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INFORMAL SECTOR EMPLOYMENT TRENDS: ANALYZING ZIMBABWE'S URBAN METAL INDUSTRY

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Abstract: *The informal sector plays a crucial role in the economic landscape of developing countries, contributing significantly to job creation, income generation, and poverty alleviation. In Zimbabwe, the informal sector witnessed notable growth during periods of economic upheaval, including the country's Economic Structural Adjustment Program (ESAP) and recent economic and political crises. ESAP was marked by widespread retrenchments in both the public and private sectors, while the more recent crisis led to a contraction in formal employment opportunities and a substantial decline in real wages, largely driven by hyperinflation. Consequently, the expansion of Zimbabwe's informal sector can be attributed to the diminishing formal employment prospects and the imperative to supplement formal incomes.*

Keywords: *Informal sector, Economic structural adjustment, Zimbabwe, Employment, Economic crisis*

1. Introduction

The importance of the informal sector to developing economies lies in the sector's contribution to job creation, income generation and poverty alleviation. In Zimbabwe, informal sector activities increased during the country's economic structural adjustment program (ESAP) and the recent economic and political crisis. While ESAP was characterized by retrenchments in the public and private sectors, the recent economic and political crisis was characterized by shrinking formal employment opportunities and a huge fall in real wages mainly due to hyperinflation. Hence, the expansion of Zimbabwe's informal sector can be attributed to the declining formal employment opportunities and the need to supplement formal incomes. Empirical evidence suggests that Zimbabwe's informal sector is now the biggest employer of labor (FinScope Study, 2012). In an attempt to formalize informal sector activities, Government has since taken steps to promote the informal sector. For example, in the 2014 National Budget, the Government proposed to decriminalize informal sector mining activities and extend financial support to the sector. The importance of the informal sector in employment creation and income generation requires policymakers' increased understanding of this sector. Hence, in order to have an in depth understanding of the informal sector employment behavior, this paper uses primary data collected under the International Development Research Centre (IDRC) sponsored project.

The study of informal labor demand is important for Zimbabwe which faces declining formal sector employment and a huge unemployment problem. The informal sector is therefore taking center stage in sustaining people's lives. It is important that policymakers know the determinants of informal sector employment which is important for stimulating employment. This paper also aims to increase our academic understanding of Zimbabwe's informal sector. The choice to study the metal sector was influenced by two major factors; first the historical importance of this sector to Zimbabwe's development and second the rapid expansion of informal activities in this sector. The development of the Zimbabwean economy during the pre-independence era and early years of independence was mainly a result of the contribution of the metal sector. The sector produced a wide range of production goods especially for the agriculture, mining and construction sectors. This paper has six sections. Following this introductory section, section two provides a brief review of the relevant literature. Section three discusses the theoretical framework and the empirical model. Section four looks at the study sample while section five presents the empirical results. Finally, section six concludes the paper with policy recommendations.

2. Literature Review

2.1. Theoretical Literature Review

There are two main competing theories in literature to the study of labor demand namely, the neoclassical and the Keynesian theories. The neoclassical approach argues that employment responds positively to output and negatively to wages. An important assumption underlying this approach is that wages are exogenously determined. Firms are price takers in the labor market with wages being determined by market forces. According to the neoclassical theory, both the output and labor markets are capable of reaching equilibrium through market forces. In the labor market factor inputs earn their marginal products. Unemployment is a result of the high wages caused by government and trade union intervention. The theory therefore identifies two key factors that influence the demand for labor, that is, the wage and output. The Keynesian approach on the other hand argues that employment is determined in the product market. This approach takes wages as endogenous. Keynesians argue that declining wages may lead to a decline in aggregate demand which then feeds into the employment. Thus, unemployment is a result of deficient demand in the product market. The Keynesian theory takes both the output and input markets as disequilibrium markets. Given the complexity of the Keynesian approach most studies of labor demand have tended to follow the neoclassical approach. The neoclassical approach has been applied to a number of labor demand studies in Zimbabwe (Kanyenze, 1993; Chifamba and Zant, 1994 and Zhou, 2001). The applicability of the neoclassical approach to the informal sector may be limited by the assumption that wages are exogenous. The reasons for this are discussed in section five.

