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Labour Market Segmentation: Labour Regulations and Rent-Sharing in the Formal and Informal Manufacturing Sector in Zimbabwe

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ABSTRACT

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This paper analyses labour market segmentation within and between the formal and informal manufacturing sector in an emerging economy, Zimbabwe, and studies the potential role of labour market policies and rent-sharing in driving these outcomes. The estimates exploit the panel dimension of a matched employer-employee dataset of Zimbabwean manufacturing firms collected between 2015 and 2016 that allows for the inclusion of firm and individual characteristics in identifying sources of segmentation. Evidence of low worker mobility between the formal and informal sector, and between contract and permanent jobs in the formal sector, suggesting the presence of segmented labour markets. Mincerian wage regressions corroborate this finding revealing high wage differentials between formal and informal workers that is more pronounced for lower wage workers, as well as wage gaps between permanent and contract workers within the formal sector. The complementarity between union membership and permanent employment status is found to be a key source of wage segmentation within the formal sector, with rent-sharing the channel driving this outcome. These findings underscore the multi-tiered nature of labour market segmentation in Zimbabwe and illustrate how the intersection of labour market regulations governing unionisation and permanent employment contracts raises the bargaining power of workers.

JEL Classification:

J31, J42, J46, O17, L60

Keywords:

labour segmentation, rent-sharing, manufacturing sector, wage gap, informality, labour market regulations and rigidities

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1. Introduction

Labour markets in emerging countries are characterised by the coexistence of formal and informal labour markets. Commonly, the literature argues that this coexistence reflects a segmentation of labour markets between low-wage informal workers and higher-wage regulated and protected formal sector workers (Günther & Launov, 2012; Heintz & Posel, 2008; Pratap & Quintin, 2006; Gindling, 1991). Such segmentation is often associated with escalating inequality (Card *et al.*, 2018) and labour market inefficiencies that depress employment growth and constrain adaptation of firms to business cycles (Bentolila, Dolado & Jimeno, 2019; Deakin 2013; Kalleberg, 2003).

However, the depiction of labour segmented into high-wage formal and low-wage informal sectors is too narrow. It rests heavily on the dualist approach, where the informal sector is seen as delinked from the formal sector, with limited worker mobility between sectors and distinct wage and employment mechanisms in each sector (Fields, 2011; Maloney, 1999).¹ This is problematic for several reasons. Firstly, informal firms are often integrated into, work alongside or compete with firms in the formal sector. For example, informal firms, particularly in manufacturing, may have production or distribution relationships with formal firms, supplying intermediate goods or providing of services through direct sales or sub-contracting (e.g., informal clothing firms providing cut-make-trim services to formal clothing manufacturers) (Chen, 2006). Informal firms can also compete with formal firms in the same product market, as is found by Amin (2022) in emerging economies. At the level of the worker, individuals may have multiple jobs that straddle both the formal and informal sectors. The notion of two distinct and separate labour markets is also undermined by the hiring of wage workers by formal enterprises under informal employment relations (e.g., part-time work, temporary workers) (Chen, 2006).

Secondly, as an alternative to the dualist approach, the ‘legalist’ view regards informality as arising from voluntary and rational decisions by entrepreneurs to circumvent regulatory, tax, and administrative costs that firms incur in the formal economy (de Soto, 1989; Chen, 2012). Relatively unskilled workers may also voluntarily select informal employment given desirable characteristics of informality (e.g., flexibility, autonomy, on-the-job training) and to avoid implicit taxes from inefficiencies that may arise from rigid labour protection laws (Maloney, 1999). Labour markets in the informal and formal sector in these cases will be relatively

¹ For a survey of theories and definitions of the informal economy, see Dell’Anno (2022).

integrated and wages for specific workers in the informal sector may actually be higher than equivalent workers in the formal sector.

Thirdly, the dualist approach fails to account for enormous heterogeneity in wages within and between formal and informal labour markets. For example, within the formal sector, employees differ with respect to wages and the protection they are afforded by contracts, (e.g., permanent vs. contract workers). The informal economy covers a spectrum of informal firms and workers including self-employed, own account operators, unpaid family workers, wage workers in informal firms, and un-protected workers in formal firms (Chen, 2006). The implication is that the formal and informal labour markets can be segmented into multiple tiers with wage segmentation varying across the wage distribution. Labour market regulations affecting formal firms, for example, may be more binding for low wage workers (Squire & Suthiwart-Narueput, 1997; Bazen, 2000), driving up wage gaps between less skilled workers in the formal and informal sector.

A further consideration is the influence of firm heterogeneity on wage outcomes. While informal firms are generally smaller and less productive than formal firms, including formal micro-enterprises, there is often considerable overlap in firm characteristics between enterprises in the two sectors (Aberra *et al.*, 2022; Kamutando & Edwards, 2024). These firm characteristics, particularly firm size and productivity (Abowd, Kramarz & Margolis, 1999; Kramarz, Lollivier & Pele, 1996), become increasingly important in driving wage gaps between similar workers when labour and product markets are imperfectly competitive, as in the case of search and matching frictions (Mortensen & Pissarides, 1999), monopsony power (Manning, 2003), and the sharing of profits associated with bargaining, efficiency wage considerations or risk-sharing (Blanchflower, Oswald & Sanfey, 1996). In these circumstances, controlling for firm characteristics, including profits, is critical if formal-informal wage gaps are to be analysed.

A final consideration is the influence on labour market segmentation and wage differentials of labour legislations and other regulations governing firms and product markets. In rent-sharing models, for example, more profitable firms paying higher wages to their workers in relation to the bargaining power of each party (Blanchflower *et al.*, 1996; Hildreth & Oswald, 1997; Nickell & Andrews, 1983). The bargaining power, in turn, is influenced by the nature and stringency of labour market institutions. Wage determination by sectoral bargaining councils that fix sector-level wages, for example may drive wage gaps between formal and informal

workers, but reduce rent-sharing at the firm level. In contrast, rent-sharing may be more prevalent if bargaining councils set the minimum wages, and the legislation allows for firm-level bargaining of wages above this minimum.

In the empirical research on emerging economies, researchers have commonly tested the labour market segmentation hypothesis by estimating wage differentials between the regulated formal sector and the unregulated informal sector (Adair & Bellache, 2018; Lehmann & Pignatti, 2018; Kahyalar *et al.*, 2018; Bargain, Etienne & Melly, 2021; Shahen *et al.*, 2020; García, 2017; La Porta & Shleifer, 2014). Although most studies support of existence of dualistic models of segmented labour markets and the presence of large earnings gaps (e.g. Rand & Torm, 2012; Tansel, Keskin & Ozdemir, 2020; Nordman, Rakotomanana & Roubaud, 2016), some studies have also provided some evidence of wage premium in the informal sector (Marcouiller, de Castilla & Woodruff, 1997; Maloney, 1999; El Badaoui, Strobl & Walsh, 2008; La Porta & Shleifer, 2014).

Few of these studies, however, directly control for firm characteristics, given the unavailability of employer-employee data. This will likely bias estimates of wage gaps upwards given relatively productive firms in the formal sector. Rand and Torm (2012), for example, find that adding firm characteristics reduces the formal-informal wage gap in Vietnam from 17 percent to 10 percent. Tests of rent-sharing as a source of wage segmentation and how this relates to product market structure and labour legislation affecting the bargaining power of workers is also under-explored in emerging economies. Martins & Esteves (2006) find limited support for rent-sharing in manufacturing in Brazil, that they argue arises from weak labour market institutions. In contrast. Velenchik (1996) finds support for rent-sharing in Zimbabwe in the 1990s, although Bigsten *et al.* (2003) argue that this may rather reflect risk-sharing between employers and workers. Finally, while most literature has estimated the earnings gaps at the mean of the wage distribution using techniques such as Oaxaca-Blinder decomposition (see Gong & van Soest (2002) for Mexico, El Badaoui *et al.* (2008) for South Africa, and Prat & Quintin (2006) for Argentina), recent literature has estimated the wage gap along the wage distribution using used quantile regressions method (Bargain & Kwenda, 2014)

This paper contributes to the literature by analysing labour market segmentation within and between the formal and informal manufacturing sector in Zimbabwe using matched employer-employee data that allows for the control of individual and firm characteristics. Further, it assesses how segmentation varies across the wage distribution using the Recentered Influence

Function (RIF) approach of Firpo, Fortin & Lemieux (2018). Finally, it assesses how labour market regulations may be a source of segmentation driving wage gaps between permanent, contract and informal workers, and profit-sharing within firms. In doing so, the paper provides further insight on how labour regulations may contribute towards labour market segmentation.

