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Employment Growth of Small, Medium, and Large Firms: Evidence from Zambia

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Abstract

We have used the World Bank Enterprise Survey data and examined the relationship between size, age and employment growth of 720 small, medium and large firms from four cities in Zambia. These firms have between 1-2010 full-time employees and operate in services, retail, and manufacturing sectors. The employment growth is defined as a difference in logarithm of full-time employees between two years and divided by the age of the firm. Our estimation shows that there is a strong relationship between employment growth, size, and age of firms. We find that younger firms but not smaller size are more important in creating employment growth.

Keywords: Employment growth, Firm size, Firm age, Zambia

1. Background and Literature

The World Bank identified three complementary objectives that should be attained to eradicate extreme poverty and inequality in Zambia (WB, 2017). These are to create more formal sector jobs; improve the productivity and earnings of informal jobs, such as those in smallholder farming; and connect vulnerable groups such as women and youth to better jobs. The formal sector absorbs less than 20% of Zambia's labour force and 42% of the population living in extreme poverty with average daily incomes of less than US $1 a day (ILO, 2016). In spite of its significant contribution to GDP, the formal sector is not only employing less but it is also growing at a slower pace as compared to the informal sectors. Between 2005 and 2012 the formal sector on average grew by 3% whereas the informal sector had an average growth rate of 14%. The Zambia Labour Force Survey estimates have also revealed that male employment in the formal economy accounts as big as 70% and the youth lack access to training and vocational guidance that match industry needs (LFS, 2012.)

Small, Medium, and Large formal enterprises are essential for the growth of Zambia's economy. The government of Zambia (GRZ) recognized the sector as major sources of employment and wealth creation and a basis for industrialization (MCTI, 2008). To expedite the growth of the sector, the government has introduced the Micro, Small and Medium Enterprise Development Policy. The policy document identified three focus areas for a ten-year implementation period. These are capacity development through entrepreneurship, innovation and technology development; improving access to market opportunities, business development services, business finance and infrastructure; and enhance the operating environment.

Growth in labour employment happens when jobs become more productive over time (Li & Rama, 2015.) More labour productivity results from an increase in the value that each employed person creates per unit of his/her input. The accumulated knowledge from education & experience, skills, and expertise that the average worker possesses is the major determinant of labour productivity and is recognized as human capital by economists. Technological change which is a combination of invention and innovation that enables to create more output or reduce labour-hour is the second determinant of labour productivity. Economies of scale is also considered as the third major factor that affects labour productivity. The Information and Communication Technology that created an increase in productivity in the mid-1990s in developed economies like the U.S. is considered by some economists as the fourth determinant of productivity.

Empirical findings have identified different factors affecting the employment growth of Small, Medium, and Large (SML) enterprises. Most found that there is a particular pattern, direct or inverse, of firm growth and factors like life cycle (age), size, sector type, location, skills level, and so forth. Employment growth measurement outcome depends on some key factors. The first is the relationship assumed (linear or non-linear) between employment growth and the independent variables in the analysis. The second factor is the time frame (number of years) considered. Firms are heterogeneous and they grow in different ways thus the pattern of growth in the short-term would not be the same as the long-term changes. The economy and the environment in which the firms are operating is the other factor. Firms in agrarian or minerals

extraction economy have different growth outcome than those in manufacturing and high-tech based economies.

We consider three time periods to estimate and compare results from a linear employment growth regression model. We define employment growth as a difference in logarithm of employment between two years. Both internal and external determinant factors of a firm's employment growth are taken into account.

The organization of the paper is as follows. In section 2 we present the model and describe the data. Results are discussed and assessed in section 3. Section 4 is for the conclusion.

2. Model and Data

2.1 Model

Employment growth, financial performance, profitability, or sales growth can measure the growth of SML enterprises. The employment growth is widely considered as vital for policy-making process as SML growth has been considered as a direct route to reducing unemployment (Robson & Robert, 2000).

Micro, small, and medium firms dominate the Zambian economy and are an important sector for the creation of jobs in Zambia (Gebremeskel, 2015). This paper attempted to assess the factors explaining employment growth for small, medium and large enterprises using regression techniques. We defined employment growth, like ((Ayyagari, Demirguc-Kunt, & Maksimovic, 2011) and Evans, 1987) as a difference in logarithm of employment between two periods and divided by the number of years between the two periods. The survey has compiled full-time employment data at the year of firm establishment, at the end of the fiscal year 2009, and at the end of the fiscal year 2012. This allows us to create two employment growth measures.

