Labour market segmentation and rent sharing in the formal and informal manufacturing sector in Zimbabwe

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Abstract

Labour market segmentation is broadly linked to poor job quality and inefficient allocation of resources. This study investigates the extent, type and sources of labour market segmentation within and between the formal and informal manufacturing sectors. The paper exploits the panel dimension of the formal and informal sector worker Matched Employer-Employee dataset collected between 2015 and 2018. The paper, first, use wage differentials between labour market subgroups to test for the extent and types of segmentation. The rent-sharing model is then used to test for the importance of profit-per-worker as a source of labour market segmentation. We find evidence of labour market segmentation between the regulated formal sector and the unregulated informal sector, with a conditional wage gap of 25 percent. The results also reveal segmentation between permanent and contract workers within the formal sector, but no evidence of wage differentials between contract and informal sector workers after controlling for human capital endowments. Further, a significant positive association between wages and profits-per-worker is estimated in the formal sector, suggesting that rent sharing is a source of labour market segmentation. This provides evidence suggesting that labour markets are segmented due to rigidities in labour market regulations and institutions that are associated with registered formal sector firms.

Keywords: labour segmentation, rent-sharing, manufacturing sector, wage gap, informality

1. Introduction

There is growing evidence suggesting that labour markets in developing and emerging economies are highly segmented as evidenced by the existence of wage differentials among labour market sectors (Fields, 1990; Pratap & Quintin, 2006; Kahyalar et al., 2018). The argument is that if the differences in the labour market outcomes, such as wages, cannot be fully accounted for by differences in worker productivity endowments then this indicates evidence against the hypothesis of competitive labour markets. [1]

This paper examines what causes labour market segmentation and along which delineation is it identified – this a contentious issue in current segmentation debate. Unlike developed economies, labour markets in emerging countries are characterised by the coexistence of formal and informal labour markets. Commonly, the literature argues that the coexistence of these markets reflects a segmentation of labour markets with low-wage informal workers and higher-wage regulated and protected formal sector workers (Gindling, 1991; Pratap & Quintin, 2006; Heintz & Posel, 2008; Günther & Launov, 2012). This paper, first, delineate workers along the regulated formal sector and the unregulated informal sector lens, thus highlighting regulations as a possible cause of segmentation.

Second, we argue that the scope of segmentation in emerging economies goes beyond the formal/informal divide. It is also possible that the average wage gap is driven by segmentation *within* a particular sector (e.g., between permanent and contract workers in the formal sector) and not primarily by differences between sectors. Such segmentation may be a result of labour markets institutions such as unions that delineates permanent and contract workers. Workers often also work in both sectors, as is the case in Zimbabwe, undermining the notion of two distinct and separate labour markets as emphasised by early literature (Doeringer & Piore, 1971; Thomas & Vallée, 1996; Leontaridi, 1998). Given the heterogeneity of workers, the productive characteristics of workers within each sector may differ, and this may explain the observed wage gaps.

We investigate segmentation within formal firms by looking at the permanent and contract workers segments. Further, the study identifies segmentation between the contract workers in the formal sector and the informal sector workers. The argument is that, although these forms of employment may not be governed by institutions such as unions, contract workers may earn

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[1] Labour market segmentation as a result of institutional and regulatory rigidity has been argued as one of the main sources of labour market inefficiencies that depresses employment growth and constrains adaptation of firms to business cycles (Kalleberg, 2003; Deakin, 2013).

higher wages due to regulations associated with being in registered firms in the formal sector. By analysing these different types of segmentation, the paper offers some insights on the importance of regulations and labour market institutions (associated with registered firms) in driving the wage gaps.

Using a matched employer-employee dataset for the formal and informal manufacturing sector in Zimbabwe, this study provides new empirical insights on the extent, types and sources of segmentation within and between the formal and informal manufacturing sector in an emerging economy. We test the hypothesis that the labour market is competitive and contrast it to alternative segmentation narratives. The analysis is based on the following research questions. Are labour markets within and between the formal and informal sector segmented in Zimbabwe and if so, why? How important is rent sharing as a source of segmentation within the formal sector?

Studying the extent and sources of labour market segmentation using our unique and new matched employer-employee dataset in Zimbabwe provides many insights. The data allows us to control for individual-level and firm-specific characteristics that may be associated with wage levels in labour markets. To deal with the *presence* of segmentation, the paper, therefore, draws on simple descriptive representations of the wage data, as well as econometric estimates, using the Recentered Influence Function (RIF) regression approach.

The second research question relates to a potential *source* of labour market segmentation. International literature has highlighted rent sharing as a key source of labour market segmentation (Blanchflower, Oswald & Sanfey, 1996; Hildreth & Oswald, 1997; Gürtzgen, 2009; Card et al., 2018). In these models bargaining between workers and owners over the sharing of rents at the firm level leads to a positive correlation between wages and firm profits, and the setting of wages above the competitive equilibrium, thus disapproving the competitive theories of labour markets.

Zimbabwe provides a suitable case study to analyse the above research questions in the context of emerging economies. First, Zimbabwe has a large informal sector labour market that coexists with the formal labour market. Hence, we can take into account the multiplicity of the labour markets within and between sectors. Second, Zimbabwe shares many common characteristics with other emerging economies such as the existence of distorted markets, the sectoral structure of employment and unionism. The results of this study can easily be generalised to other emerging economies.

In addressing the above questions, this study makes three contributions to the literature. First, it uses recent employer-employee matched survey data set on informal and formal manufacturing sector firms and employees. One of the challenges in the literature on the analysis of the wage gaps between the formal and the informal sector workers is the availability of comparable data set. Although most studies in the literature have acknowledged the importance of firm characteristics in explaining wage gaps, most of these studies have failed to control for firm characteristics due to the limitations of the data sets used (e.g., Gong and Van Soest, 2002). As such, in addition to individual characteristics, we are able to control for firm characteristics using our dataset. Further, our employer-employee matched data set provides a solid base to analyse the heterogeneous nature of the labour markets in emerging economies. Our results can thus be generalised to other developing countries where formal and informal labour markets coexist.

Second, the study makes some methodological contributions by using the recently developed econometric methods to test the existence of the wage gap. A large body of literature has used the Oaxaca-Blinder decomposition and the Mincerian model to test the existence of wage gaps. We expand this literature by employing the Recentered Influence Function (RIF) also known as the unconditional quantile regression approach. This provides a more comprehensive analysis and assessment of the earnings differentials within and between the formal and informal sectors.

The rest of the study is structured as follows: Section 2 presents the empirical literature review on sectorial wage differentials and rent-sharing. Section 3 discusses the data and empirical strategy. The discussion of the empirical findings is done in section 4 and section 5 provides the conclusion.

2. Literature Review

Differences in the theoretical formulations of segmentation have lent themselves to differences in criteria and methodology used to identify types and causes of segmentation. While the segmentation hypothesis is based on the notion that the labour markets are divided into two separate parts–the primary and the secondary segments (Doeringer and Piore, 1971), the literature does not contain any single testable empirical hypothesis for identifying the boundaries that separate the segments. Researchers have, therefore, resorted to using different criteria to identify the segments. In the context of emerging and developing economies, researchers have commonly tested the hypothesis that labour markets are segmented along the

regulated formal sector and the unregulated informal sector by exploring wage differentials between the two segments (Marcouiller, de Castilla & Woodruff, 1997; Maloney, 1999; El Badaoui, Strobl & Walsh, 2008; La Porta & Shleifer, 2014).

The general approach followed is to estimate a mincerian wage regression with an indicator variable that captures the wage gap. The approach allows one to identify the wage gap after controlling for a variety of factors that are thought to determine wages. These include human capital characteristics such as education, experience and age; job characteristics and firm characteristics such as firm size and industry. A significant coefficient on the indicator variable would imply a significant wage, thus highlighting the existence of labour market segmentation.

Other studies have extended this approach using the Oaxaca-Blinder decomposition technique that decomposes the wage gap into the explained and unexplained part at the mean. This approach allows the identification of the wage gap after controlling for worker characteristics. The relative importance of the unexplained component in explaining the wage is then used to confirm the existence of segmentation, where its significance implies segmentation.

The disadvantage of estimating the earnings gap at the mean is that important heterogeneity that may exist along the wage distribution may be concealed. An alternative approach to deal with this concern is the quantile regressions method. This method allows one to estimate the wage gap at each quantile along the wage distribution thereby giving more insights into the presence of a wage gap (Botelho & Ponczek, 2011; Nguyen, Nordman & Roubaud, 2013; Bargain & Kwenda, 2014).

One such approach is the recent RIF techniques by Fortin et al., (2011) that decompose the wage gap at each quantile. The method allows one to infer the contribution of each independent variable at different points of the wage distribution. The RIF decomposition answers the question of the extent to which wages differ if, for example, informal sector workers have the same characteristics as formal sector workers, thus providing the wage composition and structure effects. Again, the relative importance of the wage structure in explaining the wage gap is then used to confirm segmentation.

Different types of data sets have been used to analyse labour market segmentation. Commonly used datasets are the labour force and household datasets. For example, El Badaoui et al. (2008) in South Africa use the Labour Force Participation Survey panel data while Carneiro & Henley (2001) use the 1997 Brazilian household survey data. However, as argued by Gong and Van Soest (2002), Arai (2003) and Rand & Torm (2012) the key problem of using such data sets in

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analysing segmentation is that they fail to take into account the role of firm characteristics in the analysis of factors contributing to segmentation. To the extent that segmentation theories highlight institutional characteristics as the key factors in explaining labour market outcomes, studies relying on such datasets may provide biased results in explaining segmentation. An alternative approach, and one followed in this study, is to use employer-employee matched data that includes both worker and firm characteristics in order to provide a robust analysis.

