditions of Employment (Shop Workers) Order. Order by the Minister Statutory Instrument 120 of 1997.

2. Role of Unions/Organized Labor in Setting Wages (and differences across industries)

Wage setting in Zambia is conducted largely through the process of collective bargaining under the auspices of the Industrial and Labour Relations Act. Every employer employing not less than twenty five (25) employees and the trade union to which his employees belong are required to enter into a recognition agreement.

Collective bargaining as a means of establishing minimum wages and conditions of employment, and over 50% of the workforce in the formal sector are covered or affected by collective bargaining processes either directly or indirectly. That being said, the 1982 Minimum Wages and Conditions of Employment Act provides the State with residual power to determine minimum wages and other conditions of employment in cases where collective bargaining is not possible or effective.

There are two statutory wages determinations made under the Minimum Wages and Conditions of Employment Act covering shop workers (Statutory Instrument No. 3 of 2002), and a general determination (Statutory Instrument No. 2 of 2002). The general determination covers all employees except employees of the Government, local Councils, household domestic service, and more importantly employees in occupations where terms are regulated through the process of collective bargaining under the Act.

3. Overtime Requirements?

Chapter 276: The Minimum Wages and Conditions of Employment Act. Subsidiary Legislation: Section3 – Minimum Wages and Conditions of Employment (General) Order. Order by the Minister Statutory Instrument 119 of 1997.

- An employee who works in excess of 48 hours in a week shall be paid at 1.5 times the employee's hourly rate of pay (Not apply for a watchman or a guard.)
- An employee who works on a paid public holiday or on Sunday where a Sunday does not form a part of the normal working week shall be paid at 2 times the employee's hourly rate of pay (Not apply for a watchman or a guard.)
- To calculate the hourly rate of pay in a month, the actual amount received by the employee in basic wages for that month shall be divided by 208 hours.

4. Contributions to Pension, Disability Insurance, Unemployment Insurance Programs?

Chapter 256: The National Pension Scheme Act. Part IV: Contributions.

- Both employer and employee contribute to the pension Scheme at the prescribed percentage which is determined by actuarial valuation calculated to ascertain the financial sustainability of the Scheme.

Chapter 256: The National Pension Scheme Act. Part V: Benefits.

- The amount of retirement pension is based on the actuarial valuation calculated to ascertain that the Scheme is financially viable
- The minimum monthly pension shall be 20% of the national average earnings.

Year (and Month?) of Changes or Adjustments (Starting with most recent change)	Key Changes to Policies Governing Compensation and Benefits, Which Industries, Firms (size) or Population (Demographic) were Affected	References: Legal or Policy Documents, Official Memoranda, Policy Reports or Academic Papers
1997	Detail of minimum wage for different categories (under General order) and different grades (under Shop Workers) can be found in the reference.	Chapter 276: The Minimum Wages and Conditions of Employment Act. Subsidiary Legislation: Section3 – Minimum Wages and Conditions of Employment (General) Order. Order by the Minister Statutory Instrument 119 of 1997 and Section3 – Minimum Wages and Conditions of Employment (Shop Workers) Order. Order by the Minister Statutory Instrument 120 of 1997.
1995	Revocation of Statutory Instrument No. 171 of 1995. Check the Minimum Wages and Conditions of Employment (General) Order, 1995 for the changes.	

Occupational Health and Safety

Workplace safety; accident reporting and compensation; safety equipment requirements; and employee training in health and safety are outlined in the Workers' Compensation Act, the Occupational Health and Safety Act, the Factories Act, the Employment Act, and the Mines and Minerals Act.

1. Regulatory Agency Responsible for Workplace Safety?

Chapter 271: The Workers' Compensation Act. Part III: Administration.

- The Workers' Compensation Commissioner appointed by the Minister.
- The Workers' Compensation Fund Control Board which shall consist of a Chairman and not more than eleven other members. The Chairman and the other members shall be appointed by the Minister.

Occupational Health and Safety Act 2010

- established the Occupational Health and Safety Institute to regulate workplace safety
- Requires that work places with 10 or more employees must establish their own workplace health and safety committee

2. Requirements for Accident Compensation for Injured Employees?

Chapter 271: The Workers' Compensation Act. Part V: Right to Compensation.