$$Employment\ \ growth1 = \frac{\ln(Employment_{2012}) - \ln(Employment_{2009})}{3} \quad (1)$$

$$Employment\ \ growth2 = \frac{\ln(Employment_{2012}) - \ln(Employment_{year\ of\ establishment})}{firm\ \ age} \quad (2)$$

The impact of firm specific and external factors on employment growth is tested using a multiple linear regression model which is described as follows:

$$FTEG_{it} = \ \beta_1 + \beta_2 emptstart + \beta_3 size + \beta_4 age + \beta_5 sector + \beta_6 location + \varepsilon_{it} \quad (3)$$

Where the dependent variable FTEG (full-time employment growth) is the natural logarithm of the difference in the number of full-time employees between two years for each firm, *empstart* is the natural logarithm of full-time employees at start-up year, *size* the size of the firm defined by number of employees, age is the number of years the firm exists in a business, sector is the type of business activity, location is the city where the firm is located, and $\boldsymbol{\varepsilon}$ is the disturbance tem.

2.2 Data

The data source used in this analysis is the World Bank Enterprises Survey for Zambia 2013. The WB Enterprises Survey is conducted globally by the World Bank. It was collected at the end of 2012 and beginning of 2013. Qualitative and quantitative information are collected through face-to-face interviews with firm managers and owners (WB, 2014). The data was collected from four cities namely Lusaka, Livingstone, Ndola & Kitwe and cover small, medium, and large companies. The total sample size was 720 and it comprised firms from manufacturing, services and retail sectors. The questionnaire asked questions in relation to regulation and taxes, corruption, crime, informality, gender, finance, infrastructure, innovation and technology, trade, workforce, firm characteristics, biggest obstacle, and performance. The workforce major questions were regarding the number of permanent skilled workers, the number of production workers and non-production workers, the number of full-time permanent workers, and the number of temporary workers.

3. Results

3.1 Descriptive Statistics

We make both the descriptive and regression analysis based on our dependent variable full-time permanent workers. First, we analyzed the full-time employment data, descriptively, by the size of firms and by type of sector across time. We also calculated the net job created and lost for the entire sample size.

Table 1. Employment by Size of Firms in 2009 and 2012

Size and number of establishments (2012)	**2009**		**2012**		**Change between 2009 and 2012**	
	Total	Mean	Total	Mean	Total	Mean (average increment)
Small (441)	4879	10.44	5,593	11.98	714 (28.31%)	1.54
Medium (209)	7,248	36.24	7,901	39.50	653(25.89%)	3.26
Large (70)	9,596	181.05	10,751	202.85	1,155 (45.8%)	21.8
All (720)	21723	30.17	24245	33.67	2522	3.5

Table 1 shows the total and average employment of the 720 establishments by firm size in the year 2009 and 2012. The size of the firms is defined in 2013 when the survey was conducted. The table reports that data were collected from 441 small, 209 medium, and 70 large enterprises. In 2009 the total number of full-time employees were 21,723 which grew to 24,245 by the year 2012. The net job created by all the firms is 2,522. Between the two years all the three types of firms, in aggregate, increased their employment with an average increase of 1.54 by small firms, an average of 3.26 by medium-size firms, and 21.8 by large firms. The larger increment (45.8%) registered by large firms. Figure 1 presents the comparison of full-time employment in 2009 and 2012 by small, medium and large firms.