In general, the above-reviewed literature presents evidence of wage differentials between the formal and informal sector workers, highlighting the existence of segmented labour markets. For example, Carneiro and Henley (2001), use the 1997 Brazilian household survey data to assess factors that determine the selection of workers into informal or formal employment and the impact of labour market factors on wages in the two sectors. Gong and van Soest (2002) for Mexico and Bargain & Kwenda (2014) for Brazil, Mexico and South Africa find similar results corroborating the existence of labour segmentation between the formal and informal sector. These studies are, however, criticised for not controlling for firm characteristics in determining the wage gap. Studies have generally shown a reduction in the wage gap once one controls for firm characteristics. For instance, Rand and Torm (2012) show that by adding firm characteristics the formal-informal wage gap in Vietnam is reduced from 17 percent to 10 percent.

This study is further related to the strand of literature that has tested the importance of rent sharing as a potential source of segmentation (Blanchflower, Oswald & Sanfey, 1996; Rusinek & Rycx, 2013; Matano & Naticchioni, 2017). Such literature argues that formal sector workers may earn higher wages than informal workers because of differences in institutional arrangements, such as unions and bargaining power, that influence wage-setting processes. This literature underscores the importance of demand-side (rather than supply-side) characteristics in determining wages, thus disapproving the competitive labour markets hypothesis. The importance of rent-sharing is formally tested using mincerian wage equations with the profit-per-worker as the main explanatory variable (Blanchflower, Oswald & Sanfey, 1996). A positive relationship between profit-per-worker and wages is then interpreted as indicative of rent sharing as a source of segmentation. The problem in the literature associated with the use of profits-per-worker is the treatment of firms with losses. To circumvent this issue, we follow conventional literature that has used sales-per-worker or value-added-per-worker (Nickell, Stephen & Wadhwani, 1990; Hildreth & Oswald, 1997; Margolis & Salvanes, 2001).

However, as highlighted by Blanchflower et al. (1996), the major problem in estimating rent-sharing models is the endogeneity of profits. Some studies have attempted to solve this problem by using instrumental variables (IV) models by finding an instrument for profits and running a 2SLS model or using advanced methods such as the GMM (Blanchflower, Oswald & Sanfey, 1996; Nickell & Andrews, 1983). Commonly used instruments in 2SLS estimations are values of the share of intermediates inputs costs to total output, amount of foreign borrowing per employee, cost of energy, capital-labour ratios and lagged values of profits-per-worker amongst other possible instruments (Blanchflower, Oswald & Sanfey, 1996; Teal, 1996; Card, Devicienti & Maida, 2013; Rusinek & Rycx, 2013; Matano & Naticchioni, 2017). Our study uses the cost of electricity as an instrument as it is readily available in our dataset.

Empirical evidence of rent-sharing as a source of wage differentials is still marginal for emerging economies. Such studies have been constrained by the unavailability of relevant datasets. Using matched employer-employee survey data with 200 firms collected in Ghana between 1991 and 1994, Teal (1995) tested a rent-sharing model for Ghana labour markets. The author found strong evidence supporting a positive correlation between firm profits and wages. Similar results regarding rent-sharing were found by Velenchik (1997) for Zimbabwe and Mazumdar and Mazaheri (1998) for Ghana, Kenya, Zambia and Zimbabwe using the RPED data set. Bigsten et al. (2003) used a matched employer-employee RPED data set for Cameroon, Ghana, Kenya and Zimbabwe to explore the impact of rent sharing and risk-sharing among other determinants of wage-setting in Zimbabwe.

To this end, the reviewed empirical literature above has analysed labour market segmentation by focusing more attention on either between the formal and informal sector divide or within formal sector industries. The assumption is that workers within these sectors have homogeneous characteristics (Pratap & Quintin, 2006; El Badaoui, Strobl & Walsh, 2008; Günther & Launov, 2012; Bargain & Kwenda, 2014). Emerging literature has critiqued this assumption by recognizing the heterogeneity of workers, not only across firms within a sector but also across workers within firms (Maloney, 1999; Fields, 2011; Cazes & de Laiglesia, 2015). Controlling for heterogeneity of workers within and between sectors (and firms) is thus a key consideration in empirically testing for labour market segmentation.

3. Data and Methodology

3.1. Data

The empirical analysis draws on the matched employer-employee survey data of Zimbabwean formal and informal manufacturing firms and workers that was collected between 2015 and 2018. A key attribute of this dataset is that we can control for both firm and worker heterogeneity in accounting for labour market segmentation. One of the weaknesses of the data is the limited number of observations (as compared to other studies in literature) due to the nature of the survey data used. The sample size is constrained by the low number of manufacturing firms in Zimbabwe. We acknowledge that the low sample size may affect the precision of the results. However, our sample is representative of the manufacturing sector and the effects of low sample size may have a limited impact on the precision of our estimates.

For the specifications between the formal and informal sectors, we restrict the sample for the formal sector to cover only small firms (those with less than 20 workers) for comparability with the informal sector, since there are no large informal sector firms. Thus, we look at segmentation between formal and informal within similar firm size categories, industries and regions. The aim is to find a comparable sample of firms to test whether wages differ. Adjusting the sample provides us with a sample of 346 formal workers out of the initial sample of 1384, with the initial sample of the informal workers remaining unchanged at 264. The same sample restrictions also apply for the contract workers vs informal workers specifications. In this case, we are left with 202 contract workers and 264 informal workers. For within-sector specifications, there is no need for sample restrictions as we need the full variation in firm size.

The dependent variable used in the analysis is the individual hourly wage. Using hourly wages (rather than monthly) offers plausible comparability of wages across workers who work different time units. This is particularly important as most informal workers work on piece rates. The questionnaire has information on the wages a worker is supposed to earn according to position and grade of employment after taxes. In several instances, due to the economic challenges affecting firms, workers are paid less than what they are supposed to be paid. Hence, in addition to contractual wages, the questionnaire includes questions on the actual wage that the worker received net of taxes. In the wage variable we also take into account non-monetary wages workers receive in the form of allowances such as food, transport, airtime and pension contributions among others. Thus, our wage variable is measured as net after-tax income and it includes non-monetary contributions, allowances and pension payments. The advantage of

reporting wages net of taxes is that we do not have the problem of overestimation of the formal sector wages that are subject to taxes. Other key variables are grouped into four categories: Human capital; Individual worker characteristics; Firm characteristics and Job characteristics.

Human capital includes education, experience and training. To account for a potential non-linear relationship between education and wages, which is common amongst developing countries (Keswell & Poswell, 2004; Card, 1999), education is categorised as 1. Primary education, 2. Secondary education and 3. Tertiary education. Experience is measured as the years of experience before starting to work at the current place of work.

Individual workers' characteristics include gender, marital status and age. Gender is a dummy variable that is coded 1 if a worker is a male and zero otherwise. Marital status is also a dummy variable coded 1 if a worker is married and zero otherwise. Marital status has also been included in the literature to control workers' productivity. The idea is that employers perceive married workers as motivated, stable and disciplined and hence more productive (Benham, 1974; Cohen & Haberfeld, 1991). Further, we control for individual age, including the square of age to account for non-linear effects.

Firm characteristics comprise firm size, firm age, firm industry and firm location. Firm size is a categorical variable that indicates if an employee works in a firm with between 1 and 4 employees, between 5 and 20, between 21 and 100 and at least 101.

Job characteristics include job allowance (1=yes and 0 otherwise), work type (1=permanent and zero otherwise) and union (1=yes and 0 otherwise). Job allowance refers to benefit allowances that are given to workers in addition to their wages. These, for example, include food, transport, and housing allowance among others.

Table 1 presents the summary statistics for the key variables used in our analysis for the earnings differentials within and between the formal and informal manufacturing sectors. On average, formal sector workers (permanent and contract) earn higher wages compared to informal sector wage earners. The mean log wage for permanent workers is 0.49 log points and 0.19 log points for contract workers in the formal sector. In contrast, the mean log wage for informal workers is -0.16 log points.

In Table 1 we also see that, compared to informal sector workers, formal sector workers are more educated, have more experience, are older, are more likely to receive job allowances, and are paid their wages per time period. Workers in the manufacturing sector are

disproportionately male, with no discernible difference across formal and informal sectors. Formal sector employees work fewer hours per week, but this difference is more than offset by the wage difference, implying higher weekly earnings for formal sector workers.

Table 1. Pooled summary statistics on key variables for the period 2015 -2016 for the formal sector and 2015-2018 for the informal sector.