2.2. Empirical Literature Review

There are numerous labor demand studies both from the developed and the developing world. A number of these studies have concentrated on labor demand in the formal sectors. In the developed economies, notable labor demand studies have been conducted by Nassim (1984),

Symons and Layard (1984), Symons (1985), Freeman and Medoff (1982), Hamermesh (1993), and Berman, Bound and Griliches (1994), among others. Generally, these studies agree that labor demand is positively related to output and negatively related to wages. Hamermesh (1993) provides a review of various empirical labor demand studies which concluded that estimates of constant output demand elasticities range between 0.2 and 0.4. On the other hand, the conditional labor demand elasticities ranged between -
0.15 and -0.75.

Developing country studies generally agree that output and wages influence labor demand. In Zimbabwe examples of such studies include Kanyenze (1993), Chifamba and Zant (1994), Zhou (2001) and Heshmati and Ncube (2003), among others. Chifamba and Zant (1994) studied the demand for both skilled and unskilled labor in Zimbabwe's manufacturing sector. Zhou (2001) makes a distinction between production and nonproduction labor in Zimbabwe's engineering industry. Heshmati and Ncube (2003) studied labor demand in Zimbabwe's manufacturing sector. Generally, these formal sector studies agree on the importance of output and wages in determining labor demand. Folawewo (2006) incorporated both worker and firm characteristics as explanatory variables in studying informal sector labor demand in Western Nigeria.[1] Not much is known about labor demand in Zimbabwe's informal sector. Informal sector studies have mainly been qualitative in nature (ILO/SATEP, 1984; GEMINI, 1991 and Mhone, 1993). These studies have tended to concentrate on identifying and analyzing the different types of labor used in Zimbabwe's informal sector. For example, Mhone (1993) identifies three types of labor used by Zimbabwe's informal sector in production that is, paid, unpaid and family labor.

3. Theoretical framework and empirical model

The labor demand model is specified assuming that employment decisions of each urban informal metal firm flows from its desire to maximize profits subject to its production technology. Hence, the theoretical framework for the firm's production technology is given by:

$$Q = f(L, K) \qquad (1)$$

where Q is output, L is labor and K is the capital stock. Labor is assumed to be homogenous. From equation 1, the following firm's short run labor demand function can be derived:

$$L^D \square\ L^D \square K, w/p \square \qquad (2)$$

where w and p are the wage rate and the product price, respectively. The easiest way of estimating this labor demand function is to postulate some functional form. In the long run, factor inputs, labor and capital are variable; hence the price of capital also becomes an important factor in the demand function.

[1] The survey data did not collect information on worker characteristics such as age, education, experience, etc.

Hence, the estimated empirical labor demand function for Zimbabwe's urban informal metal sector has output, wages, and capital price as explanatory variables. The estimated labor demand function is therefore given by:

$$Lab_i = \beta_0 + \beta_1 output_i + \beta_2 price\_lab_i + \beta_3 price\_cap_i + u_i \qquad (3)$$

where *Lab* is labor, *price lab* is the wage rate and *price cap* is the price of capital. The error term u_i is assumed to be identically and independently distributed, that is, $u_i \sim IID(0,\sigma_u^2)$. Theoretically, labor demand is positively and negatively related to output and the wage rate, respectively. In order to provide a robust estimation, equation (3) can be estimated using a robust ordinary least squares (OLS) technique which remedies the problem of heteroscedasticity.

In order to avoid the possible problem of endogeneity in equation (3), a simultaneous equation modelling approach can be applied. This involves estimating equation (3) simultaneously with a wage equation. The empirical wage equation model can be defined as:

$$price\_lab_i = \beta_0 + \beta_1 output_i + \beta_2 Lab_i + \beta_3 rent\_amount_i + e_i \qquad (4)$$

where *rent amount* is the amount paid for the use of premises and the remaining variables are as defined above. Equationa (3) and (4) can be simultaneously estimated using the three stage least squares (3SLS) technique. Estimations can be carried out using the STATA program.

4. The Study Sample

The data used in this study was collected from Zimbabwe's urban informal metal sector using an IDRC approved questionnaire. Since Zimbabwe has no register for informal firms, purposive sampling was used. Four urban areas namely Harare,[2] Bulawayo, Mutare and Rusape were purposively selected because of the large concentration of informal firms in these cities. The city authorities have designated areas for the operation of small and medium enterprises.[3] During the survey an attempt was made to cover all informal firms operating in the visited designated areas. In Harare, interviews were conducted in Mbare, Gazaland and Makoni business areas while in Mutare the visited areas included Sakubva and Dangamvura business areas. In Bulawayo, interviews were conducted in Renkin and Belmont business areas. Rusape has one major area, the bus terminus where informal firms are located. The data was collected by a group of enumerators[4] through face-to-face interviews. Table 1 summarizes the sample firm information.