Zimbabwe is an excellent case for such a study. Firstly, Zimbabwe has a large informal labour market that coexists and competes with the formal labour market (Kamutando & Edwards, 2024). Informal manufacturing firms, for example, accounted for close to 70 percent of total employment in manufacturing in 2019 (ZIMSTAT, 2020). Secondly, private sector wage determination in Zimbabwe is set by an industry-level collective bargaining process that is uneven in its coverage across formal and informal firms, allows for firm-level flexibility in negotiations of wages above the industry minimum, and is argued to be subverted by firms using contract labour (Nathan Associates, 2016). This opens up opportunities to assess how labour regulations may be a source of segmentation giving rise to wage differentials between the formal and informal manufacturing, and between permanent and contract workers within the permanent sector in Zimbabwe. Further, it points to the potential of firm-level wage bargaining outcomes within formal firms, such as rent-sharing, that may differ across permanent and contract workers. Thirdly, 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 paper can, therefore, easily be generalised to other emerging economies. Finally, the availability of employer-employee data for formal and informal firms collected as part of the Zimbabwe Manufacturing Firm Survey 2015-2018 resolves a key data constraint that inhibits similar research in other emerging economies.² The surveys provide detailed information on firm characteristics, individual characteristics, employee contract status and earnings, including non-monetary wages.

The results show significant evidence of labour market segmentation in Zimbabwe between the regulated formal sector and the unregulated informal sector, with a raw wage gap of 49 percent. The wage gap is more pronounced at the lower part of the wage distribution. Controlling for firm and individual characteristics reduces the mean wage gap to 24 percent, with firm characteristics alone contributing significantly towards the decline. Moreover, segmentation extends beyond the formal-informal dichotomy, as evidenced by disparities within the formal sector, where permanent workers command a significant wage premium over

² For access to the data, see <https://www.datafirst.uct.ac.za/dataportal/index.php/catalog/702/study-description>.

contract workers. Unionization is also found to amplify wage disparities, with the union wage premium particularly pronounced among permanent workers. Finally, rent-sharing is found to be key channel driving wage segmentation within the formal sector, with the combination of union membership and permanent employment raising the bargaining power of workers in the sharing of rents. These findings underscore the multi-tiered nature of labour market segmentation in Zimbabwe and illustrate how the complementarity between labour market regulations governing unionisation and permanent employment contracts raise the bargaining power of workers.

The rest of the paper is structured as follows: Section 2 presents the literature review on segmentation. Section 3 discusses the data. The discussion of the empirical strategy and findings is presented in section 4 and section 5 provides the conclusion.

1.1. Zimbabwe

Zimbabwe is a low-income economy characterised by repeated economic crises. Loose monetary and fiscal policy, foreign exchange rationing, and structural challenges culminated in major recessions and hyperinflation in 2000-2008 and 2019-2020 (World Bank, 2024). At its peak, inflation reached 231 million percent in 2008, before stabilising following the dollarization of the economy in 2009. The recovery, however, was fragile and remained susceptible to continued external (e.g., lower commodity prices, droughts and floods) and internal (government deficit, trade deficit, monetary policy) instability, combined with political uncertainty (Kamutando & Edwards, 2024). Annual growth in real gross domestic product, for example, recovered from a decade of negative growth rates to around 16 percent from 2009 to 2012, but then dropped to 2.8 percent from 2013 to 2018, before turning negative (-7.1 percent per annum) in 2019 and 2020.³

The Zimbabwean economic crises have had a profound impact on production, industrialization and employment (Confederation of Zimbabwe Industries [CZI] 2012; World Bank 2012; World Economic Forum 2017). During the early 1990s, Zimbabwe possessed one of the most advanced and diversified industrial sectors in Africa (Gunning and Oostendorp 1999). In 1993, the manufacturing sector contributed 24 percent of the gross domestic product (GDP) and accounted for 21 percent of non-agricultural formal employment. As shown in **Fehler! Verweisquelle konnte nicht gefunden werden.**, by 2011, three years following the cessation

³ Own calculations using data obtained from the World Development Indicators.

of hyperinflation, the share of manufacturing in non-agricultural employment had declined to 14.5 percent (or 269 826 employees). The manufacturing share of non-agricultural employment continued to fall with employment numbers falling to 217 977 in 2019, or 11.7 percent of non-agricultural employment (**Fehler! Verweisquelle konnte nicht gefunden werden.**).

The deindustrialization of the economy was accompanied by an informalization of employment, particularly in manufacturing. Whereas employment in the formal manufacturing sector fell from 192 572 to 67 097 from 2011 to 2019, employment in informal manufacturing nearly doubled from 77 254 to 150 880 (**Fehler! Verweisquelle konnte nicht gefunden werden.**). The informal sector share of employment in manufacturing rose from 28.6 percent to 69.2 percent over the period. The increase in informal sector share of employment in manufacturing was substantially higher than for the rest of the non-agricultural sector.

Table 1. Summary statistics on employment in the formal and informal sector in Zimbabwe, 2011 and 2019.

	2011		2019	
	Employed	Share (%)	Employed	Share (%)
<i>Non-agricultural</i>				
Formal	1 292 615	69.6	879 677	47.4
Informal	564 518	30.4	975 880	52.6
Total	1 857 133	100.0	1 855 557	100.0
<i>Manufacturing</i>				
Formal	192 572	71.4	67 097	30.8
Informal	77 254	28.6	150 880	69.2
Total	269 826	100.0	217 977	100.0
<i>Share manufacturing in non-agricultural employment</i>				
Formal		14.9		7.6
Informal		13.7		15.5
Total		14.5		11.7

Source: Own calculations using data from the 2011 (ZIMSTAT, 2012) and 2019 Labour Force Surveys (ZIMSTAT, 2020). The employment numbers are for informal production units, that by definition, are not registered with the Registrar of Companies. Note that this differs from informal employment that paid employees not entitled to any of the following: contribution to pension fund by employer, paid annual leave, paid sick leave and written contract with employer.

The informal manufacturing firms in Zimbabwe produce in designated areas in the urban centres. Although informal and formal manufacturing firms are spatially segregated, they compete in the production and sale of goods, mainly in the textile, metal and wood industries (Couasnon, Mutsaka & Robalino, 2021; Kamutando & Edwards, 2024). For example,

according to the 2016 World Bank Enterprise Survey data for Zimbabwe, 40.8 percent of manufacturing firms identify practices of competitors in the informal sector as a major or very severe constraint, with 76.7 percent noting that they compete against unregistered or informal firms. These shares are higher than the average for Sub-Saharan Africa.⁴ Further, firms in both sectors are integrated in the production value chain, with informal firms purchasing intermediates from the formal sector, while formal sector firms outsource production to informal producers (e.g., in the clothing industry) (Luebker 2008).

Turning to labour regulations, wage determination in the formal private sector is primarily done through industry-level collective bargaining between representative unions and employer associations in National Employment Councils. The outcome of these negotiations is a legally binding Collective Bargaining Agreement (CBA) that sets minimum conditions of employment (minimum wage, working hours and overtime pay, leave entitlements, disciplinary procedures and grievance mechanisms, etc) for different grades and occupations that are applicable to formal sector employers and employees in the industry, irrespective of whether they participated in negotiations. Within firm negotiations between employers and unions for wages above the industry minimum are also permitted. However, private sector compliance of these agreements is argued to be low, due to poor monitoring and implementation. Firms also make widespread use of contract labour to avoid paying the minimum wage (Nathan Associates, 2016). This may explain the relatively low share of manufacturing firms identifying labour regulations as a major or severe constraint to their operations in the 2016 World Bank Enterprise Survey (15.3 percent).