Variable	Formal Sector						Informal sector	
	(1)		(2)		(3)		(4)	
	Overall		Permanent		Contract		Overall	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Hourly wages (log US dollars)	0.39	0.64	0.49	0.62	0.19	0.63	-0.16	0.78
Education Level								
1. Primary (share)	0.07	0.26	0.09	0.28	0.05	0.22	0.03	0.21
2. Secondary (share)	0.78	0.41	0.75	0.44	0.86	0.35	0.89	0.38
3. Tertiary (share)	0.15	0.35	0.17	0.37	0.09	0.29	0.07	0.33
Experience (years)	5.88	7.43	6.01	7.49	5.56	7.26	3.30	4.21
Age (years)	42.66	11.22	44.30	10.58	39.15	11.80	30.55	9.27
Gender (share male)	0.83	0.38	0.86	0.34	0.76	0.43	0.84	0.37
Married (share)	0.90	0.30	0.92	0.28	0.86	0.35	0.76	0.33
Weekly hours of work	44.08	5.11	44.05	5.27	44.07	4.88	48.08	12.10
Methods of Payment								
1. Per time period (share)	0.96	0.18	0.97	0.17	0.96	0.19	0.47	0.43
2. Piece rate (share)	0.01	0.09	0.01	0.08	0.01	0.11	0.32	0.31
3. % of firm sales (share)	0.02	0.13	0.01	0.12	0.02	0.14	0.16	0.48
4. Commission (share)	0.01	0.09	0.01	0.10	0.01	0.08	0.05	0.15
Job allowance (share)	0.59	0.49	0.63	0.48	0.49	0.50	0.22	0.41
Union membership (share)	0.43	0.50	0.48	0.50	0.32	0.47	0.00	0.00
Other jobs (share)	0.31	0.46	0.28	0.45	0.35	0.48	0.14	0.35
N	1054		711		343		323	

Notes: Computed from our pooled employer-employee dataset. Presents summary statistics for the key variables used as explanatory variables in the analysis after taking into account overlapping missing data.

Identifying Heterogeneity of Labour Market Segmentation

While the summary statistics in Table 1 show average wage differentials across labour segments, some distributional comparisons provide some more insights. In Figure 1, we present the kernel densities for the comparisons of the wage distributions between various labour market segments. Panel A provides the wage distributions for the formal and informal sector workers. The distributions reveal that the informal sector wage distribution is to the left of the formal sector wage distribution, implying a higher probability that an informal sector

worker has a lower wage than their formal counterpart. This indicates the possible presence of between-sector segmentation. However, we also note a wide distribution of wages in both sectors, with a substantial overlap in the density functions. The implication is heterogeneity among workers within and between the informal and formal sectors. To more tightly test the segmentation hypothesis, these characteristics need to be controlled for.

Panel B and C compare the wage distributions of permanent and contract workers within the formal sector, and formal contract workers and informal workers. The density functions reveal that contract workers tend to earn lower wages than their permanent counterparts, while informal workers earn lower wages than formal contract workers.

Figure 1. Wage distributions within and between the formal and informal sector
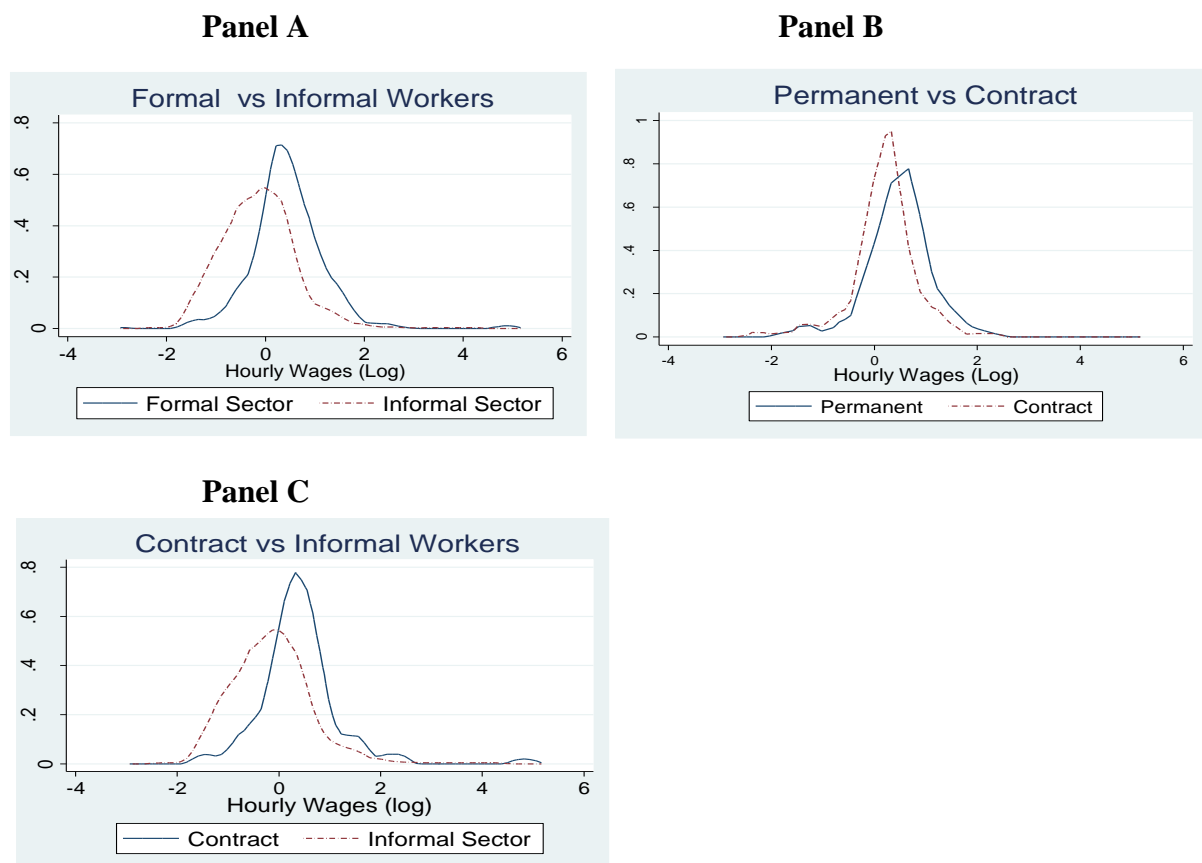
Notes: Differences in hourly wages between labour market segments. Hourly wages are in logs. The dashed line represents informal wage, contract and tiers in Panels A, B, and C. Panel A and C shows wage differences between sectors, while Panel B shows the difference within sectors. In Panel A and C we have restricted the sample for formal firms to include only those with less than 20 workers for plausible comparability.

These results are consistent with the presence of labour market segmentation within the formal sector and between the formal contract labour market and the informal sector. Once again, there is a wide distribution of wages within each category.

Relationship between Firm Profits and Wages

The rent-sharing model predicts that wages will be positively correlated with firm profits. To assess the consistency of the data with this hypothesis, Figure 2 plots individual wages against firm value-added per worker, a proxy for profit-per-worker.

Figure 2 reveals no significant relationship between firm profits-per-worker and individual wages in both the formal and informal sectors. If anything, the positive relationship appears to be weaker in the formal sector, contrary to expectations given the rigidities in laying off workers in that sector. However, the scatter plot reveals substantial variation in wages and profits across firms. Other confounding factors may thus be present, obscuring the relationship between wages and firm profits. The next section, therefore, conducts more rigorous econometric testing of the wage segmentation hypothesis, while controlling for individual and firm characteristics.

Figure 2. Relationship between value added-per-worker and wages
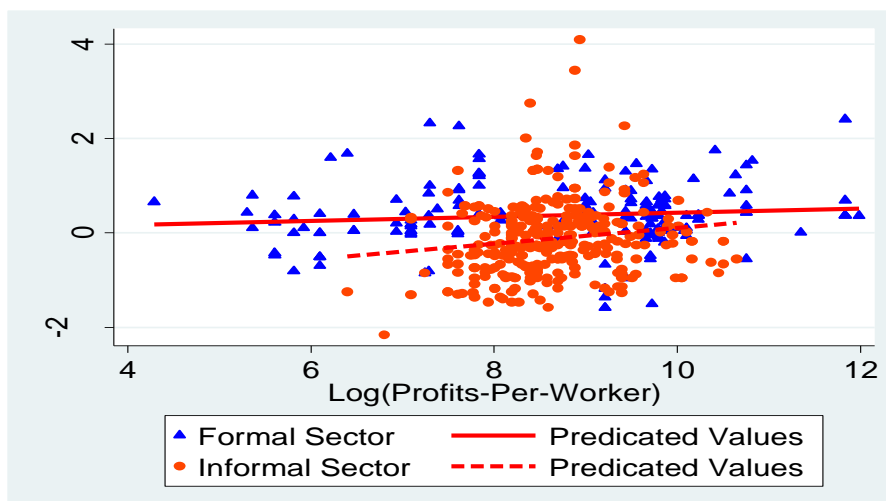
Notes: Scatter plot on the relationship between profits-per-worker and wages. Profits-per-worker is proxied by value-added per worker. All variables are in logs. The triangle scatters and solid fitted line represent the formal sector while the circle scatters and dotted fitted line represents the informal sector.

3.2. Estimation Strategy

The estimation strategy is twofold. First, we explore the extent to which the labour markets are segmented in Zimbabwe by estimating the wage gap between segments. This allows us to answer our first research question. Secondly, we incorporate the rent-sharing model discussed in the preceding section to analyse the extent to which differences in bargaining powers amongst labour market subgroups account for segmentation. This allows us to answer our second research question. To provide robust analysis, we complement our models with the Re-centred Influence Function (RIF) decomposition technique. This allows us to perform an in-depth analysis of the extent and sources of labour market segmentation along the wage distribution.

To estimate the wage gap within and between the formal and informal sectors, we use the standard OLS wage regression with an indicator dummy variable that captures different labour market segments. The base or unadjusted earnings gap can be derived from estimating the below baseline wage regression model;

$$logW_{ij} = \delta + \beta_1 D_i + \xi_{ij} \tag{1}$$

where $logW_{ij}$ is the logarithm of hourly wages for worker i in firm j, δ is the intercept, D_i is an indicator dummy variable that indicates a worker's segment of employment, β_1 is the coefficient of importance that depicts the 'raw' wage gap, and ξ_i is the error term. A significant coefficient β_1 is indicative of the presence of labour market segmentation.