- Compensation shall be paid by either the employer individually liable or the Commissioner.

3. Safety Equipment Requirements?

Chapter 441: The Factories Act

- Part VI Safety: General Provisions provides for requirements in regards to factory machinery, proper ventilation for fumes, precautions with explosives, and fire escapes.
- Part VII Safety: Lifting Machinery provides for requirements in regards to factory hoists and lifts, chains, ropes, cranes, and other lifting devices.
- Part VIII Safety: Steam Boilers, Etc provides for requirements in regards to factory boilers and air receivers.
- Part IX Welfare: General Provisions and Part X: Health, Safety, & Welfare: Special Provisions and Regulations provides for requirements in regards to general safety and welfare of workers.

Chapter 268: Employment Act, Part VI Housing and Welfare

- 42. Requires that there be adequate clean water available for employees
- 43. Requires that employers offer medical attention to employees who are ill or injured

Mines & Minerals Act

- Part IV Air Quality and Emission Standards requires that mines comply with all Occupational Health and Safety requirements, provide access to clean drinking water and have adequate ventilation
- Part VI: Storage, Handling & Processing Hazardous Materials requires proper storage and handling of hazardous materials

Occupational Health and Safety Act 2010

- establishes guidelines for building and providing safety equipment in the workplace.

4. Required Training on Health and Safety for Employees?

Chapter 441: The Factories Act, Part VI: General Safety Provisions

- 35. No person shall be employed at any machine or in any process, being a machine or process liable to cause bodily injury, unless he has been fully instructed as to the dangers likely to arise in connection therewith and the precautions to be observed, and- (a) has received a sufficient training in work at the machine or in the process; or (b) is under adequate supervision by a person who has a thorough knowledge and experience of the machine or process

Occupational Health & Safety Act 2010

- requires appropriate training and supervision on health and safety

5. Reporting Requirements for Serious Workplace Accidents?

Chapter 271: The Workers' Compensation Act. Part VII: Procedure for Obtaining Compensation.

- Employer shall report such accident to the Commissioner within 3 days after having gained knowledge of the happening of an accident to a workman.

Chapter 441: The Factories Act, Part XI: Notification and Investigation of Accidents, Dangerous Occurrences and Industrial Diseases

- Requires written notice to inspectors of any death, injury, or related disease that occurs within the factory, as soon as the proprietor finds out about the incident.

Occupational Health & Safety Act 2010 requires appropriate training and supervision on health and safety

Dispute Resolution

The rights of employers and employees when involved in a dispute are found in the Industrial and Labour Relations Act and proper arbitration procedures for dealing with disputes are briefly discussed in the Employment Act.

1. Existence of a Labor Relations Board to Resolve Disputes?

Chapter 269: The Industrial and Labour Relations Act. Part IX: Settlement of Collective Disputes.

- Labour Commissioner could request the Minister to appoint a conciliator for collective disputes that fail to agree within a period of 7 days from the date when the collective dispute arose.

Chapter 269: The Industrial and Labour Relations Act. Part X: Tripartite Consultative Labour Council.

- Consultative Labour Council consist of the Minister and such equal number of members representing the trade unions, the employers, and the Government, as the Minister may determine but the members shall not be less than 21.

2. Rights of Employees and Employers when Disputes Arise?

Chapter 269: The Industrial and Labour Relations Act. Part IX: Settlement of Collective Disputes.

- Employees could strike, and employers could lockout under unresolved collective dispute.

Chapter 269: The Industrial and Labour Relations Act. Part XII: General.

- There are some exceptions which they could not take part in strike or lockout in section 101. However, if they do, there are some penalties.

3. Procedures if Employee Alleges Unfair Dismissal?

Chapter 269: The Industrial and Labour Relations Act. Part XII: General.

- Employee may lay a complaint before the Court within 30 days of the occurrence. The court could extend to 3 months.