2. Empirical method

Our empirical analysis is structured around identifying three key relationships. Firstly, we explore the extent to which labour markets are segmented in Zimbabwe by estimating the wage gap between workers in formal and informal sector firms. Secondly, we test for heterogeneity in segmentation by splitting formal sector workers into permanent and contract workers and estimating how segmentation varies across the wage distribution using the Recentered Influence Function (RIF) decomposition technique. Thirdly, we test the relevance of the rent-sharing model in explaining wage gaps, and how union membership and permanent worker

⁴ Based on data downloaded from the World Bank Enterprise Survey sites <https://www.enterprisesurveys.org/en/data/exploreconomies/2016/zimbabwe#informality>.

status affects bargaining power of the different labour market subgroups. This allows us to infer the extent to which labour regulations are a source of segmentation.

To test for segmentation, we estimate using Ordinary Least Squares (OLS), the following wage equation

$$\log W_{if} = \alpha + \theta^j \text{Segment}_{if}^j + X'_{if}\gamma + Z'_f\rho + \epsilon_{if} \quad (1)$$

where $\log W_{if}$ is the logarithm of hourly wages for worker i in firm f , Segment_{if}^j is an indicator dummy variable that indicates a worker's segment, j , of employment (informal, formal, permanent and/or contract), X_{if} denotes a vector of individual, job and human capital characteristics for worker i , Z_f denotes the vector of firm characteristics (firm size, firm age, capital intensity firm industry and location dummies), and ϵ_{if} is the error term. Our coefficient of interest is θ^j that measures segmentation, namely the unexplained wage gap between segments. Our approach is to first test segmentation between formal and informal workers, and then between informal workers, formal contract workers and formal permanent workers.

To further characterise the segmentation, we use 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. 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).

To determine whether rent-sharing drives the wage gap, we draw on the bargaining model of Blanchflower *et al.* (1996) as applied by Rycx & Tojerow (2004) and extend equation (1) to include profits per worker, $\left(\frac{\pi}{n}\right)_f$. The resulting specification is shown in equation (2)

$$\log W_{if} = \alpha + \theta^j \text{Segment}_{if}^j + X'_{if}\gamma + Z'_f\rho + \sigma \left(\frac{\pi}{n}\right)_f + \epsilon_{if} \quad (2)$$

where π denotes firm profit and n denotes number of workers in the firm. A positive and significant coefficient σ confirms the importance of rent-sharing in accounting for wage gaps. A negative coefficient, on the other hand, implies that an increase in firm profits is associated with a decrease in wages, suggesting the presence of firm monopsony power in setting wages. Again, this provides evidence of segmentation through product market distortions.

We then dig deeper to infer how labour regulations may drive labour segmentation within the formal sector. We use as our proxies for labour regulations a worker's contract status (permanent vs. contract) and membership in a union. We hypothesise that bargaining power will be stronger for permanent compared to contract workers, and for union members compared to non-union members. We restrict the sample to formal sector firms given that labour regulations are mostly not binding on informal sector firms. We estimate the following equation (3)

$$\log W_{if} = \alpha + \beta_1 \text{Bargain}_{if} + \beta_2 \left(\frac{\pi}{n}\right)_f + \beta_3 \left(\left(\frac{\pi}{n}\right)_f \times \text{Bargain}_{if}\right) + Z'_f \rho + X'_{if} \gamma + \epsilon_{if} \quad (3)$$

where Bargain_{if} denotes the proxy for bargaining power (permanent vs. contract, union vs. non-union). Our coefficients of interest are β_1 , β_2 and β_3 . We expect permanent workers and union members to earn higher wages than their counterparts (positive coefficient β_1). Also included in the regression is an interaction between bargaining power and firm profits per worker. Theoretically, we expect the coefficient on this interaction term (β_3) to be positive, indicating a stronger association between wages and profits in firms where workers have higher bargaining power (Hildreth & Oswald, 1997).

There are several considerations when estimating these relationships. The first consideration is selection bias. Unions may be more likely to establish themselves in profitable firms. Profitable firms may also be more likely to employ more productive workers. Workers with certain characteristics or attributes may also systematically self-select themselves either into the formal or informal sector. An example is when poorly educated people systematically choose to work in the informal sector. These selection effects will bias estimates of the profits per employee coefficient upwards. Although our estimates do control for individual characteristics such as education, residual selection bias may still remain.

Therefore, we adopt two approaches to control for selection effects. Firstly, we include firm fixed effects, whereby we identify segmentation by analysing drivers of wage gaps between worker segments using the variation in wages across workers *within* firms. Secondly, we use the Propensity Score Matching (PSM) technique as a robustness check.⁵ The matching is conducted at the worker level, with informal sector workers matched to formal sector workers

⁵ Propensity Score Matching (PSM) is an econometric method used to reduce selection bias in observational studies by matching treated and control units based on their estimated propensity scores, which represent the likelihood of receiving treatment given observed covariates. The technique creates a balanced comparison group, ensuring that the distribution of covariates is similar between treated and untreated units. By matching on the propensity score, PSM aims to isolate the causal effect of the treatment on the outcome variable.

based on observable characteristics. This approach ensures comparability between formal and informal workers and mitigates potential selection bias, providing a robust estimate of the wage gap.

A second consideration is the potential endogeneity between profits and wages. Endogeneity may, for example, arise in cases where firms offer efficient wages to increase workers' productivity, which in turn increases firm profits. Further, product market shocks may affect labour productivity and firm profitability concurrently. Under these scenarios, the coefficient on profits per employee estimated using OLS will be biased downwards. 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 as in Rusinek & Rycx (2013) and Matano & Naticchioni (2017). The second is to find a plausible instrumental variable that is correlated with profits per worker but not wages. We follow both these approaches, first by proxying profit-per-worker with lagged values of the sales-per-worker, then using the cost of electricity within the firm as an instrument as in Blanchflower *et al.* (1996), and Card, Devicienti & Maida (2014).⁶

3. Data

The empirical analysis draws on a matched employer-employee survey of Zimbabwean formal and informal manufacturing firms and workers that was collected between 2015 and 2016.⁷ The data was collected via structured interviews with owners or managers of manufacturing firms. Formal manufacturing firms were selected using stratified random sampling with three levels of stratification: firm size (5-19, 20-99, 100+), industry (6 industry strata based on 2-digit ISIC Rev.2) and main industrial location (Harare and surrounds, Bulawayo, Gweru, Kwekwe/Redcliff, and Mutare). In total, 195 interviews were completed out of an estimated universe of 973 firms.

The informal sector survey only covered the major informal sector manufacturing industries (Metal; Wood and furniture; and Textile and leather) in the two largest urban cities in Zimbabwe (Harare and Bulawayo), where the bulk of informal manufacturing activity takes place. Informal manufacturing industries tend to cluster in specific locations (for example, the

⁶ There is a strong correlation between lagged sales per worker and profits per worker, making lagged sales per worker a credible proxy (see Table A1 in the appendix for the correlation results). Additionally, we find a strong correlation between the cost of electricity and profit per worker (see Table A2 in the appendix).

⁷ Access to the data and documentation on the survey questionnaire and sampling methods is available at <https://www.datafirst.uct.ac.za/dataportal/index.php/catalog/702/>.

furniture industry is located in Glenview Area 8). A two-stage sampling process was followed, with random draws of blocks of roughly equal numbers of firms for each industry within each region, and then random draws of firms within each of these blocks.

For both formal and informal firms, a selection of workers were interviewed. In 2016, follow-up interviews were conducted targeting both formal workers and informal manufacturing workers, as well as owners of informal firms. In Wave 1 (2015), the dataset includes a total of 1,559 workers, consisting of 1,385 formal sector employees and 174 informal sector employees. In Wave 2 (2016), a total of 1,263 employees were re-interviewed (1,164 formal employees and 99 informal employees).

The surveys provide detailed information on firm and worker characteristics. The firm survey, for example, contains information on sales, raw material costs, indirect costs, capital stock, labour inputs and age among other information. The worker surveys contain information on age, education, gender, wages, hours worked, experience, union membership, methods of payment, etc. Additional information from re-interviews includes transition of workers between and within sectors between 2015 and 2016.