Table 1: Sample firms by location

Location	Sample size	Percent

[2] For purposes of this study, Harare includes Chitungwiza.

[3] Although the firms operating in these areas are expected to be formally operating, these firms do not fulfill the conditions of formal firms in terms of registration/licensing and observation of labor laws and regulations.

[4] Enumerators were University of Zimbabwe postgraduate and undergraduate final year students from the faculties of Social Studies and Agriculture.

Harare	471	72.8
Bulawayo	96	14.8
Mutare	53	8.2
Rusape	27	4.2
Total	**647**	**100**

Interviews were conducted between January and March 2013. Information collected during the survey included the firm owners' background, employment and remuneration data, firms' pricing techniques, entrepreneurs' perceptions on stakeholders and the firms' constraints. The sample firms were mainly involved in metal fabrication and welding. The firms mainly produced building materials and farming equipment. Building material products included among others; window and door frames and gates while farming equipment included hoes, axes and scotch carts. Other common products included grinding mills, cooking utensils and braai stands.

The sample firms sourced their materials from both formal and informal sources. The business owners indicated that they have a diverse customer base. The majority (87.4%) of their customers were households and individuals. Other customers included formal enterprises (5.3%), the public sector (3.9%) and informal firms (3.4%). The information on sourcing of production materials and the customer base of the sample firms suggests linkages between formal and informal firms. This is very important for the growth of the Zimbabwean economy. Although the survey collected a wide range of information it is important to note that for purposes of this study, the section on employment and remuneration data has been selected for analysis.

5. Empirical Findings

5.1. Informal sector employment

The sample firms use three types of labor in the production process, namely owners, family labor and employees (see Table 2). These three categories can be further divided into paid and unpaid employees. The 647 sample firms had 1791 employees (including owners) of which only 1.9% was females. There was a marginal increase in the number of participants per firm from 2010 to 2012. This trend marginally declined in 2013. The average number of participants per firm was 2.77, 2.85, 2.75 and 2.74 in 2013, 2012, 2011 and 2010, respectively. Compared to previous studies, the results indicate an increase in the number of Zimbabweans involved in informal activities. Mhone (1993) reports the pre-ESAP and post-ESAP numbers of informal sector participants per firm as 1.27 and 1.35, respectively. The ILO/SATEP (1984) and GEMINI (1991) studies report that informal participants per enterprise were 2.6 and 1.83, respectively.

Table 2: Composition of Employment in Sample Firms 2010-13

Year	Sample size	Employee type	Males		Females		
			Paid	**Unpaid**	**Paid**	**Unpaid**	**Total**
2013	647	Owners	759	82	5	3	**849**
		Family members	307	34	7	2	**350**
		Employees	573	2	17	0	**592**

		Total	**1639**	**118**	**29**	**5**	**1791**
2012	639	Owners	760	69	7	0	**836**
		Family members	309	40	3	1	**353**
		Employees	628	2	5	0	**635**
		Total	**1697**	**111**	**15**	**1**	**1824**
2011	588	Owners	702	67	5	0	**774**
		Family members	277	35	4	0	**316**
		Employees	520	2	5	0	**527**
		Total	**1499**	**104**	**14**	**0**	**1617**
2010	509	Owners	616	56	5	0	**677**
		Family members	226	35	6	0	**267**
		Employees	450	0	4	0	**454**
		Total	**1292**	**91**	**15**	**0**	**1398**

The employment figures show a decline of 1.81% in 2013 from the 2012 figures despite the increase in the number of firms from 2012. While total employment declined in 2013, the share of women almost doubled despite its insignificant share in total labor. It was about 1% from 2010 to 2012 but rose to about 2% in 2013. The employment gender proportions were 98.1% males and 1.9% females in 2013; 99.1% males and 0.9% females in 2012 and 98.9% males and 1.1% in 2011 and 2010. Thus, labor demand in this sector is biased towards males.