4. Arbitration Procedures?

Chapter 268: The Employment Act

- Part IV: whenever an employer or employee neglects or refuses to comply with the terms of any contract of service, or whenever any question, difference or dispute arises as to the rights or liabilities of any party to such contract or as to any misconduct, neglect or ill-treatment of any such party, or concerning any injury to the person or property of such party, the party aggrieved may report the matter to a labour officer, who shall thereupon take such steps as may seem to him to be expedient to effect a settlement between the parties and, in particular, shall encourage the use of collective bargaining facilities where applicable.

Year (and Month?) of Changes or Adjustments (Starting with most recent change)	Key Changes to Policies on Dispute Resolution, Which Industries, Firms (size) or Population (Demographic) were Affected	References: Legal or Policy Documents, Official Memoranda, Policy Reports or Academic Papers
1997	Penalties on taking part in strike or lockout under some exceptions	Amended by Act No. 13 of 1994

Appendix 7 References

Employment Protections (Firms Subject to Regulations): http://www.mac.co.zm/employment_act.htm

Severance pay requirements and what firms are subject to regulations from:

<http://www.ilo.org/public/english/dialogue/ifpdial/info/termination/countries/zambia.htm>

The role of unions in setting wages: <http://library.fes.de/pdf-files/bueros/sambia/50015.pdf>

Occupational Health and Safety information:

http://www.parliament.gov.zm/index.php?option=com_docman&task=cat_view&gid=135&Itemid=113

Chapter 268 The Employment Act:

http://www.mywage.org/zambia/pdf-files/6._chapter_268_employment_act.pdf

All others are from: <http://www.lexadin.nl/wlg/legis/nofr/oeur/lxwezam.htm#Labor%20Law>

Chapter 256 The National Pension Scheme Act:

<http://www.parliament.gov.zm/downloads/VOLUME%2015.pdf>

Act No: 40 of 1996

Act No: 9 of 2000

Chapter 268 The Employment Act :

<http://www.mlss.gov.zm/images/pdf/chapter%20268%20employment%20act.pdf>

Act No: 57 of 1965

Act No: 28 of 1971

Act No: 29 of 1975

Act No: 18 of 1982

Act No: 15 of 1989

Act No: 8 of 1989

Act No: 28 of 1992

Act No: 13 of 1994

Act No: 15 of 1997

Chapter 269 The Industrial and Labour Relations Act :

<http://www.mlss.gov.zm/images/pdf/chapter%20269%20industrial%20and%20labour%20relations%20act.pdf>

Act No: 27 of 1993

Act No: 13 of 1994

Act No: 30 of 1997

http://www.parliament.gov.zm/index.php?option=com_docman&task=doc_download&gid=368

Act No: 8 of 2008

Chapter 271 The Workers' Compensation Act:

<http://www.parliament.gov.zm/downloads/VOLUME%2015.pdf>

Act No: 65 of 1963

Act No: 22 of 1965

Act No: 4 of 1966

Act No: 37 of 1969

Government Notices

176 of 1964

467 of 1964

Act No: 499 of 1964

Statutory Instruments

156 of 1965

222 of 1969

Act No: 19 of 1973
Act No: 19 of 1976
Act No: 20 of 1979
Act No: 24 of 1982
Act No: 27 of 1994
Act No: 13 of 1994
Act No: 10 of 1999

Chapter 274 The Employment of Young Persons and Children to Implement the International Labour Organisation Convention on Minimum Age and International Labour Organisation on the Worst Forms of Child Labour Act:

<http://www.parliament.gov.zm/downloads/VOLUME%2015.pdf>

Act No: 10 of 1933
Act No: 18 of 1936
Act No: 40 of 1938
Act No: 49 of 1950
Act No: 47 of 1963
Act No: 36 of 1967
Act No: 14 of 1989
Act No: 4 of 1991
Act No: 13 of 1994
Act No: 10 of 2004
Government Notices
233 of 1964
499 of 1964

Chapter 276 The Minimum Wages and Conditions of Employment Act:

<http://www.mlss.gov.zm/images/pdf/chapter%20276%20minimum%20wages.pdf>

Act No: 25 of 1982
Act No: 13 of 1994
Statutory Instrument
119 of 1997
120 of 1997