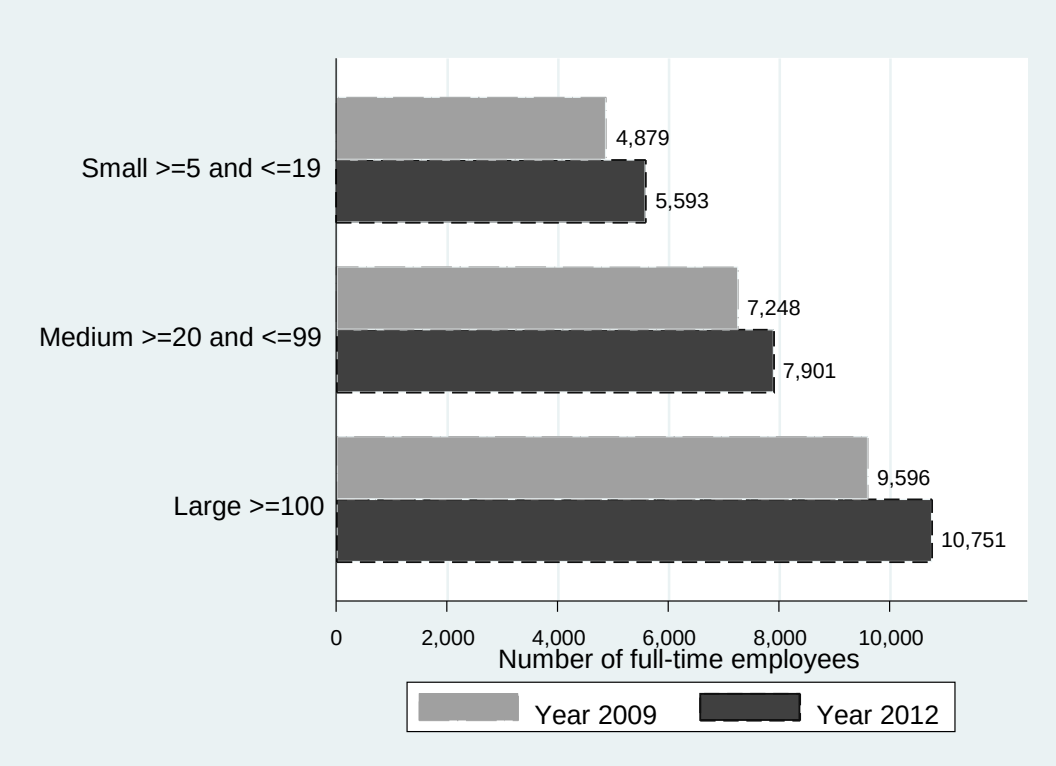

Figure 1. Total Full-Time Employment by Size in the Years 2009 and 2012

The World Bank Enterprise Survey classified the establishments as manufacturing, retail, and other services. Table A-1 reports the distribution of total and average employment between 2009 and 2012 by the type of firms. The table shows that out of the 720 firms 368 are manufacturing, 123 are retail, and the remaining 229 firms are services. Out of the 2,522 jobs created the majority (63.2%) is recorded by manufacturing firms with an average of 4.34 workers per firm. We further summarized the data by type of activity and size for the year 2012. Figure 2 below and Table A-2 in the appendix both show that our data is more represented by smaller firms. The figure presents the age distribution for firms and we observe that firms of age less than or equal to 10 are most represented. The small firms represent 57% of the manufacturing and 73% of both the services and retail sectors.

Table A-1. Total and Average Employment by Type of Firms in 2009 and 2012

Size and number of establishment	2009		2012		Change	
	Total	Mean	Total	Mean	Total	Mean (average increment)
Manufacturing (368)	12,810	34.80	14,404	39.14	1,594 (63.2%)	4.34
Retail (123)	2,214	18	2,592	21.07	378 (14.99%)	3.07
Other services (229)	6,699	29.25	7,249	31.65	550 (21.8%)	2.4
All (720)	21,723	30.17	24,245	33.67	2,522	

Table A-2. Employment by Sector and Size

Size of firms	Manufacturing			Services			Retail		
	Number of firms	Employment		Number of firms	Employment		Number of firms	Employment	
		Total	Mean		Total	Mean		Total	Mean
Small	210	2,269	10.8	167	2,314	13.8	90	1,010	11.22
Medium	126	5,351	42.46	45	1,648	36.6	29	902	31.1
Large	32	6,784	212	17	3,287	193.4	4	680	170