Business owners formed the largest group of enterprise participants at 47.4%. The second largest group was employees. Employees comprised 33.1%, 34.8%, 32.6% and 32.5% of the labor force in 2013, 2012, 2011 and 2010, respectively. The increasing trend of the number of employees as a ratio of the total workforce was reversed in 2013. This can be attributed to the depressed business activities as the country was gearing up for the national elections. Unpaid employees constituted a very small proportion of total employees. The proportions of paid employees to total workforce were 99.7%, 99.7%, 99.6% and 100% in 2013, 2012, 2011 and 2010, respectively. In 2013, the ratio of family members to total labor force was 19.5%. This ratio which was 19.1% in 2010 indicates a marginal increase between 2010 and 2013. This may be an indication of the pressures on the households to get supplementary incomes.

Table 3 summarizes the employment descriptive statistics for the four-year period. There was not much variation in terms of the average employment levels from 2010 to 2013. Throughout the four-year period, the smallest firm employed one person. The largest firm employed 30, 35 and 40 persons in 2010, 2011 and 12, respectively. This trend was reversed in 2013.

Table 3: Employment descriptive statistics

Year	Sample size	Minimum	Average	Maximum
2013	647	1	2.8	15
2012	639	1	2.8	40

2011	588	1	2.7	35
2010	509	1	2.8	30

5.2 Econometric results

For estimation, only cross-sectional data for 2012 was used because the survey collected the output, and capital price data for 2012 only. All variables were obtained directly from the survey data. Out of the 647 firms, 435 firms gave complete data on all variables. The labor variable comprise all paid employees, that is, paid owners, paid family members and paid workers. The total wage bill for paid employees comprise the basic wage plus all other benefits. The price of labor was obtained by dividing the wage bill by the total number of paid employees. Output was taken to be the firms' production in US dollars. During the survey, owners gave estimates of the replacement value of their capital equipment. This was used as a proxy for the price of capital. The descriptive statistics for the variables are presented in Table 4. The data has huge variations. However, a standard deviation of 1.61 indicates small variations in labor data.

Table 4: Variables descriptive statistics

	Labor	Output	Price cap	Price lab
Observations	447	435	437	447
Mean	3.053691	19498.09	3367.414	2758.946
Maximum	15.00000	200000.0	100000.0	120000.0
Minimum	1.000000	700.0000	60.00000	40.00000
Std. Dev.	1.609049	22943.82	7679.623	6600.079

The ordinary least squares (OLS) results obtained after estimating equation (3) are presented in Table

5. The Breusch-Pagan test shows that the assumption of a homoskedastic variance of the error term is rejected at the 5% level of significance (see Appendix1).This problem was corrected using a robust technique. The labor demand equation was estimated as a non-logarithm linear function hence the coefficients measure the actual change in labor demand explained by a marginal change in explanatory variables.

Table 5: OLS Regression Results Dependent variable: Labor demand

Observations = 435	F(3, 431) =9.17	Prob > F = 0.0000	R-squared =0.1100	
Independent variable	**Coefficient**	**Standard error**	**t-statistic**	**p-value**
Output	0.0000175	0.00000470	3.71	0.000
Price lab	- 0.0000403	0.0000213	-1.89	0.059
Price cap	0.0000309	0.00000830	3.73	0.000
Intercept	2.7216500	0.11214700	24.27	0.000

There is a statistically significant association between labor demand and the explanatory variables as shown by the F-statistic. The F-statistic rejects the null hypothesis that the slope coefficients

are simultaneously equal to zero. Our model has the assumption that all three explanatory variables are exogeneous. The size of the coefficients are however questionable and may be indicative of an endogeneity problem. There are reasons to suggest that the exogeneity assumption for all three variables may not hold in the informal sector. For example, the informal sector draws labor from the formal sector, implying that the supply of labor for the informal sector may not be perfectly elastic. Out of the 524 firms that disclosed information on wage setting, the majority (52.7%) negotiated with their workers, 36.8% paid wages they considered beneficial to firm, 7.2% paid wages that were similar to their competitors, 2.1% used the official salary scale and only 1.2% used other methods. This suggests that wages are endogenous.

In order to deal with the possible endogeneity problem, we used the 3SLS technique and experimented with each of the explanatory variables as endogenous. To deal with the identification problem, more variables namely firm age, rent and two dummy variables[5] were added. Firm age and the two dummy variables turned out to be statistically insignificant. The final results that consider wages as endogenous are presented in Table 6 (see also Appendix 2).