Although equation (1) is useful for estimating the wage gap, its weakness is that we do not know what accounts for that wage gap. As such, we expand equation (1) to control for other individual and firm variables that explain differences in wages for different types of segmentation. The resulting specifications are shown in equations (2) – (5). First, equation (2) shows the specification for the between sector segmentation, that is formal vs informal sector:

$$logW_{ij} = \alpha + \beta_1 Informal_i + X_i'\gamma + Z_j'\theta + \zeta_{ij} \tag{2}$$

where $logW_{ij}$, is the logarithm of hourly wages for worker i in firm j, $Informal_i$ is a dummy variable coded 1 if an employee works in the informal sector, X_i denotes a vector of individual, job and human capital characteristics for worker i, Z_j denotes the vector of firm industry and location dummies and ζ_{ij} is the error term. The coefficient β_1 captures the wage gap between

formal and informal sector workers after controlling for other determinants of wages. If β_1 is negative and statistically significant, then the segmented labour market theory is confirmed.

Second, we test for the presence of wage gaps between contract and permanent workers within firms in the formal sector. The specification is presented as follows:

$$logW_{ij} = \alpha_2 + \beta_2 Contract_i + X_i'\gamma + Z_j'\theta + \lambda_j + \eta_{ij} \qquad (3)$$

where $logW_{ij}, X_i$ and Z_j are defined as in equation (2), $Contract$ is a dummy variable coded 1 if a one is a contract worker and zero if is a permanent worker, λ_j are firm fixed effects (FE) and η_{ij} is the error term. β_2 signifies the presence of the wage gap between the contract and permanent workers. Equation (3) is used to test the hypothesis that there is segmentation within firms in the formal sector.

Lastly, we test the presence of the wage gap between contract workers in the formal sector and informal wage workers. We can think about short-term contract workers as a form of 'informalisation' within the formal sector. Thus, the need to compare contract formal sector workers with informal sector workers. The model is specified in equation (4),

$$logW_{ij} = \alpha_3 + \beta_3 Informal\_contr_i + X_i'\gamma + Z_j'\theta + \epsilon_{ij} \qquad (4)$$

where $logW_i, X_i$ and Z_j are defined as in equation (2), $Informal\_contr$ is an indicator variable coded 1 if the one is an informal sector worker and zero if is a contract worker in the formal sector. We hypothesise that there is cross-sector labour market segmentation. β_3 indicate the wage gap between the contract and informal sector workers. The sample firms are also restricted to small firms (employing fewer than 20 workers).

The second part of the analysis tests for the importance of rent-sharing, a source of segmentation within formal sector firms. We follow the theoretical model of Blanchflower et al. (1996) as applied by Rycx & Tojerow (2004). We are interested in the importance of profit-per-worker in explaining segmentation within the formal sector. We hypothesise that there is a positive association between wages and profit-per-worker in the formal sector and that this should be higher for unionised or permanent workers as they have higher bargaining power. To test this, we estimate the equation specified below.

$$logW_{ijt} = \delta_0 + \delta_1 \frac{\pi}{n_{jt-1}} + \delta_2 \left(\frac{\pi}{n_{jt-1}} \times Bargaining_{jt0} \right) + \delta_3 Bargaining_{jt0} + Z_{jt0}'\theta + X_i'\gamma +$$

$$\eta_{ij} \qquad\qquad (5)$$

where $logW_{ijt}$, , is the logarithm of hourly wages for worker i in firm j in period t, Z_{jt0} is a vector of firm characteristics in the base period and X_i is a vector of human capital, individual and $Bargaining_{jt0}$ represents the bargaining power of workers in the firm. We proxy it by three variables available in our data: the share of union workers in the firm, the share of permanent workers, and individual employee working status (permanent vs contract). Our coefficients of interest are δ_1, δ_2 and δ_3.

Theoretically, we expect a positive coefficient of profits per worker (δ_1). This shows that an increase in profits is associated with an increase in wages, ceteris paribus implying that workers have strong bargaining power, thus suggesting rent-sharing. This would imply that beyond human capital endowments and job characteristics, other non-market or institutional mechanisms explain wage differentials and thus provide evidence of segmented labour markets. A negative coefficient, on the other hand, implies that an increase in firm profits is associated with a decrease in wages, hence highlighting the importance of firm monopsony power in setting wages. Again, this provides evidence of segmentation. Hence, a significant association between profits and wages confirms non-competitive labour markets. δ_2 shows whether the effects of the rent-sharing differ between the firms with workers strong and weak bargaining powers. Theoretically, we expect δ_2 to be positive, indicating that the association between wages and profit will be stronger in firms where workers have higher bargaining power (Hildreth & Oswald, 1997). δ_3 is also expected to be positive – firms with larger union workers or permanent worker share are associated with workers with strong bargaining power in negotiating for wages. The inclusion of bargaining could control for selection – unions establish in firms with high profits.

To further characterise the segmentation, this paper uses the RIF decomposition technique as proposed by Fortin, Lemieux & Firpo et al. (2011). The RIF is a quantile regression-based technique used to estimate and decompose the wage gap between two groups and it allows one to determine the part of the wage distribution where segmentation is high. Methods that estimate the wage gap at the mean may conceal important information in characterising segmentation, as its extent may vary along the wage distribution.

In contrast to the OLS methods of estimating the wage gap, the RIF decomposition compares, for example, the informal sector wage distribution to the reweighted informal sector wage distribution that mimics the formal sector wage distribution, and this allows us to get the composition effects of the wage gap. Further, it compares the formal sector wage distribution

to a reweighted informal sector wage distribution, and this allows us to obtain the wage structure effect of the wage gap. If the part of the wage gap explained by the wage structure (unexplained part) is more than half, then evidence of labour market segmentation holds.

One reason we may wish to implement the RIF and look at the wage distribution is that labour market regulations may be more binding for low-wage workers (Squire & Suthiwart-Narueput, 1997; Bazen, 2000).

The results are reported based on the 10th, 50th and 90th quantiles. The key advantage of the RIF approach, as mentioned by Firpo, Fortin and Lemieux (2018), is that the reweighting provides a consistent nonparametric estimate of the counterfactual distribution based on the ignorability assumption and overlapping support[2]. See Fortin, Lemieux & Firpo et al. (2011) for details of the RIF decomposition specifications.

In estimating equation (5), one needs to be cautious about the endogeneity of profits (and other covariates). Endogeneity may, for example, arise in cases where firms offer efficient wages to increase workers' productivity, which in turn increases firm profits. This implies that wages determine firm profits and not vice versa. Under such a scenario, the coefficient of profits-per-employee estimated using OLS will be biased downwards. Further, a product market shock may also affect labour productivity and firm profitability concurrently. Blanchflower et al (1996) proposed two ways to deal with the problem. The first is to regress wages on the lagged value of profit-per-worker measures (Rusinek & Rycx, 2013; Matano & Naticchioni, 2017). The second is to find a plausible instrumental variable that is correlated with profits-per-employee but not wages. In reality, it is difficult to find such an instrument. Thus, this study attempts to solve this problem by first proxying profit-per-worker with lagged values of the sales-per-worker, then using the cost of electricity as instruments (Blanchflower et al., 1996). We have established that there is a strong correlation between lagged sales per worker and profits per worker, making lagged sales per worker a credible proxy (see Table A3 in the appendix for the correlation results).

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2 The ignorability assumption specifies that the distribution of the unobserved variables is the wage model is the same across the informal and formal sectors after controlling for productivity observed characteristics. The overlapping support assumption requires that every independent variable should have values for every member group.

One of the major issues when decomposing the wage gap using non-experimental data between two groups is selection bias[3].

4. Empirical Results

This section uses the empirical methods discussed in the prior section to more rigorously test for the extent and sources of labour market segmentation in Zimbabwean manufacturing. First, we test for the significance of the wage gaps between and within the formal and informal sector segments. We then estimate the conditional relationship between wages and profit-per-worker.

4.1. Wage Gaps

Table 2 presents the results where we pool the formal and informal data and regress wages on a dummy variable for informal worker status. Column (1) presents the baseline results that exclude controls. The results reveal a significant (at 1 % level) wage gap of -51 log points (or 40 percent)[4].

To control for the human capital of the worker, column (2) includes controls for education, experience and training. The wage gap falls to -35.9 log points, reflecting the higher human capital endowment of workers in the formal sector, but it remains significant at the 1 percent level. In column (3) additional controls for job characteristics, industry and location are included. The coefficient remains significant but falls further to -24.8 log points, implying a 22 percent wage deficit for informal workers.

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3 In this study, the selection bias is a result of self-selection of workers into a particular sector (e.g., formal or informal) of employment. People with certain characteristics or attributes may systematically self-select themselves either the formal or informal sector, such that the choice of a sector is systematic. An example is when poorly educated people systematically choose to work in the informal sector. Controlling for selection bias may be necessary for identification of the composition and the wage structure effects. To account for possible selection bias, the conventional method in literature is to use the Heckman two-stage selection model. The procedure requires the inclusion of a valid instrument explaining formal-informal employment selection, but not wages. To be valid, the instrument should be correlated with participation decision in either the formal and informal sector and uncorrelated with the wages. It is, however, acknowledged in the literature that finding such an instrument is difficult (Casale & Posel, 2011). The use of inappropriate exclusion instruments may generate identification problems such as collinearity and high standard errors. Further, the selection procedure may lead to measurement errors, given that the expected value of the error term is used in the second stage of the procedure. Burger & Walters (2008) also argue that the selection methods are sensitive to heteroskedasticity, and the validity of the distribution assumptions discussed in the above section. It is still a contentious issue in the literature on how best to tackle the issue of the exclusion variable problem (Pratap & Quintin, 2006; Casale & Posel, 2011). Thus, given these shortfalls, our inability to find plausible exclusion variables and lack of alternative methods to deal with the exclusion variable in literature, we do not correct for the selection bias in this paper. However, we acknowledge that this may bias our results, and that the direction of the bias is difficult to predict.
4 Calculated as exp(beta)-1.