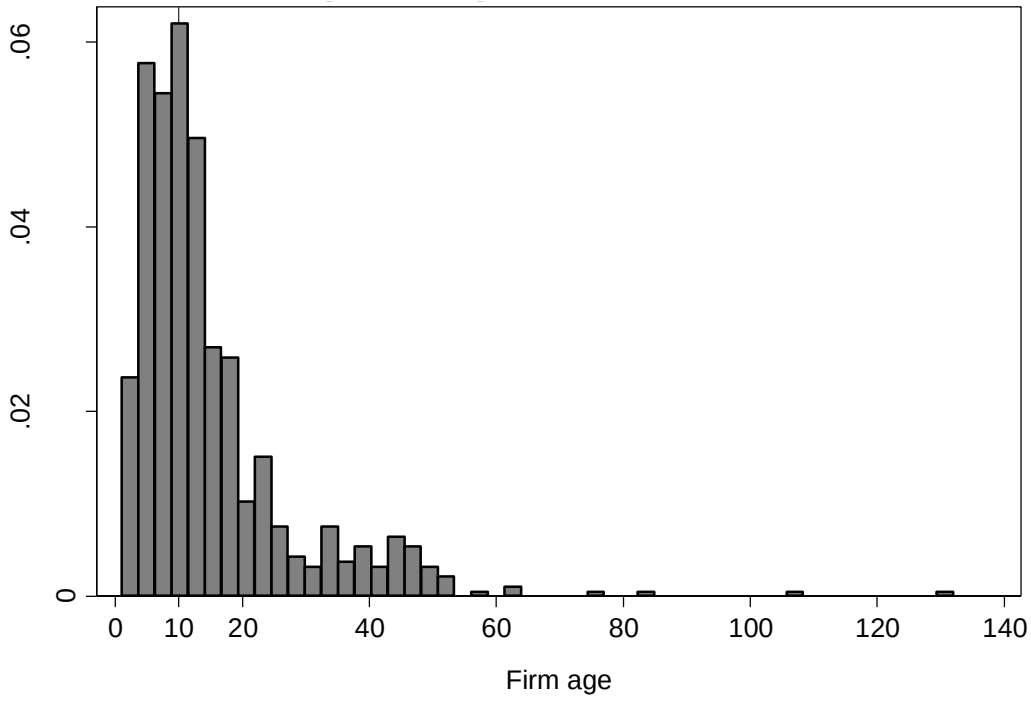

Figure 2. Age Distribution of Firms

Table A-3 reports the employment change by type and size of firms for two periods. Between 2009 and 2012, three hundred twenty seven (327) firms increased their employment of full-time workers. We further show that 131 firms increased their employment by 50% and more whereas 196 firms registered a less than 50% increase. One hundred (124) firms found that their employment in 2012 is less than what they had in 2009. The remaining 267 firms made no change in their employment. We use Table A-4 to estimate the change of employment growth we calculated growth rate for the year of establishment up to 2009 and 2009 up to 2013.

Table A-3. Employment Change for Three Periods by Sector and Size

Employment change between:	Manufacturing			Services			Retail		
	Small	Medium	Large	Small	Medium	Large	Small	Medium	Large
Establishment year – 2009	473	1,396	3,402	-1,099	948	1,900	438	509	395
2009 - 2012	247	416	931	269	111	170	198	126	54
Establishment year- 2012	720	1,812	4,333	-830	1,059	2,070	636	635	449

Table A-4. Employment Change between Establishment Years and 2012 by Sector, Size and Number of Firms

Employment change between establishment year and 2013	Manufacturing			Services			Retail			Total No of Firms
	Small	Medium	Large	Small	Medium	Large	Small	Medium	Large	
No change	36	13	2	30	4	3	17	5	0	110
Increase 50% and more	116	83	24	84	31	13	49	19	3	422
Increase less than 50%	25	11	2	33	3	0	16	3	1	94
Subtotal increase	141	94	26	117	34	13	65	22	4	516
Decrease 50% and more	1	0	0	3	0	0	0	0	0	4
Decrease less than 50%	32	19	4	17	7	1	8	2	0	90
Subtotal decrease	33	19	4	20	7	1	8	2	0	94

3.2 Regression Results

Our primary aim in this section is to understand the relationship between employment growth, size, age, sector and business location. Accordingly, we estimate an OLS regression of the form

$$logFTEG = f(logemployment\ at\ start\ up, age\ dummies, sector\ dummies, location\ dummies)$$

We define the dependent variable employment growth as described by equation (1) and (2) of section 2 of this paper. We control age with three categories: less than or equal to 5 years, greater than 5 and less than or equal to 10 years, and greater than 10 years (reference category). The sector has three dummies: manufacturing, services and retail (reference category). We also use location with four dummies: Lusaka, Kitwe, Ndola, and Livingstone (reference category).

Table 6. Employment Growth in Three Periods

	Dependent Variable			
	1		2	
	Employment growth2 (2009 – 2012)		Employment growth3 (at start-up – 2012)	
	Coef.	P value	Coef.	P value
Ln(size)	-0.0338	0.014	-0.0688	0.000
	(0.0137)		(0.0076)	
$Ln(size)^2$	0.0006	0.787	0.0034	0.014
	(0.0025)		(0.0013)	
Medium	0.0389	0.001	0.0800	0.00
	(0.0115)		(0.0063)	
Large	0.0694	0.000	0.1295	0.000
	(0.0198)		(0.0110)	
Age1 (<=5 years)	0.0266	0.040	0.0397	0.000
	(0.0129)		(0.0068)	
Age2 dummy (>5 and <=10 years)	0.0135	0.161	0.0236	0.000
	(0.0976)		(0.0054)	
_Cons	0.0806	0.000	0.1357	0.000
	(0.0172)		(0.0095)	
No of observations	592		614	
R squared	0.0658		0.3982	
Adj R squared	0.0563		0.3922	
F	(6, 585) 6.87		(6, 607) 66.94	
Prob > F	0.0000		0.0000	

Table 6 presents two OLS regression for two periods to examine if size, age, sector and location affect the employment growth. Column (1) shows the employment growth estimates between the years 2009 and 2013. Column (2) is used to measure between at start-up year employment to the year 2013. We used rreg and rregfit STATA commands for robust regression and measure of model fit.