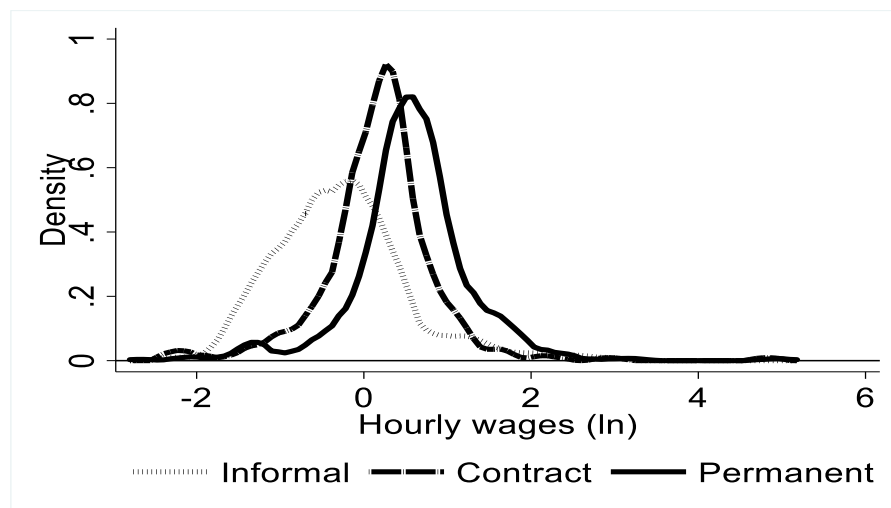
For comparability purposes, the specifications between the formal and informal sectors are restricted to cover the overlapping industries (metal, wood, and textiles). This provides a sample of 614 formal workers out of the initial sample of 1385, and 134 informal workers. In the rent-sharing analysis that focuses only on formal sector workers, firms (194 firms) and workers (1096) from all industries are used.

3.1. Summary statistics

Fehler! Verweisquelle konnte nicht gefunden werden. presents summary statistics of key firm and worker indicators using the overlapping sample of industries for the base year 2015. Wages, net of taxes, are converted to hourly rates and include non-monetary wages received in the form of allowances such as food, transport, airtime and pension contributions among others. There is a clear wage hierarchy, with permanent workers earning more per hour (US\$ 1.6) than contract workers (US\$ 1.2), who in turn earn more than informal workers (US\$ 0.7). However, there is significant heterogeneity in wages as shown in the high standard deviations in **Fehler! Verweisquelle konnte nicht gefunden werden.**, as well as the kernel density estimates of informal and formal contract and permanent worker wages presented in **Fehler! Verweisquelle konnte nicht gefunden werden.** While the informal sector wage distribution is to the left of

the formal sector wage distributions, there is substantial overlap of wages, particularly between informal and formal contract workers.

Figure 1: Wage distributions within and between the formal and informal sector



Notes: Hourly wages are in natural logarithms. The sample only covers the overlapping metal, wood, and textiles industries for plausible comparisons.

Returning to Table 2, formal sector workers are more educated, have more experience, are older, are more likely to receive job allowances, and are more likely to be paid their wages per time period compared to informal sector workers. Workers in the manufacturing sector are disproportionately male (83 percent share), with no discernible difference across formal and informal sectors. Formal sector employees work fewer hours per week (44 percent vs. 51 percent), but this difference is more than offset by the wage difference, implying higher weekly earnings for formal sector workers compared to informal sector workers.

Table 2: Summary statistics on key variables for the formal sector and 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	0.50	0.64	0.16	0.58	-0.32	0.79
Education Level								
1. Primary (share)	0.07	0.26	0.09	0.29	0.03	0.18	0.04	0.20
2. Secondary (share)	0.78	0.42	0.73	0.44	0.87	0.34	0.89	0.31
3. Tertiary (share)	0.15	0.36	0.17	0.38	0.09	0.29	0.07	0.25

Experience (years)	5.82	7.53	6.00	7.65	5.45	7.28	3.02	4.31
Training	0.08	0.28	0.11	0.32	0.02	0.14	0.00	0.00
Age (years)	42.26	11.58	44.54	10.84	37.48	11.65	29.66	9.03
Gender (share male)	0.83	0.38	0.87	0.34	0.74	0.44	0.82	0.38
Married (share)	0.89	0.32	0.91	0.28	0.83	0.38	0.73	0.45
Weekly hours of work	43.89	4.60	43.75	4.67	44.18	4.45	50.86	10.14
Methods of Payment								
1. Per time period (share)	0.96	0.21	0.96	0.20	0.95	0.22	0.51	0.50
2. Piece rate (share)	0.01	0.11	0.01	0.10	0.01	0.12	0.31	0.46
3. % of firm sales (share)	0.02	0.15	0.02	0.14	0.03	0.17	0.14	0.35
4. Commission (share)	0.01	0.10	0.01	0.11	0.00	0.07	0.05	0.21
Job allowance (share)	0.56	0.50	0.60	0.49	0.47	0.50	0.41	0.49
Union membership (share)	0.42	0.49	0.49	0.50	0.29	0.45	0.00	0.00
Other jobs (share)	0.32	0.47	0.28	0.45	0.39	0.49	0.11	0.31
N	614		414		200		135	

Notes: Computed from employer-employee dataset for the base year 2015. Presents summary statistics for the key variables used as explanatory variables in the analysis after considering overlapping missing data. The table presents statistics for overlapping industries between formal and informal sectors. Experience is measured as the years of experience before starting to work at the current place of work.

Looking at firm characteristics in Table 3, formal sector firms are on average older, larger (in terms of employment), more capital-intensive and more productive firms. For example, the average age for formal sector is 39.8 years old, compared to 8.6 years for informal sector workers. In terms of productivity, measured as value added per worker, formal sector firms are more productive than the informal sector firms. The gap in capital-intensity is even larger (20 times larger for formal sector firms), reflecting substantially higher barriers to accessing capital for informal firms (Kamutando & Edwards, 2024).

Table 3: Firm characteristics

	N	Mean	Std.Dev	Min	Max
Formal firms					
Profit per worker	79	9.34	1.50	4.28	11.83
Union share	79	0.59	0.40	0	1.00
Capital-labour ratio (log)	79	8.47	1.42	5.47	13.13
Value-added per worker (log)	79	8.46	1.24	4.26	10.04
Firm age (level)	79	35.84	22.23	0	85.00
Firm size (number of workers)	79	69.15	89.07	4.00	600.00
Informal firms					
Profit per worker (log)	119	8.72	0.69	6.80	10.51
Union share	119	-	-	-	-
Capital-labour ratio (log)	119	5.48	1.23	2.08	11.03
Value-added per worker (log)	119	7.75	0.84	5.35	9.75

Firm age	119	8.57	6.34	0	25.00
Firm size (number of workers)	119	3.08	1.48	1.00	10.00

Notes: Authors' analysis based on the Zimbabwe Manufacturing Firm Survey firm-level data. Presents summary statistics for the key firm characteristics after taking into overlapping industries between formal and informal sectors and missing data.

3.2. Labour market rigidities and worker mobility between the formal and informal sectors

In addition to wage gaps, labour market segmentation is characterized by low mobility of workers between sectors (Conover, Khamis & Pearlman, 2022). To evaluate this, Table 4 Fehler! Verweisquelle konnte nicht gefunden werden. uses the panel dimension of the worker survey data to present the change in labour market status (formal permanent, formal contract, informal worker, informal firm owner) of workers between 2015 and 2016. We observe very low levels of mobility between formal and informal employment and between contract and permanent positions within the formal sector. Looking at column (1), 77 percent of formal permanent workers in 2015 remained permanently employed in 2016. Of the remainder, none entered into informal wage employment, while 4 percent entered the informal sector as firm owners and 7 became unemployed (primarily as a result of firm closures and retirement). Similarly, as shown in column (2) no formal contract workers shifted into informal wage employment and 21 percent obtained permanent contracts in 2016. 15 percent of contract workers in 2015 became unemployed over the period, reflecting the vulnerability of their employment positions.⁸

Table 4: Mobility of workers across different labour segments (percent)

		2015			
		Formal Sector		Informal Sector	
Employment status		Permanent	Contract	Informal Workers	Informal firm owners
		(1)	(2)	(3)	(4)
2016	Permanent	76.92	21.05	0.00	na
	Contract	11.94	56.91	9.21	na
	Informal Workers	na	na	35.53	na
	Informal firm owners	3.85	7.24	50.00	98.98
	Unemployed	7.29	14.80	5.26	1.02

⁸ The main reasons provided were company closures and the termination or non-renewal of their employment contracts. It should be noted that 19% of those interviewed did not respond in 2016, creating a potential problem of non-response bias. We examine whether non-response among workers was systematic by conducting an attrition regression analysis. Our findings indicate no evidence of systematic non-response, suggesting that any potential bias is minimal.