According to the competitive theories of labour markets, earning differentials should be exclusively explained by differences in human capital endowments. The fact that we observe a huge wage gap after controlling for human capital, individual, job firm industry and location dummies is the first indication that the labour markets in Zimbabwe are segmented, and the extent of segmentation is quite high.

Table 2. The wage gap between the formal and informal manufacturing sector workers

VARIABLES	(1) Baseline	(2) +Human Capital	(4) +Industry and location
1.Informality	-0.514***	-0.359***	-0.248**
	(0.0673)	(0.080)	(0.099)
1.Gender		0.035	-0.045
		(0.098)	(0.112)
Age		0.051**	0.059***
		(0.021)	(0.020)
Age square		-0.001**	-0.001***
		(0.000)	(0.000)
1.Married		0.117	0.068
		(0.097)	(0.096)
Education Level			
2.Secondary		0.152	0.026
		(0.125)	(0.124)
3.Tertiary		0.618***	0.329**
		(0.147)	(0.161)
1.Training		0.528	0.714***
		(0.330)	(0.270)
Years of Experience		0.006	0.004
		(0.014)	(0.012)
Years of Experience square		-0.000	-0.000
		(0.001)	(0.000)
Constant	0.384***	-1.056***	-1.069***
	(0.0511)	(0.404)	(0.411)
Observations	494	494	494
R-squared	0.098	0.178	0.244
Job Characteristics	NO	NO	YES
Firm Industry and Location	NO	NO	YES

Notes: The dependent variable is the log of hourly wages. Informality is a dummy variable coded 1 if one is an informal wage worker. Column (1) shows the raw wage with no controls in the model. Column (2) shows the wage gap after controlling for human capital and individual characteristics. In column (3) we add job characteristics, firm industry and location dummies. Job characteristics include job allowance and methods of wage payment. Asterisks denotes level of significance (*** $p<0.01$, ** $p<0.05$, * $p<0.1$). Robust standard errors are in brackets

We now unpack the extent to which firms in the formal sector pay permanent and contract workers different wages after controlling for the same human capital endowments (using the model specified in equation (3). Temporal work contracts have traditionally been used by firms

to seek some flexibility in employment and wages. We are thus testing the hypothesis that there exists a wage gap between contract and permanent workers.

Table 3 presents the results estimating the wage differential between the formal sector permanent and contract workers. The coefficient on the dummy variable *Contract* (equals 1 if contract worker, 0 if permanent worker) denotes the wage gap relative to permanent workers within the formal sector. The baseline results without controls presented in Column (1) show an estimated wage gap of 28.2 log points that is significant at the 1 percent level. Because the characteristics of permanent and contract workers may differ, Column (2) includes human capital controls. The coefficient falls slightly to -0.213.

The inclusion of controls for job characteristics and firm fixed effects in Column (3), reduces the wage gap coefficient further to -0.149, although it remains highly significant. The inclusion of firm FE implies that the wage gap is estimated using the within-firm variation for wages among contract and permanent workers. The coefficient is thus an indicator of the segmentation of the permanent and contract labour markets 'within' firms. These results suggest the existence of segmented labour markets within firms in the formal sector. This adds another dimension of segmentation – within-firm segmentation.

Table 3. Within firms in the formal labour market wage gap: Permanent vs Contract workers

| VARIABLES | Permanent vs Contract workers | | |
	(1) Baseline	(2) +Human Capital	(3) +Firm FE
Contract	-0.282***	-0.213***	-0.149***
	(0.0336)	(0.034)	(0.035)
Constant	0.538***	-0.350	3.726***
	(0.490)	(0.549)	(1.420)
Observations	1896	1896	1896
R-squared	0.039	0.172	0.466
Human Capital Characteristics.	NO	YES	YES
Individual Characteristics.	NO	YES	YES
Job Characteristics	NO	NO	YES
Firm FE	NO	NO	YES

Notes: The dependent variable is the log of hourly wages. Columns 1-3 present results for within formal sector firms. *Contract* is a dummy variable coded 1 if one is a contract worker. Column (1) shows the raw wage with no controls in the model. Controls include human capital (education, experience, training), individual characteristics (age, marital status, gender), job characteristics (job allowance, methods of payment) and firm FE. Asterisk denotes level of significance (*** $p<0.01$, ** $p<0.05$, * $p<0.1$). Robust standard errors are in brackets.

We may also think of short-term contract workers in the formal sector as some form of formal sector 'informalisation'. We, therefore, test for the existence of the wage gap between contract workers and informal sector workers. Table 4 presents the results. While the contract employees work in the regulated formal sector firms, they are not governed by labour markets institutions and legislations such as unions.

The coefficient on the dummy variable *Informal_contract* (equals 1 if informal worker, 0 if contract worker) denotes the wage gap relative to contract workers. The baseline results in column (1) exclude controls. The results indicate a significant (at 1 percent level) wage gap of -27 log points. After controlling for human capital characteristics in column (2), the wage gap falls to -12 log points that are statistically insignificant. The fact that the wage gap became insignificant after controlling for human capital characterises suggests evidence against segmentation.

By adding the controls for job characterises, industry and location, the wage gap slightly increased to -16 log points and became weakly significant at 10 percent level. The results show that segmentation between contract and informal workers is not as profound as between formal and informal workers.

Table 4. Contract vs informal sector wage gap

	Contract vs Informal Sector Workers		
	(1)	(2)	(3)
VARIABLES	Baseline	+Human Capital	+industry and location
Informal_contract	-0.273***	-0.116	-0.167*
	(0.071)	(0.083)	(0.092)
Constant	0.391***	-0.785***	-0.731***
	(0.0799)	(0.441)	(0.461)
Observations	329	329	329
R-squared	0.035	0.117	0.145
Human Capital Charact.	NO	YES	YES
Individual Charact.	NO	YES	YES
Job Characteristics	NO	YES	YES
Industry and Location	NO	NO	YES

Notes: The dependent variable is the log of hourly wages. *Informal_contract* is a dummy variable coded 1 if one is an informal wage worker and 0 if a contract in the formal sector. Columns 1-3 show regression results. Column (1) shows the raw wage with no controls in the model. Controls include human capital (education, experience, training), individual characteristics (age, marital status, gender), job characteristics (job allowance, methods of payment), industry and location. Asterisk denotes level of significance (*** $p<0.01$, ** $p<0.05$, * $p<0.1$).

The above results present estimates of the wage gap around the mean of the wage distribution. The weakness of estimating and basing our analysis on equations 2 - 4 is that it is practically difficult to control for all variables as some variables are not available in the data set or are unobserved. Drawing on the literature reviewed in the earlier section, we additionally apply the Oaxaca-Blinder decomposition technique to further characterise the wage gap. The technique is essentially used to explain the differences in the mean of the dependent variable (wages) between two groups by decomposing the gap into two parts: the explained (observed) effect and the unexplained (unobserved) effect (Oaxaca, 1973). The explained effect of the wage gap is the one that shows differences in observed individual productivity characteristics such as education, training and experience. The unexplained effect shows the differences in the structure of the labour markets, that is, unobserved characteristics. The extent to which the wage structure effect explains the wage gap determines the extent to which the labour market is segmented. Table 5 presents the Oaxaca-Blinder decomposition results for the following groups: formal vs informal workers (in column 1), permanent vs contract workers (in column 2), and informal vs contract workers (in column 3). The results in column 1 show that the unobserved (unexplained) characteristics are statistically significant (at 1 percent level), and account for 57% (0.294/0.514) of the wage gap. This indicates that formal and informal sector labour markets are segmented.

Table 5. Oaxaca-Blinder wage decomposition

	(1)	(2)	(3)
			Informal vs
	Formal Vs Informal	Permanent vs Contract	Contract
Group_1	0.384***	0.538***	0.294***
	(0.051)	(0.0188)	(0.0486)
Group_2	-0.130***	0.252***	0.0238
	(0.044)	(0.0303)	(0.0591)
Difference	0.514***	0.287***	0.270***
	(0.067)	(0.0357)	(0.0765)
Explained	0.220***	0.107***	0.0681
	(0.074)	(0.0189)	(0.0588)
Unexplained	0.294***	0.180***	0.202**
	(0.097)	(0.0361)	(0.0902)
Observations	494	1896	329

Notes: The table presents the Oaxaca-Blinder decomposition. *Group_1* represents average wages for formal, permanent and informal workers in columns 1, 2 and 3 respectively, while *Group_2* represents average wages for informal, contract and contract in columns 1, 2 and 3 respectively. We control for human capital, individual and job characteristics as well as industry location in all columns. Asterisk denotes level of significance (*** $p<0.01$, ** $p<0.05$, * $p<0.1$). Robust standard errors are in brackets.

Similarly, column 2 results illustrate that the unexplained part of the wage is statistically significant (at 1 percent level) and accounts for 63% (0.18/0.287) of the wage gap, thereby suggesting segmentation within the formal sector (permanent vs contract workers). Lastly, column 3 also shows that the unexplained wage gap accounts for 75% percent of the wage and is statistically significant at a 5 percent level.