The employment level at start-up is an important growth determinant variable (Almus and Nerlinger, 1999). Our regression estimation captures this variable as logarithm of the number of full-time employees at start up (ln(size)) and its square $(ln(size)^2)$ is also included to control for non-linear relationship. First the coefficient on employment start level is negative and statistically significant at 1% both periods. The negative sign indicates that those firms started

with few employees recorded higher employment growth than those firms started with more employees. This inverse relationship between firm size and growth implies relatively higher employment growth by small firms. Our finding is similar to Lawless (2013), Almus & Nerlinger (1999). Second, we found that the effect of size on employment growth is positive and statistically significant. Medium and large firms created more employment growth as compared to small-size firms. Third, the effect of a firm's age appears important for employment growth. Looking at the effect of age, we see a significant positive effect, specifically for the period start-up up to 2013, showing that young firms created more jobs as compared to older firms. All three findings suggest that younger firms but not smaller size are more important in creating employment growth.

Table 7. Employment Growth in Three Sectors

	Dependent variable – Employment growth3					
	Services		**Retail**		**Manufacturing**	
	Coef.	P value	Coef.	P value	Coef.	P value
Ln(size)	-0.1168	0.000	-0.0527	0.000	-0.0602	0.000
	(0.0176)		(0.0096)		(0.0091)	
$Ln(size)^2$	0.0109	0.001	-0.0002	0.966	0.0021	0.176
	(0.0032)		(0.0051)		(0.0016)	
Medium	0.0828	0.000	0.0882	0.000	0.0776	0.000
	(0.0132)		(0.0177)		(0.0078)	
Large	0.1496	0.000	0.0168	0.000	0.1186	0.000
	(0.0212)		(0.0424)		(0.0134)	
Age1	0.0402	0.001	0.0843	0.000	0.0261	0.006
	(0.0121)		(0.0190)		(0.0094)	
Age2	0.0319	0.003	0.0184	0.180	0.0223	0.003
	(0.0105)		(0.0136)		(0.0074)	
Cons	0.1371	0.000	0.1080	0.000	0.1157	0.000
	(0.0139)		(0.0176)		(0.0074)	
No of observations	195		102		317	
R squared	0.3985		0.3685		0.4527	
Adj R squared	0.3793		0.3286		0.4421	
F	(6,188)		(6, 95)		(6, 310)	
	20.76		9.24		42.73	
Prob > F	0.0000		0.0000		0.0000	

To assess variations in employment growth among different sectors, separate regressions for the three sectors 'Services', 'Retail', and 'Manufacturing' are conducted. The dependent variable is employment growth between start-up year and the year 2013. We repeat all the explanatory variables from Table 6 in Table 7 for comparison purposes. Most of the variables maintained their sign and statistical significance with minor changes. Irrespective of the type

of sector where the firm belongs, size and age remain determinant factors of employment growth. These findings are different from others like Geroski (1995) and Acs & Armington (2004) that new firms start-ups are not important for employment growth in manufacturing.

4. Conclusion

This paper aims to contribute to the analysis of the employment growth of firms in Zambia. The relationship between firm size, age, and employment growth is examined for 720 firms. These firms have 1 – 2010 full-time employees and operate in the cities of Lusaka, Livingstone, Ndola, and Kitwe. Micro, small, and medium firms dominate the Zambian economy and are an important sector for the creation of employment.

We use two periods of employment growth. The first is for the period between the firm's start-up year up to 2013 and the other is from 2009 up to 2013. We defined employment growth as a difference in logarithm of employment between two years and divided by the age of the firm. We estimate the regression models using OLS technique. In the estimation of the growth of employment, we control for factors like size, age and employment levels at start-up. Assessment of growth difference among sectors also considered with a separate regression estimation. Based on the sample data our results are as follows. First, we find evidence that the duration of the time period considered in employment growth measurement has an important effect. The coefficients for age are highly statistically significant for a longer period of growth measurement than the shorter period. Second, the hypothesis of firm size and employment growth are independent is rejected. The relationship is found to be negative and it indicates that higher employment growth is recorded by firms started with few workers. Third, Positive relationship between younger firms and employment growth is found. Fourth, irrespective of the type of sector where the firm belongs, size and age remain determinant factors of employment growth. Younger firms starting their business with few workers across all sectors generate proportionally more employment suggests that employment creation policies and supports by stakeholders should be directed to newly established small size firms.

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