Total	100.00	100.00	100.00	100.00
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Notes: Movement of workers across different labour market segments between 2015 and 2016. Permanent and contract workers constitute the formal sector, while informal workers and informal firm owners constitute the informal sector. The table is constructed based on the workers that responded both in 2015 and 2016. na denotes ‘not applicable’.

Looking at informal workers (column 3), we see much greater mobility of workers across labour market status, with 65 percent percent of 2015 workers changing labour market status. None of the 2015 informal workers transitioned into permanent contract positions in the formal sector over the period, although 9 percent obtained contract jobs in the formal sector. The bulk (50 percent) shifted to being informal firm owners, while a few (5 percent) became unemployed. Finally, informal firm owners’ mobility rates are very low, with 99 percent not transitioning from being informal firm owners over the period.

The low transition into and out of permanent employment suggests a high degree of rigidity in the formal labour market. Additional insights on labour market inflexibility are provided in Table 5 that presents the responses by firm owners and managers on factors preventing the laying off permanent workers should they wish to do so.

Table 5: Main factors preventing firms from laying off workers in the formal sector and informal sector (percent).

	Formal Sector Firms	Informal Sector firms
No difficulty	13.85	85.50
Difficult redundancy procedures	30.72	0.00
High severance pay	37.35	0.00
Difficulties in rehiring workers	9.04	12.98
Other	9.04	1.52
Total	100.00	100.00

Notes: Measures of employment flexibility in the formal and informal sector. Firms were asked: What is the main factor preventing the firm from laying off permanent workers?

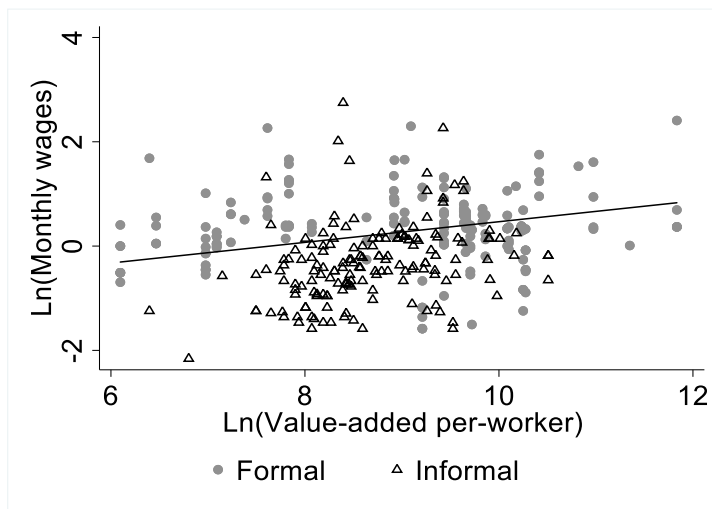
The contrast between the formal and informal sector firms is striking. 85.5 percent of informal sector firms find no difficulty in laying off workers, compared to 13.9 percent of formal sector firms. 68 percent of formal sector firms reported difficult redundancy procedures (that includes the requirement that firms seek approval from the trade unions and the government to lay off workers) and high severance pay as the main challenges preventing lay-offs. These results point to the potential contribution that labour market regulations may play in driving wage segmentation in Zimbabwean manufacturing sector. Further, these rigidities may increase the

bargaining power of permanent workers in negotiating above-market equilibrium returns, as predicted by rent-sharing models.

3.3. Relationship between firm profits and wages (Rent-sharing)

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.⁹ A positive relationship is revealed 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 value-added per worker and monthly wages for the base year, 2015. Value-added-per-worker is a proxy for profits per worker. All variables are in natural logs. The triangle scatters represent the informal sector while the circle scatters represent the formal sector. The solid-fitted line is for all workers.

⁹ The problem 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 & Wadhvani, 1990; Hildreth & Oswald, 1997; Margolis & Salvanes, 2001).

4. Results

This section presents the results of the Mincerian wage regressions. We first present evidence on the wage differentials across different segments (as specified in equations 1 and 2), then decompose the wage differentials to further characterise segmentation, and then, finally, analyse the extent to which labour regulations and institutions drive wage segmentation (as specified in equation 3).

In estimating the wage segmentation relationship, we make use of several individual and firm controls to deal with potential confounding influences driving wage gaps. *Individual worker characteristics* include Marital status (coded 1 if married, zero otherwise) to control for the possible perception by owners that married workers are relatively motivated, stable and disciplined and hence more productive (Benham, 1974; Cohen & Haberfeld, 1991) and individual age, including its square to account for non-linear effects. *Human capital* variables include education categorised as primary education, secondary education and tertiary education to also allow for non-linear effects as is commonly found amongst developing countries (Keswell & Poswell, 2004; Card, 1999), and experience and training. Experience is measured as the years of experience before starting to work at the current place of work. *Firm characteristics* comprise firm size, firm age, capital intensity, firm industry and firm location. Finally, *Job characteristics* include job allowance (1=yes and 0 otherwise), method of payment (1=Per time period, 2=Piece rate, 3=percentage of firm sales, 4=Commission and union membership (1=yes and 0 otherwise). Job allowance refers to benefit allowances (e.g., food, transport, and housing allowance) that are given to workers in addition to their wages.

Identifying the extent of segmentation: the wage differentials

Table 6 presents the results for hourly wage differentials between the formal and informal sector workers based on equation (1). Column (1) presents the baseline results that exclude controls – the raw wage gap and reveal a significant (at 1 percent level) wage gap of -67 log points (or 49 percent).¹⁰ In column (2) we control for individual and human capital endowments (such as education and experience). The wage gap falls to -51 log points (40 percent), reflecting the higher human capital endowment of workers in the formal sector, but it remains significant at the 1 percent level.

¹⁰ Calculated as $\exp(\beta)-1$.

Table 6: The wage gap between the formal and informal manufacturing sector workers

VARIABLES	(1) Base	(2) +Human Capital	(3) +Job Characterist ics	(4) +Firm Controls	(5) Permanent
Informality	-0.666*** (0.0724)	-0.510*** (0.077)	-0.407*** (0.098)	-0.270** (0.135)	-0.152 (0.138)
Permanent					0.213*** (0.055)
Gender		0.240*** (0.064)	0.260*** (0.066)	0.191*** (0.073)	0.163** (0.072)
Age		0.022 (0.014)	0.030** (0.014)	0.027** (0.013)	0.019 (0.014)
Age square		-0.000 (0.000)	-0.000* (0.000)	-0.000 (0.000)	-0.000 (0.000)
1. Married		0.221*** (0.081)	0.198*** (0.076)	0.202*** (0.075)	0.213*** (0.074)
Education Level					
2. Secondary		0.066 (0.098)	0.041 (0.097)	0.037 (0.097)	0.048 (0.098)
3. Tertiary		0.563*** (0.119)	0.539*** (0.118)	0.500*** (0.118)	0.479*** (0.119)
Experience		0.002 (0.009)	-0.000 (0.009)	-0.000 (0.009)	0.003 (0.009)
Experience square		0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
1. Job allowance			0.087* (0.046)	0.056 (0.046)	0.046 (0.046)
Method of payment					
2. Piece rate			-0.030 (0.148)	0.029 (0.145)	0.033 (0.147)
3. % of firm sales			-0.535*** (0.181)	-0.439** (0.175)	-0.421** (0.175)
4. Commission			0.085 (0.152)	0.140 (0.118)	0.105 (0.127)
Firm age				-0.006*** (0.001)	-0.006*** (0.001)
Capital-labour ratio (ln)				0.014 (0.019)	0.013 (0.019)
Firm size (ln)				0.100*** (0.026)	0.104*** (0.025)
Constant	0.392*** (0.0259)	-0.673** (0.288)	-0.868*** (0.288)	-0.958*** (0.358)	-0.905** (0.354)
Observations	749	749	749	749	749
R-squared	0.127	0.222	0.252	0.290	0.303

Job characteristics	NO	NO	YES	YES	YES
Firm characteristics	NO	NO	NO	YES	YES

Notes: The dependent variable is the log of hourly wages. Informality is a dummy variable coded 1 for an informal wage worker and 0 for formal sector workers. 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, in column (4) we add firm controls. In column (5), we include a dummy variable for permanent workers, coded as 1 for permanent and 0 otherwise. Job characteristics include job allowance and methods of wage payment (the base comparison group is ‘Per-time period’) aimed to control for job quality. Firm controls include firm age, firm size, capital intensity, industry and location dummies. The sample is restricted to similar industries between formal and informal sectors. The regressions are based on the 2015 base year data. Asterisks denotes level of significance (***) $p < 0.01$, ** $p < 0.05$, * $p < 0.1$). Robust standard errors are in brackets.