The results in Table 5 provide evidence that traditional dualist models of segmentation do not apply in the Zimbabwean labour markets. Hence, labour markets in Zimbabwe are more integrated. These results are also consistent with Tansel and Kan (2012), who find the wage gap to be explained by observable individual and employment characteristics and they concluded that stylised facts of segmentation do not hold in Turkey's labour markets.

Noting the strength of the Oaxaca-Blinder decomposition, its weakness is that it estimates the wage gap at the means, just like the OLS. The wage gap may differ across the wage distribution and the Mincerian regression and the Oaxaca-Blinder decomposition misses this. This is captured using the RIF.

Table 6 presents the results of RIF decomposition for the Formal vs Informal in columns 1-3, Permanent vs Contract in columns 4-6, and Contract vs Informal in columns 7-9 for the 10th, 50th and 90th quantiles. In all the specifications, we control for human capital, individual, and job characteristics. We also adjust the sample to include only a small firm category for comparability. The results in columns 1-3 show that the wage gap is higher 10th and 90th quantiles of the wage distribution. In columns 1-3, characteristics are also not significant in explaining the observed wage gap while the unexplained part of the wage is statistically significant at 1 percent level. We see that in columns 1-3 the unexplained part contributes entirely to the wage gap. These results reveal that the between formal and informal sector labour markets are highly segmented along the entire wage distribution.

Further, columns 4-6 present decomposition results for within formal firm segmentation, that is, permanent vs contract workers. These results indicate that the wage gap is higher at the 10th and 90th percentiles.

Table 6. The RIF decomposition results for the wage gap

Quantiles	Formal vs Informal			Permanent Vs Contract			Contract vs Informal		
	(1) 10th	(2) 50th	(3) 90th	(4) 10th	(5) 50th	(6) 90th	(7) 10th	(8) 50th	(9) 90th
Formal	-0.431***	0.349***	1.330***						
	(0.0976)	(0.0374)	(0.0903)						
Informal	-1.059***	-0.179***	0.722***				-0.868***	0.005	1.035***
	(0.0618)	(0.0511)	(0.0850)				(0.073)	(0.064)	(0.155)
Permanent				-0.182***	0.556***	1.330***			
				(0.038)	(0.017)	(0.040)			
Contract				-0.507***	0.261***	1.007***	-0.396***	0.319***	1.084***
				(0.073)	(0.023)	(0.067)	(0.093)	(0.039)	(0.114)
Wage gap	0.628***	0.528***	0.608***	0.325***	0.294***	0.323***	0.472***	0.314***	0.049
	(0.116)	(0.0633)	(0.124)	(0.082)	(0.029)	(0.078)	(0.118)	(0.075)	(0.193)
explained	-0.283	0.00560	-0.329	0.098**	0.099***	0.262***	0.057	0.075	0.517***
	(0.376)	(0.140)	(0.339)	(0.039)	(0.020)	(0.048)	(0.117)	(0.050)	(0.149)
unexplained	0.911**	0.522***	0.937***	0.227***	0.195***	0.061	0.415**	0.239***	-0.468**
	(0.391)	(0.152)	(0.358)	(0.088)	(0.032)	(0.085)	(0.164)	(0.088)	(0.233)

Notes: The table presents the evolution of the earnings differentials for 10th, median (p50) and 90th (p90) quantiles using the RIF decomposition. We control for human capital, individual and job characteristics as well as industry location in all columns. Asterisk denotes level of significance (*** $p<0.01$, ** $p<0.05$, * $p<0.1$). Robust standard errors are in brackets.

At the 10th quantile, the unexplained part accounts significantly (at 1 percent level) for 70 percent (0.227/0.325) of the wage gap. At the 50th quantile, the unexplained part accounts for a significant 66 percent (0.195/0.294) (at 1 percent level of significance) of the wage while it accounts insignificantly for only 19 percent (0.061/0.323) at the 90th percentile. The results suggest that segmentation within formal firms is higher at the lower part of the wage distribution.

Comparing columns 7-9 for contract vs informal sector workers, that segmentation is characterised at the bottom of the wage distribution, as indicated by the unexplained part that accounts significantly (at 1 percent level) for 88 percent (0.415/0.472) of the wage gap at the 10th quantile. At the 90th quantile, the wage gap is insignificant and is entirely accounted for by the explained part. It is, therefore, amongst the cohort of low wages that we see evidence of the greater impact of segmentation on wages. The RIF decomposition results are in line and comparable with the Oaxaca-Blinder decomposition results presented in Table 5.

Thus far, we tested for and identified the different types of labour market segmentation. We have been able to provide some empirical answers to our first research question on the extent and heterogeneity nature of labour market segmentation in Zimbabwe. In the remainder of this paper, we test a specific source of labour market segmentation that is related to rent-sharing.

4.2. Rent sharing as Explanation for Formal Sector Segmentation

Baseline Results

Given the extent of segmentation identified in the above sections, we now test the hypothesis that rent sharing is a source of labour market segmentation. Table 7 present the baseline results for the rent-sharing model.

The robust OLS serves as our baseline results for the analysis. In this model, we regress the logarithm of hourly wages on lagged values of sales per worker as presented in equation (5). As discussed in detail in the earlier section, we use lagged sales per worker as a proxy for profit-per-worker to reduce some bias associated with using level values of profits-per-worker.[5]

In column 1 we only include the key variable of interest, lagged sales per worker, without any controls. We find a positive significant association between wages and lagged sales per worker.

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5 A better option would have been to use lagged values of valued-added per-worker, but we are unable to construct this variable for this period given our data.

A 1 percent rise in firm profitability is associated with a 0.14 percent rise in wages. In columns 2-7, we test for the importance of bargaining power in influencing wages through rent-sharing. We control for the influence of human capital, individual, job and firm characteristics (firm size, firm industry and industry dummies). For example, *firm size* is expected to be positively related to firm profitability, as bigger firms are likely to be more productive (Schmidt & Zimmermann, 1991; Oi & Idson, 1999; Van Biesebroeck, 2005). Hence to isolate the true unbiased coefficient on profits-per-worker we extended our model by adding some controls discussed above and clustering at the firm level. The inclusion of the controls leads to a drastic reduction in the coefficient on profits-per-worker in all columns, but it remains highly significant except in column 5.

In column 2 we measure bargaining power with the share of union workers in the firm. The positive significant association between wages and share of union workers suggests that firms with a higher proportion of union workers pay high wages; this is consistent with the rent-sharing theory. In column 3 we interact *union share* with the lagged values of the *sales-per-worker*, as we are also interested in the marginal relationship that bargaining and rent-sharing have with influencing wages. We find an insignificant marginal difference between firms with higher union share and those with lower union share on the relationship between wages and sales-per worker suggesting that the effects of rent-sharing are the same for unionised and non-unionised firms. This result is consistent with the findings by Velenchik (1997), who argues that employees are unlikely to have meaningful bargaining power in Zimbabwe due to widespread unemployment. One possible explanation for the correlation between profits-per-worker, bargaining and wages is that firms are coerced to pay higher wages out of rents due to stringent government policies and labour market regulations. Although we cannot infer this argument from our data, it is consistent with the intervention of government in wage-setting processes, and this particularly favours the permanent or unionised workers as shown by our results.

Table 7. Rent sharing in the formal sector labour markets.

VARIABLES	Baseline	Measures of Bargaining Power					
		Union_share	Union_share × lagged sales per-worker	Permanent_ share	Permanent_ share × lagged sales per worker	Permanent-_worker status	Permanent_ Status × lagged sales per-worker
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Sales/worker (lagged)	0.140***	0.098***	0.098***	0.094***	0.051*	0.094***	0.080***
	(0.028)	(0.015)	(0.017)	(0.014)	(0.030)	(0.014)	(0.017)
Bargaining_power		0.019**	-0.037	0.101*	0.550*	0.161***	-0.065
		(0.009)	(0.073)	(0.053)	(0.316)	(0.031)	(0.189)
Bargaining_power × Sales/worker (lagged)			0.012		-0.060		0.031
			(0.015)		(0.043)		(0.025)
Constant	-0.559***	-1.077***	-0.992***	-0.982***	-0.574	-1.145***	-1.041***
	(0.214)	(0.342)	(0.285)	(0.325)	(0.392)	(0.281)	(0.283)
Observations	1,902	1,764	1,764	1,836	1,836	1,902	1,902
R-squared	0.076	0.234	0.200	0.232	0.236	0.244	0.244
Human Capital	NO	YES	YES	YES	YES	YES	YES
Individual Characteristics	NO	YES	YES	YES	YES	YES	YES
Job Characteristics	NO	YES	YES	YES	YES	YES	YES
Firm Controls	NO	YES	YES	YES	YES	YES	YES

Notes: The dependent variable is the log of *hourly wages*. *Lagged sales per worker* are in logs and are a proxy for profit-per-worker. Controls include human capital (education, experience, training), individual characteristics (age, marital status, gender), job characteristics (job allowance, methods of payment), firm characteristics (firm age, firm size, industry dummies, and location dummies). Asterisk denotes level of significance (*** $p<0.01$, ** $p<0.05$, * $p<0.1$). Standard errors are in brackets. Bargaining power is proxied by *Union share* (share of union workers to total employment in the firm) in columns 2 and 3, *Permanent share* (share of permanent workers to total employment in a firm) in columns 4 and 6, and *Permanent worker status dummy* (1 if permanent and 0 otherwise) in column 6 to 7.