Table 6: Three Stage Least Squares Results

Equation	Observations	RMSE	Chi-square	P-value
Labor demand	400	9.880506	1.91	0.5917
Wage equation	400	6960.187	30.23	0.0000
	Labor Demand equation			
Independent variable	**Coefficient**	**Standard error**	**z-statistic**	**p-value**
Price lab	-0.0015442	0.0015802	-0.98	0.328
Price cap	-0.0000707	0.0001242	-0.57	0.569
Output	0.0001519	0.0001421	1.07	0.285
Constant	4.6504130	2.1636060	2.15	0.032
	Wage equation			
Labor	-2509.423	1881.133	-1.33	0.182
Output	0.1199611	0.030894	3.88	0.000
Rent amount	10.06930	11.34215	0.89	0.375
Constant	6833.069	3919.159	1.74	0.081

In Table 6, both output and wage have the correct signs but are statistically insignificant. This confirms that labor demand in Zimbabwe's urban informal metal sector cannot be explained by contemporary economics. The labor demand equation's low Chi-square statistic (1.91) and its probability value of 59% reject the notion that labor demand is determined by wages, price of capital and output. In the wage equation, output is statistically significant at the 1% level. The results show that a unit increase in output increases wages by 0.12 units. The importance of the output variable in wage determination is also indicated by the Chi-square value of 30.23 with a

[5] During estimations we experimented with the location and government support variables.

probability of value 0%. This rejects the hypothesis that the slope coefficients of labor, output and rent are simultaneously equal to zero.

6. Conclusions and policy recommendations

The main objective of this paper was to investigate the determinants of labor demand in Zimbabwe's urban informal metal sector. The results allow us to make important conclusions about the production relations in Zimbabwe's urban informal metal sector. The descriptive statistics showed that to a large extent, Zimbabwe's urban informal metal firms rely on owners and paid employees for their labor.
Secondly, family members are an important component of labor. Finally, Zimbabwe's urban informal metal firms mainly rely on paid labor. The need to use family labor may be a clear indication of the need to reduce labor costs.

The econometric results suggest that when considering the informal sector, we should not pay much attention to the role of wages in employment determination. Employment determination in the informal sector is more complicated than what is suggested in formal sector studies. In the informal sector, wage labor assumes a variety of forms that do not conform to conventional wage labor. A large part of informal sector labor is derived from business owners. Hiring additional labor depends on demand fluctuations. Informal sector wages respond to productivity shocks and are therefore endogenous. Given that informal employment is not something that the Zimbabwean economy is likely to graduate from, the policymaker's challenge is how to increase informal employment. Increasing informal sector output increases wages and hence reduces poverty among workers. Policymakers can consider expanding informal employment by boosting markets for informal sector products. This may be done by encouraging the various government departments as well as private sector formal firms to source their products from the informal sector. Government may also assist informal sector firms establish export markets.

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Appendix 1: Heteroskedasticity Test

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of labour_dem

chi2(1) = 3.48

Prob > chi2 = 0.0622

Appendix 2: Estimation Results regress labour_dem price lab price cap output, robust

Linear regression Number of obs = 435
F(3, 431) = 9.17
Prob > F = 0.0000
R-squared = 0.1100
Root MSE = 1.5279

labour_dem	Robust Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
price lab	-.0000403	.0000213	-1.89	0.059	-.0000821	1.51e-06
price cap	.0000309	8.30e-06	3.73	0.000	.0000146	.0000472
output	.0000175	4.70e-06	3.71	0.000	8.22e-06	.0000267
_cons	2.72165	.112147	24.27	0.000	2.501227	2.942073

. reg3 (labour_dem = price lab price cap output) (price lab = labour_dem output rent_amo > nt)

Three-stage least-squares regression

Equation	Obs	Parms	RMSE	"R-sq"	chi2	P
labour_dem	400	3	9.880506	-35.3037	1.91	0.5917
price lab	400	3	6960.187	-0.0622	30.23	0.0000

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
labour_dem						
price lab	-.0015442	.0015802	-0.98	0.328	-.0046412	.0015529
price cap	-.0000707	.0001242	-0.57	0.569	-.0003141	.0001727
output	.0001519	.0001421	1.07	0.285	-.0001265	.0004303
_cons	4.650413	2.163606	2.15	0.032	.4098228	8.891004
price lab						
labour_dem	-2509.423	1881.133	-1.33	0.182	-6196.376	1177.531
output	.1199611	.0308943	3.88	0.000	.0594094	.1805128
rent amount	10.0693	11.34215	0.89	0.375	-12.1609	32.2995
_cons	6833.069	3919.159	1.74	0.081	-848.3418	14514.48

Endogenous variables: labour_dem price lab
Exogenous variables: price cap output rent_amount