According to the competitive theories of labour markets, earning differentials should be exclusively explained by differences in human capital endowments (Mincer, 1974; Becker 1993). The fact that we observe a huge wage gap after controlling for human capital endowments is the first indication that the labour markets between the formal and informal sectors in Zimbabwe are segmented, and the extent of segmentation is quite high.

The regression results in column (4) introduce firm-specific controls, allowing for an exploration of how firm heterogeneity influences labour market segmentation. The inclusion of these variables—such as firm size (as measured by number of workers), capital intensity, and firm age—results in a significant reduction in the magnitude of the informality gap from -41 log points to -27 log points (or 23.7 percent lower wage). This attenuation suggests that part of the observed segmentation between formal and informal sector is attributable to differences in the firms these workers are employed. Further evidence of the imperfection of labour markets, is revealed by the significant positive association between firm size and wages. A 10 percent rise in firm sales is associated with a one percent higher wage. This finding corroborates those of Velenchik (1997) who uses Zimbabwean manufacturing survey data collected in the early 1990s.

By accounting for firm heterogeneity, the model captures the role that firm-level attributes play in shaping the disparities between formal and informal workers, emphasizing that segmentation is not solely a function of individual or job characteristics but also reflects structural differences across firms. This underscores the importance of firm-level dynamics in understanding and addressing labour market segmentation.

As argued in the above sections, we may think of short-term contract workers in the formal sector as some form of formal sector ‘informalisation. In column (5), we, therefore, test for the existence of wage gaps between formal permanent, formal contract, and informal sector workers by the inclusion of a dummy variable for permanent employment status. Formal sector contract workers serve as the base category. The results reveal a significant positive wage gap between permanent and contract workers (within formal sector segmentation), as evidenced by the positive and statistically significant (at 1 percent) coefficient for the permanent dummy (21 log points). In contrast, the coefficient for informality of -15 log points is not statistically significant, suggesting no wage difference between informal workers and formal sector contract workers.

These findings highlights a multiplicity of labour market segmentation that goes beyond the traditional formal-informal segmentation. The informal-formal wage segmentation in Zimbabwean manufacturing appears to be primarily driven by higher wages of permanent workers. As argued earlier, this may arise from labour market rigidities that delineate permanent and contract workers, with temporary work contracts being used by firms that seek some flexibility in employment and wages (Deakin, 2013).

We test the robustness of these findings in several ways. To control for potential selection of workers into formal and informal sectors, Table 7 compares monthly and hourly wages of formal workers that also hold informal jobs.¹¹ Consistent with segmentation, these workers consistently earn higher monthly wages in their formal sector jobs than their informal sector jobs. However, when wages are assessed on an hourly basis (only possible using 2016 data), the picture is reversed with significantly higher average hourly wages (USD3.85) for formal-informal workers in the informal sector job compared to the formal sector job (USD1.78). These formal-informal sector workers appear to be working fewer hours at higher hourly wage rates in their informal jobs, while engaging in longer working hours at lower hourly wages in their formal sector jobs. These patterns underscore the complex dynamics of wage segmentation across formal and informal employment.

¹¹ Only the questionnaire for formal workers requested information on informal jobs. Workers in the informal sector survey were not asked about other jobs held in the formal sector.

Table 7: Comparisons of formal and informal sector wages (in USD) for formal workers that also hold informal jobs.

	Monthly Wages in 2015 (USD)	Monthly Wages in 2016 (USD)	Hourly wages in 2016 (USD)	Number of weekly hours in 2016
Formal monthly wages	308	333	1.78	44
Informal sector wages	228	191	3.85	16

Notes: Presents the average wages in the formal and informal sector for formal workers who also have other jobs in the informal sector. In 2015, no information on hours worked in other informal sector jobs was recorded and the average monthly wages are presented. For 2016, both monthly and hourly wages are presented.

As an additional approach, Table 8 shows the changes in hourly wages for the sample of workers that transition between different employment types. These values therefore reflect the average within-worker change in wages as the individual's employment status changes. A comparison of the individual's wage changes does not perfectly control for selection effects (e.g. less productive workers may lose employment and transition to lower wage jobs), but the results corroborate the findings of wage segmentation. Workers transitioning from permanent to contract employment experienced a decrease, albeit modest, in their hourly wages. Individuals transitioning from contract to permanent positions see a significant increase in hourly wages, rising from USD1.36 in 2015 to USD1.68 in 2016. The most significant shift in earnings is observed among workers moving from informal to contract employment, with hourly wages rising from USD0.78 in 2015 to USD1.22 in 2016.

Table 8: Comparison of hourly wages (in USD) for individuals before and after transitioning.

	Wages in 2015 (USD)	Wages in 2016 (USD)	Number of workers
Permanent to contract	1.93	1.89	87
Contract to permanent	1.36	1.68	61
Informal to contract	0.78	1.22	7

Notes: Presents the averages for individuals who transitioned between permanent, contract and informal employment status. No permanent or contract workers transitioned to the informal sector, and no informal wage workers transitioned to permanent positions in the formal sector.

As a final robustness test, we draw upon PSM econometric technique. The validity of PSM results hinges on two key assumptions: unconfoundedness (no unobserved confounders) and common support (sufficient overlap in propensity scores between formal and informal worker

groups). A visual inspection of the density distribution for formal and informal workers plotted in Figure A1 (in the appendix), indicates that the common support condition is satisfied. There is substantial overlap in the propensity score distribution for the two groups, ensuring that comparable informal sector workers exist for the formal sector workers across the range of observed characteristics. The overlap supports the validity of the matching process, as it ensures that treatment effects can be estimated for individuals with similar observable covariates.

The PSM estimates of wage gaps (see Table A3 in the appendix) tend to be larger than the OLS estimates presented in Table 6. Monthly wages in the informal sector are estimated to be 38.5 log points lower than in the formal sector after controlling for individual and firm characteristics. Disaggregating formal sector workers according to contract status, reveals significantly higher wages for permanent workers compared to contract workers (22.6 log points). Further, in contrast to the insignificant association found in Table 6, informal sector wages are now found to be significantly lower (-25.9 log points) than contract workers in the formal sector. Overall, the consistency of the results point to the presence of multiple tiers of segmentation in the labour market.

4.1. Decomposing wage segmentation

To provide further insight into the sources contributing towards the wage gap, column (1) in Table 9 presents an Oaxaca-Blinder decomposition that breaks down the difference in the mean wage between formal and informal manufacturing sector workers into a part explained by worker and firm characteristics, and an unexplained component.¹² The results illustrate that observed worker and firm characteristics account for 61 percent (0.404/0.666) of the wage gap, with the residual reflecting the degree to which formal and informal sector labour markets are segmented. The results also reveal the relevance of firm characteristics in driving average wage gaps, with these characteristics explaining 23.5 percent (0.157/0.666) of the mean raw wage gap, and 38.9% of the explained wage gap. The significance of firm characteristics in

¹² 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 and has been used to measure the extent of segmentation. We have controlled for exactly the same variables as in the regression presented in Table 6.

explaining the wage gap is inconsistent with competitive theories of labour markets where wage differentials arise solely from differences in human capital endowments.

Table 9: Wage gap decomposition: Formal vs informal sector

Quantiles	Oaxaca-Blinder	(1)	(4)	(7)
		The RIF decomposition		
		10th	50th	90th
Formal	0.392*** (0.026)	-0.279*** (0.067)	0.401*** (0.023)	1.119*** (0.055)
Informal	-0.274*** (0.068)	-1.231*** (0.079)	-0.309*** (0.070)	0.579*** (0.219)
Wage gap	0.666*** (0.072)	0.952*** (0.104)	0.709*** (0.074)	0.540** (0.225)
Explained	0.404*** (0.105)	0.822*** (0.284)	0.302*** (0.097)	0.423* (0.229)
Unexplained	0.262** (0.123)	0.130** (0.061)	0.407*** (0.119)	0.117 (0.320)
Explained				
Individual characteristics	0.150*** (0.039)	0.059 (0.107)	0.158*** (0.039)	0.372*** (0.089)
Human Capital	0.031* (0.017)	0.075** (0.034)	-0.005 (0.015)	0.055** (0.022)
Job characteristics	0.066* (0.039)	0.029 (0.020)	0.009 (0.006)	0.004 (0.013)
Firm controls	0.157* (0.091)	0.659** (0.267)	0.139 (0.090)	-0.007 (0.212)
Observations		749	749	749

Notes: Column (1) presents the Oaxaca-Blinder decomposition. Columns (2)-(4) 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.