In column 4 we proxy bargaining power with the share of permanent workers in the firm. The results are consistent with the results in column 2, showing a positive but weakly significant association between wages and the share of permanent workers. The interaction between profit-per-worker and share of permanent workers is insignificant, as shown by the results in column 5. In column 6 we proxy bargaining power with a binary variable for individual worker status (1 if a worker is permanent). The results show a strong positive association between permanent worker status and wages. However, there are no marginal differences in rent-sharing between permanent and non-permanent workers as indicated by an insignificant interaction term in column 7.

Overall, the results in Table 7 suggest that more profitable firms pay more wages to their workers. Such a positive relationship between wages and sales-per-worker indicates that rent-sharing is a source of segmentation in the formal labour markets. The results also indicate that high bargaining power is associated with higher wages. However, we find no evidence indicating that bargaining power influences wages through rent-sharing.

We extend the analysis to the informal manufacturing sector. However, our analysis is limited as we only have concurrent sales per worker. Thus, the results may be affected by endogeneity bias. The results for the informal sector rent-sharing model are shown in Table A1 in the appendix. The baseline results in column 1 show a significant positive association between profit-per-worker and wages. In column 2, after adding the controls for human capital, individual, job and firm characteristics the profit-per-worker coefficient falls slightly and becomes less significant (albeit still at a 5 percent level). It is difficult to justify that the correlation between wages and profits in the informal sector indicates rent-sharing since these workers are neither regulated nor unionised. Rather, such a relationship may be a result of the payment structure in the informal sector. It should be emphasised that most of the informal sector workers are paid the piece rate. Consequently, if more profitable firms sell more, then they will pay workers more. Thus, what may be driving the informal sector results is the piece-rate system.

As already mentioned in the earlier sections, our benchmark specifications might suffer from the endogeneity of sales-per-worker. To test the robustness of the results, we adopt the instrumental variable regression approach. Following Blanchflower and Oswald (1996), we use the cost of electricity as our instrument. A good instrument should be able to sufficiently

explain the variation in the potential endogenous variable (sales-per-worker) but not the variation in the dependent variable (hourly wages).

Using a two-stage least squares (2SLS) regression where, in the first step (see Table A2 in the appendix), we regress the value of lagged sales-per-worker on the cost of electricity. The coefficient of our instrument in Table A2 is positive and significant at the 1 percent level of significance. These results, therefore, satisfy the requirement that the instrument should be highly correlated with the explanatory variable. Further, as argued by Blanchflower et al. (1996), the cost of energy does not directly enter the wage equation as there is no theoretical link between the two. This suggests that the cost of energy is a valid instrument and that our IV models are well specified.

Table 8 presents results for the second stage of the instrumental variable regression for formal sector workers. The results generally corroborate our earlier findings that rent-sharing is significant in determining wage-setting processes. The coefficients for sales-per-worker in all the specifications, except for column 5, are positive and significant at 1, 5, or 10 percent.

Compared to the non-instrumented results in Table 7, the 2SLS estimated coefficients are larger indicating a downward bias associated with failure to account for endogeneity. We are only able to conduct robustness for the formal sector as we do not have plausible instruments for the informal sector. For example, we do not have a stand-alone measure for the cost of electricity as it is pooled together in rentals and water costs.

Table 8. 2SLS results for the formal sector sales-per-worker and the wage relation.

VARIABLES	Baseline	Measures of Bargaining Power					
		Union_share	Union_share × lagged sales per-worker	Permanent_ share	Permanent_ share × lagged sales per worker	Permanent-_worker status	Permanent_ Status × lagged sales per-worker
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Sales/worker (lagged)	0.117***	0.114***	0.106**	0.085***	0.107	0.092***	0.078*
	(0.024)	(0.030)	(0.041)	(0.030)	(0.113)	(0.029)	(0.044)
Bargaining_power		0.024**	-0.028	0.096*	0.039	0.161***	-0.071
		(0.011)	(0.134)	(0.055)	(0.982)	(0.030)	(0.319)
Bargaining_power × Sales/worker (lagged)			0.010		0.006		0.032
			(0.026)		(0.138)		(0.043)
Constant	-0.392**	-1.177***	-1.009***	-0.916**	-1.071	-1.130***	-1.028**
	(0.179)	(0.379)	(0.372)	(0.373)	(0.962)	(0.333)	(0.407)
Observations	1,902	1,764	1,764	1,836	1,836	1,902	1,902
R-squared	0.066	0.228	0.231	0.232	0.236	0.244	0.246
Human Capital	NO	YES	YES	YES	YES	YES	YES
Individual Characteristics	NO	YES	YES	YES	YES	YES	YES
Job Characteristics	NO	YES	YES	YES	YES	YES	YES
Firm Controls	NO	YES	YES	YES	YES	YES	YES

Notes: The dependent variable is the log of *hourly wages*. *Lagged sales per worker* are instrumented by the cost of power. Controls include human capital (education, experience, training), individual characteristics (age, marital status, gender), job characteristics (job allowance, methods of payment), firm characteristics (firm age, firm size, industry dummies, and location dummies). Asterisk denotes level of significance (*** $p<0.01$, ** $p<0.05$, * $p<0.1$). Standard errors are in brackets. Bargaining power is proxied by *Union share* (share of union workers to total employment in the firm) in columns 2 and 3, *Permanent share* (share of permanent workers to total employment in a firm) in columns 4 and 6, and *Permanent worker status dummy* (1 if permanent and 0 otherwise) in column 6 to 7.

In summary, the extent that firms' profits are associated with individual wages confirms that the labour markets in Zimbabwe are segmented and that firms' ability to pay plays a critical role in explaining wage differentials. Our findings are in line with other results in literature from developing economies (Teal, 1995; Velenchik, 1997; Söderbom & Teal, 2001; Bigsten et al., 2003). These studies have established that rent-sharing plays a key role in explaining labour segmentation. Although the nature of our data could not allow us to do a complete exploration of the sources of rent-sharing, our results provide a plausible link between profits-per-worker and the wage determination process in Zimbabwe.

5. Conclusion

This study investigated the extent and source of labour market segmentation between and within the formal and informal manufacturing sectors in Zimbabwe. First, we used the wage gap between different labour market segments to identify the extent of labour segmentation. Second, we tested a specific source of segmentation associated with the association between profit-per-worker and wages. The paper draws on the recent employee-employer matched dataset we collected in the manufacturing sector in Zimbabwe between 2015 and 2018. The advantage of our dataset is that we were able to control for firm characteristics.

We found evidence suggesting the following stylised facts. First, we found that the nature of labour market segmentation is heterogeneous across labour market segments. Second, we found that the mobility of workers is unidirectional towards the informal sector, while the movement to the formal sector (especially on permanent jobs) is highly restricted. Firms in the formal sector face high rigidities in laying off workers should they wish to do so. These stylised facts imply the immobility of workers to the primary sector, and this is consistent with labour market segmentation theories.

The empirical results have provided some key insights. First, we have found evidence suggesting that labour markets in Zimbabwe are segmented between the regulated formal sector and the unregulated informal sector. The results show a raw wage gap of about 52 percent and a conditional wage gap of about 25 percent. We then used the RIF decomposition technique to characterise segmentation. The RIF results show that the unexplained part accounts for relatively more of the wage, thus indicating evidence of labour market segmentation. Second, we have found evidence indicating labour market segmentation within formal sector firms, that is between permanent and contract workers. The RIF decomposition illustrates that the segmentation is higher at the top tail of the wage distribution. Thirdly, the

results show insignificant wage differentials between contract workers in the formal sector and informal sector workers after controlling for human capital characteristics.

Concerning rent-sharing as a source of segmentation, the study found a positive and significant association between firm sales-per-worker and individual wages in the formal sector. We also found a positive but weak significant association between sales-per-worker and wages in the informal sector. To the extent that firm sales-per-worker significantly explains wages, these results confirm that competitive labour models do not apply in the formal labour markets. The results imply that rent-sharing is an important source of labour market segmentation in Zimbabwe, thus indicating that labour markets are inefficient.

To this end, in addressing the concerns of labour market segmentation, care should be taken in designing policies that promote competitive labour markets and inclusive growth. One way to improve the competitiveness and efficiency of labour markets is to improve their flexibility by reducing the length and expenses of firing workers – these are exceptionally high in the context of Zimbabwe. This would bolster firm performance and productivity thereby preparing firms to increase employment in the long run. The inflexibility of labour markets is thought to discourage firms from employing permanent workers.

Given the potential contribution of this study, we conclude with a word of caution when interpreting the results. The major issues concerning our results are the selection bias associated with estimating sectoral earnings differentials, and the potential endogeneity problem associated with estimating the relationship between wages and profits-per-worker.

Regarding the endogeneity of profits-per-worker, we first proxy profits-per-worker with the lagged values of sales-per-worker to account for endogeneity associated with using level values of profits per worker. We then used the instrumental variable strategy to try to minimise endogeneity. However, it is also always a challenge to find plausible instruments. Thus, future studies could focus on securing panel data on formal sector firms that can allow one to utilise a wide range of methods such as fixed effects that can deal with some endogeneity and selection bias issues more comprehensively.

References

Arai, M. 2003. Wages, profits, and capital intensity: Evidence from matched worker-firm data. *Journal of Labor Economics.* 21(3):593-618.

Bargain, O. & Kwenda, P. 2014. The informal sector wage gap: New evidence using quantile estimations on panel data. *Economic Development and Cultural Change.* 63(1):117-153.

Bazen, S. 2000. The impact of the regulation of low wages on inequality and labour-market adjustment: A comparative analysis. *Oxford Review of Economic Policy.* 16(1):57-69.

Benham, L. 1974. Benefits of women's education within marriage. *Journal of Political Economy.* 82(2, Part 2): S57-S71.