A weakness of the Oaxaca-Blinder decomposition is that it decomposes the wage gap at the mean. To assess whether the wage gap varies across the wage distribution, columns (2) to (4) of Table 9 present the results of the RIF decomposition for the 10th, 50th and 90th quantiles. The wage gap is found to be largest at the lower quantile (95.2 log points) at the lower end of the wage distribution (10th quantile) compared to the median (70.9 log points) and 90th quantile (54 log points). The unexplained component is significant at the 10th and 50th quantile of the wage distribution and accounts for 57 percent of the wage gap at the median. This finding suggests that segmentation is more pronounced at the lower part of the wage distribution.

The results further shows that human capital and individual are particularly important at the median and upper quantiles, indicating that education, skills, and experience become more critical for wage determination as workers move up the income ladder. In contrast, firm characteristics are a primary factor explaining wages gaps at the lower quantiles (69 percent of the raw wage gap), pointing to more pronounced labour market imperfections driving wages of low wage workers.

4.2. Driver of segmentation: Permanent work status, union membership and rent sharing as proxies for labour regulations.

This section tries to unpack the extent to which labour regulations, as proxied by permanent status and unionisation are a source of wage segmentation. Given that the labour legislation directly affecting employment contracts and wage bargaining pertain only to formal sector firms, we exclude informal sector firms, but expand the sample to include all manufacturing industries covered in the survey.

4.2.1. Permanent work status and union membership

On average, 42 percent of workers are members of unions (Table 2). However, union membership rates differ considerably across permanent and contract workers, with 49 percent of permanent workers members of a union compared to 29 percent of contract workers. These gaps are expected as permanent workers may be better able to enforce their right to establish unions that represent their interests within a firm. However, the presence of union membership for both permanent and contract workers suggests that union membership may be an additional channel driving wages gaps, over and above contract status.

Column (1) in

Table 10 establishes the baseline relationship between permanent employment, union membership and wages in the formal manufacturing sector. The regression also includes controls for worker and job characteristics, but to simplify the presentation, the coefficients on these variables are hidden. The coefficient on permanent employment status is positive and highly significant indicating a 21 log point higher wage for permanent workers compared to contract workers. Union membership also has a significant positive effect on wages (15 log points) reflecting the bargaining power of unions in securing better pay for workers.

Table 10: Drivers of segmentation within the formal manufacturing sector: Permanent work status and union membership

	(1)	(2)	(3)
Permanent (=1)	0.213*** (0.048)	0.164*** (0.060)	0.058 (0.058)
Union membership (=1)	0.145*** (0.042)	0.033 (0.069)	-0.007 (0.058)
Permanent × Union membership		0.149* (0.087)	0.276*** (0.076)
Constant	-0.699*** (0.251)	-0.700*** (0.252)	-0.515** (0.221)
Observations	1,096	1,096	1,096
R-squared	0.193	0.195	0.590
Human capital	YES	YES	YES
Job characteristics	YES	YES	YES
Firm characteristics	YES	YES	YES
Firm fixed effects	NO	NO	YES

Notes: The sample covers all formal sector manufacturing industries covered in the survey. The dependent variable is the log of *hourly wages*. 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, capital-labour ratio). Asterisk denotes level of significance (*** p<0.01, ** p<0.05, * p<0.1). Standard errors are in brackets.

Column (2) introduces an interaction term between permanent employment and union membership to examine whether the wage premium associated with union membership varies by employment contract. The coefficient on union membership becomes insignificant, while the coefficient on the interaction term is positive and significant (at 10 percent level). In column (3), we test the robustness of this finding with the inclusion of firm fixed effects to control for unobserved firm-level heterogeneity. The firm fixed effects also control for potential selection effects whereby higher wage firms are more likely to employ workers on a permanent basis. In these estimates, we use the variation in wages and individual characteristics across workers *within* firms to identify the relationships.

The coefficient on the interaction term increases in size and significance, while the coefficient on permanent status becomes insignificant. The wage premium for permanent workers within firms is, therefore, closely associated with union membership, with little impact of union membership for contract workers, and no significant difference in wages between contract workers and non-union permanent workers. It is the complementarity between labour legislation determining the permanent status of workers and the right of unions to bargain for

higher wages within firms over and above those negotiated through sectoral bargaining that appears to be a key driver of wage segmentation within formal manufacturing firms.

4.2.2. Rent-sharing

In this section, we test whether rent-sharing is the channel through which permanent unionised workers are able to bargain for higher wages. In the rent-sharing model, as specified in equations (2), the logarithm of hourly wages is regressed on the values of sales per worker, a proxy for firm profitability. A positive coefficient on sales per worker is consistent with the presence of rent-sharing as a source of wage segmentation. The presence of rent-sharing is already suggested by the positive association between wages and firm size, a commonly used proxy for firm productivity and profitability (Van Biesebroeck, 2005; Oi & Idson, 1999; Schmidt & Zimmermann, 1991), found in the regression results presented in Table 6. We extend the base regression using equation (3) and interact sales per worker with union membership and permanent status to identify whether these proxies for labour legislation enhance the bargaining power of workers in the sharing of rents. All the regressions control for worker, job and firm characteristics, and to control for simultaneity bias, we use lagged sales per worker.

Column (1) of Table 11 presents the baseline regression results. As found in

Table 10, wages are higher for permanent workers and union members. In addition, the results provide support for rent-sharing with wage levels rising with firm profitability. A 10 percent rise in firm profitability is associated with a 0.8 percent rise in wages. Column (2) introduces an interaction term between permanent employment and profit per worker to assess whether the rent-sharing mechanism varies by contract type. The interaction term is positive but statistically insignificant, suggesting that permanent status alone, does not enhance bargaining power. There is little change in the results if the firm characteristics are replaced by firm fixed effects, as shown in column (3).

Table 11. Drivers of segmentation: Rent-sharing

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Permanent (Yes=1)	0.185*** (0.047)	0.101 (0.352)	0.082 (0.345)	0.187*** (0.047)	0.158*** (0.047)	0.563 (0.438)	0.278 (0.382)
Union membership (Yes=1)	0.165*** (0.041)	0.160*** (0.042)	0.192*** (0.040)	-0.192 (0.309)	-0.266 (0.309)	1.136** (0.551)	0.061 (0.460)
Profit per worker	0.081*** (0.016)	0.076** (0.031)		0.066*** (0.020)		0.078** (0.039)	
Permanent × Profit per worker		0.009 (0.035)	0.007 (0.035)			-0.041 (0.043)	-0.022 (0.038)
Union membership × Profit per worker				0.036 (0.031)	0.047 (0.031)	-0.113* (0.058)	-0.007 (0.047)
Permanent × Union membership						-1.641** (0.649)	-0.342 (0.605)
Permanent × Union membership × Profit per worker						0.184*** (0.067)	0.063 (0.061)
Constant	-1.348*** (0.284)	-1.372*** (0.405)	-0.509** (0.223)	-1.191*** (0.309)	-0.504** (0.223)	-1.463*** (0.466)	-0.518** (0.223)
Observations	1,096	1,096	1,096	1,096	1,096	1,096	1,096
R-squared	0.220	0.215	0.586	0.221	0.587	0.229	0.591
Job characteristics	YES	YES	YES	YES	YES	YES	YES
Firm characteristics	YES	YES	NO	YES	NO	YES	YES
Firm fixed Effects	NO	NO	YES	NO	YES	NO	YES

Notes: The dependent variable is the log of *hourly wages*. Profit-per-worker is proxied by lagged sales 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, capital-labour ratio). Asterisk denotes level of significance (***) $p < 0.01$, (**) $p < 0.05$, (*) $p < 0.1$. Standard errors are in brackets.