Bigsten, A., Collier, P., Dercon, S., Fafchamps, M., Gauthier, B., Gunning, J.W., Oduro, A., Oostendorp, R. et al. 2003. Risk sharing in labor markets. *The World Bank Economic Review.* 17(3):349-366.

Blanchflower, D.G., Oswald, A.J. & Sanfey, P. 1996. Wages, profits, and rent-sharing. *The Quarterly Journal of Economics.* 111(1):227-251.

Botelho, F. & Ponczek, V. 2011. Segmentation in the Brazilian labor market. *Economic Development and Cultural Change.* 59(2):437-463.

Burger, J.D. & Walters, S.J. 2008. Testing fair wage theory. *Journal of Labor Research.* 29(4):318-332.

Card, D. 1999. The causal effect of education on earnings. *Handbook of Labor Economics.* 3:1801-1863.

Card, D., Cardoso, A.R., Heining, J. & Kline, P. 2018. Firms and labor market inequality: Evidence and some theory. *Journal of Labor Economics.* 36(S1): S13-S70.

Card, D., Devicienti, F. & Maida, A. 2014. Rent-sharing, holdup, and wages: Evidence from matched panel data. *Review of Economic Studies.* 81(1):84-111.

Carneiro, F. & Henley, A. 2001. Modelling formal vs. informal employment and earnings: micro-econometric evidence for Brazil. *U of Wales at Aberystwyth Management & Business Working Paper.* (2001-15).

Casale, D. & Posel, D. 2011. Unions and the gender wage gap in South Africa. *Journal of African Economies.* 20(1):27-59.

Cazes, S. & de Laiglesia, J.R. 2015. Temporary Contracts and Wage Inequality. Janine Berg. *Labour Markets, Institutions and Inequality: Building just Societies in the 21st Century.* :147-183.

Cohen, Y. & Haberfeld, Y. 1991. Why do married men earn more than unmarried men? *Social Science Research.* 20(1):29-44.

Deakin, S. 2013. *Addressing labour market segmentation: The role of labour law.* Centre for Business Research, University of Cambridge Cambridge.

Doeringer, P.B. & Piore, M.J. 2020. *Internal labor markets and manpower analysis: with a new introduction.* Routledge.

El Badaoui, E., Strobl, E. & Walsh, F. 2008. Is there an informal employment wage penalty? Evidence from South Africa. *Economic Development and Cultural Change.* 56(3):683-710.

Fields, G.S. 1990. Labour market modelling and the urban informal sector: Theory and evidence.

Fields, G.S. 2011. Labor market analysis for developing countries. *Labour Economics.* 18:S16-S22.

Firpo, S.P., Fortin, N.M. & Lemieux, T. 2018. Decomposing wage distributions using recentered influence function regressions. *Econometrics.* 6(2):28.

Fortin, N., Lemieux, T. & Firpo, S. 2011. Decomposition methods in economics. In *Handbook of labor economics.* Elsevier. 1-102.

Gindling, T.H. 1991. Labor market segmentation and the determination of wages in the public, private-formal, and informal sectors in San Jose, Costa Rica. *Economic Development and Cultural Change.* 39(3):585-605.

Gong, X. & Van Soest, A. 2002. Wage differentials and mobility in the urban labour market: a panel data analysis for Mexico. *Labour Economics.* 9(4):513-529.

Günther, I. & Launov, A. 2012. Informal employment in developing countries: Opportunity or last resort? *Journal of Development Economics.* 97(1):88-98.

Gürtzgen, N. 2009. Rent-sharing and collective bargaining coverage: Evidence from linked employer-employee data. *Scandinavian Journal of Economics.* 111(2):323-349.

Heintz, J. & Posel, D. 2008. Revisiting informal employment and segmentation in the South African labour market. *South African Journal of Economics.* 76(1):26-44.

Hildreth, A.K. & Oswald, A.J. 1997. Rent-sharing and wages: evidence from company and establishment panels. *Journal of Labor Economics.* 15(2):318-337.

Kahyalar, N., Fethi, S., Katircioglu, S. and Ouattara, B., 2018. Formal and informal sectors: is there any wage differential? *The Service Industries Journal.* 38(11-12):789-823.

Kalleberg, A.L. 2003. Flexible firms and labor market segmentation: Effects of workplace restructuring on jobs and workers. *Work and Occupations.* 30(2):154-175.

Keswell, M. & Poswell, L. 2004. Returns to education in South Africa: A retrospective sensitivity analysis of the available evidence. *South African Journal of Economics.* 72(4):834-860.

La Porta, R. & Shleifer, A. 2014. Informality and development. *Journal of Economic Perspectives.* 28(3):109-126.

Leontaridi, M. 1998. Segmented labour markets: theory and evidence. *Journal of Economic Surveys.* 12(1):103-109.

Maloney, W.F. 1999. Does informality imply segmentation in urban labor markets? Evidence from sectoral transitions in Mexico. *The World Bank Economic Review.* 13(2):275-302.

Marcouiller, D., de Castilla, V.R. & Woodruff, C. 1997. Formal measures of the informal-sector wage gap in Mexico, El Salvador, and Peru. *Economic Development and Cultural Change.* 45(2):367-392.

Margolis, D.N. & Salvanes, K.G. 2001. Do firms really share rents with their workers? *Available at SSRN 276520.*

Matano, A. & Naticchioni, P. 2017. The extent of rent sharing along the wage distribution. *British Journal of Industrial Relations.* 55(4):751-777.

Mazumdar, D. & Mazaheri, A. 1998. The Structure of Labor Market and Wages in African Manufacturing. *University of Toronto, Mimeo.*

Nguyen, H.C., Nordman, C.J. & Roubaud, F. 2013. Who suffers the penalty?: A panel data analysis of earnings gaps in Vietnam. *Journal of Development Studies.* 49(12):1694-1710.

Nickell, S.J. & Andrews, M. 1983. Unions, real wages and employment in Britain 1951-79. *Oxford Economic Papers.* 35:183-206.

Nickell, S. & Wadhwani, S. 1990. Insider forces and wage determination. *The Economic Journal.* 100(401):496-509.

Oaxaca, R. 1973. Male-female wage differentials in urban labor markets. *International Economic Review.* :693-709.

Oi, W.Y. & Idson, T.L. 1999. Firm size and wages. *Handbook of Labor Economics.* 3:2165-2214.

Pratap, S. & Quintin, E. 2006. Are labor markets segmented in developing countries? A semiparametric approach. *European Economic Review.* 50(7):1817-1841.

Rand, J. & Torm, N. 2012. The benefits of formalization: Evidence from Vietnamese manufacturing SMEs. *World Development.* 40(5):983-998.

Rusinek, M. & Rycx, F. 2013. Rent-Sharing under Different Bargaining Regimes: Evidence from Linked Employer-Employee Data. *British Journal of Industrial Relations.* 51(1):28-58.

Schmidt, C.M. & Zimmermann, K.F. 1991. Work characteristics, firm size and wages. *The Review of Economics and Statistics.* :705-710.

Söderbom, M. & Teal, F. 2001. *Firm size and human capital as determinants of productivity and earnings.* United Nations Industrial Development Organization Geneva.

Squire, L. & Suthiwart-Narueput, S. 1997. The impact of labor market regulations. *The World Bank Economic Review.* 11(1):119-143.

Tansel, A. & Kan, E.O. 2012. The formal/informal employment earnings gap: evidence from Turkey.IZA Discussion Papers 6556. *Institute for the Study of Labor (IZA).*

Teal, F. 1995. Real wages and the demand for labour in Ghana's manufacturing sector. *Centre for the Study of African Economies, University of Oxford.Working Paper Series 95-7.*

Teal, F. 1996. The size and sources of economic rents in a developing country manufacturing labour market. *The Economic Journal.* 106(437):963-976.

Thomas, M. & Vallée, L. 1996. Labour market segmentation in Cameroonian manufacturing. *The Journal of Development Studies.* 32(6):876-898.

Van Biesebroeck, J. 2005. Firm size matters: Growth and productivity growth in African manufacturing. *Economic Development and Cultural Change.* 53(3):545-583.

Velenchik, A.D. 1997. Government intervention, efficiency wages, and the employer size wage effect in Zimbabwe. *Journal of Development Economics.* 53(2):305-338.

Appendix

Table A1. Profits-per-worker and wages in the informal sector labour markets

VARIABLES	Baseline (1)	+Controls (2)
Profits-per-worker	0.185***	0.170**
	(0.059)	(0.069)
Firm size		0.217**
		(0.107)
Constant	-1.156***	-2.560***
	(0.374)	(0.894)
Observations	312	312
R-squared	0.035	0.200
Human Capital	NO	YES
Individual Characteristics	NO	YES
Job Characteristics	NO	YES
Firm Characteristics	NO	YES

Notes: The dependent variable is the log of hourly wages. The proxy for profit-per-worker is sales per worker in logs. Asterisk denotes level of significance (*** $p<0.01$, ** $p<0.05$, * $p<0.1$). Standard errors are in brackets

Table A2. First-stage Regression: The Relationship between the Profit-per-worker and the instruments-cost of electricity.

VARIABLES	(1) **Dependent variable:** Profit-per-worker
Cost of electricity	0.330***
	(0.013)
Constant	3.389***
	(0.166)
Observations	1,902
R-squared	0.317
Human capital	NO
Job Characteristics	NO
Firm Characteristics	NO

Table A3. Correlation between lagged sales per worker and profits per worker

	Lagged Sales Per worker	Profits
Lagged Sales Per worker	1.0000	
Profits	0.4126	1.0000