In column (4), we focus on whether union membership enhances bargaining power to extract rents through the inclusion of an interaction between *union membership* and profit-per-worker. The results show an insignificant marginal difference suggesting that unionised workers do not bargain for higher shares of firm profits when compared to nonunionised workers. As with the prior results, the inclusion of firm fixed effects in column (5) does not alter this finding.

Finally, column (6) incorporates a three-way interaction among permanent employment, union membership, and profit per worker to examine the compounded effects of these institutional mechanisms. The interaction term is positive and statistically significant (at 1 percent), indicating that the combination of union membership and permanent employment status enhances the bargaining power of workers in the sharing of rents. The effect disappears once firm fixed effects are controlled for in column (7), suggesting some of the impact is being driven by differences in the bargaining relationships across firm types. Nevertheless, the analysis underscores the importance of institutional structures, particularly the interplay between unions and contract types, in shaping rent-sharing and segmentation within labour markets.

To test the robustness of these results to potential endogeneity of profits per worker, we re-estimate the equations, but use the declared cost of electricity by the firm as an instrument for sales per worker. The results presented in Table A4 in the appendix are qualitatively similar to those presented in Table 11. The coefficient on the profit variable and the triple interactions are actually larger in the instrumental variable (columns 1 to 6) suggesting that the profit-sharing results are not driven by potential endogeneity of profits.¹³

5. Conclusion

This paper analyses labour market segmentation within and between the formal and informal manufacturing sector in an emerging economy, Zimbabwe, and studies the potential role of labour market policies and rent-sharing in driving these outcomes. The study advances our understanding of labour market segmentation by moving beyond the traditional dualist framework, which often oversimplifies the dynamics of formal and informal sectors. The study

¹³ We also explored the influence of regulations by analysing firms' reported constraints on labour market flexibility reported in Table 5. We did not observe statistically significant results.

was made possible by the availability of a matched employee-employer data collected as part of the Zimbabwe Manufacturing Firm Survey 2015–2016.

The paper provides several insights. Firstly, we find strong evidence of multiple tiers of segmentation between and within the formal and informal manufacturing sector in Zimbabwe. Using Mincerian wage regressions, we find evidence of high wage differentials between formal and informal workers, as well as between permanent and contract workers within the formal sector. Further, the formal-informal wage gaps are more pronounced at the lower part of the wage distribution. These results are consistent with evidence of low worker mobility between the formal and informal sector, and between contract and permanent jobs in the formal sector.

Secondly, firm characteristics play a significant role in explaining raw wage gaps. The estimates show that introducing firm controls account for 24 percent of the raw wage gap, and nearly 40% of the explained wage gap. This result has two implications. The findings are inconsistent with the human capital model of wages, suggesting labour markets in Zimbabwe are not fully competitive. Secondly, studies that do not control for firm characteristics will exaggerate the formal-informal wage gap. More productive and larger firms, for example, pay higher wages. Failing to account for this influence will upwardly bias estimates of the wage gap.

Thirdly, labour legislation governing labour contracts and the right to establish unions play an important role in explaining wage gaps within the formal sector, particularly between permanent and contract workers. The wage of permanent workers is around 23 percent (21 log points) higher than contract workers. However, this gap is entirely explained by the complementarity between union status and permanent contract status. Permanent workers that are not members of unions are paid wages similar to contract workers.

Fourthly, increased bargaining power over the sharing of rents appears to be a key channel through which unionized permanent workers are able to raise their wages. Estimates of rent-sharing models reveal a significant association between firm profits and wages. This association is strongest for permanent workers that are also unionized, suggesting that union membership and permanent contract status enhance workers' bargaining power in negotiating wages.

These findings underscore the multi-tiered nature of labour market segmentation in Zimbabwe and illustrate how the intersection of labour market regulations governing unionisation and

permanent employment contracts may raise the bargaining power of workers. One word of caution is that our results are largely based on cross-worker differences in characteristics and wages and, despite attempts to control for this, may still be subject to residual selection bias. To properly test these associations, future studies could focus on securing or collecting panel data on formal and informal sector firms and workers.

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Appendix

Table A1. Correlation between lagged sales per worker and profits per worker

Variables	Sales per worker (lagged)	Profits per worker
Sales per worker (lagged)	1.000	
Profits per worker	0.685*** (0.000)	1.000

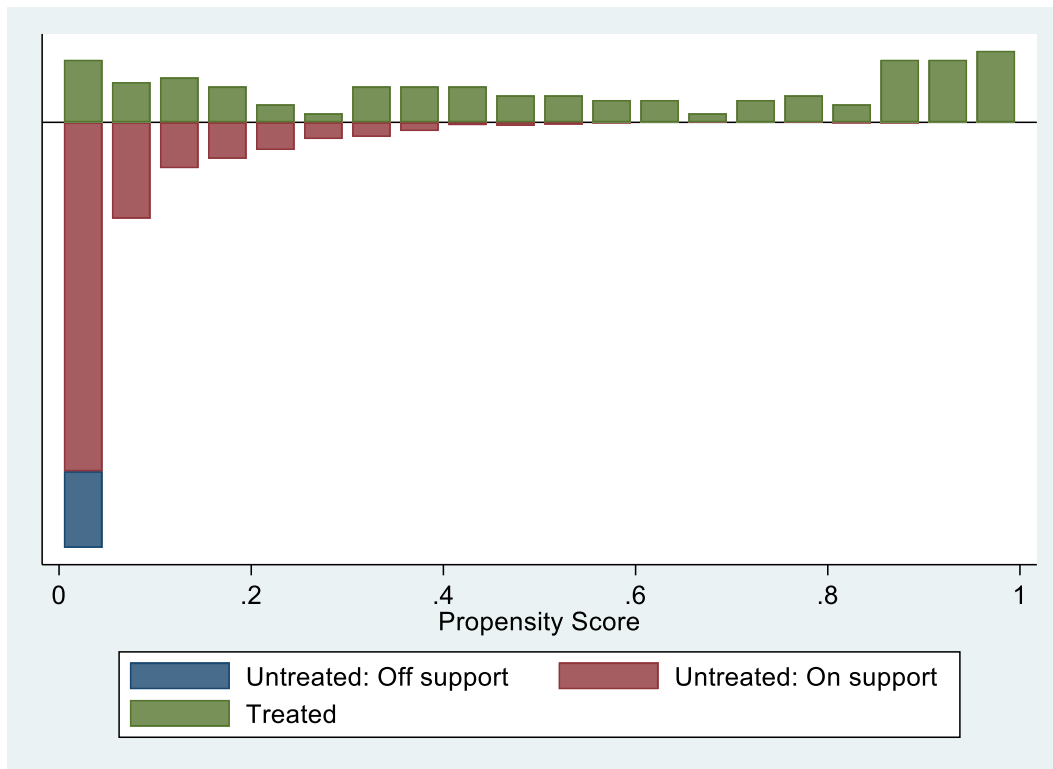
Notes: Presents the correlation between lagged sales per worker and profits per worker. A strong positive association suggest that sales per worker is a valid proxy for profits per worker. *** shows significance at $p < .01$

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

VARIABLES	(1)
Cost of electricity	0.348*** (0.019)
Constant	4.770*** (0.138)
Observations	1,096
R-squared	0.245
Controls	NO

Notes: Shows the correlation between profits-per worker and the instrument cost of electricity. *** shows significance at $p < .01$.

Figure A1. Propensity score distribution and common support for propensity score estimation



Notes: “Treated: on support” indicates the observations in the treated group that have suitable comparison. “Treated: off support” indicates that the observations in the treated that do not have a suitable comparison.

Table A3: PSM results: the wage gap comparison for formal and informal workers at the common support.

VARIABLES	(1) Base	(2) +Human Capital	(3) +Job Characteri stics	(4) +Firm Controls	(5) Permanent
Informality	-0.620*** (0.0729)	-0.504*** (0.077)	-0.413*** (0.097)	-0.385*** (0.141)	-0.259* (0.144)
Permanent					0.226*** (0.057)
Gender		0.241*** (0.067)	0.259*** (0.069)	0.193** (0.077)	0.159** (0.075)
Age		0.023 (0.018)	0.032* (0.017)	0.031* (0.016)	0.027 (0.017)
Age square		-0.000 (0.000)	-0.000* (0.000)	-0.000 (0.000)	-0.000 (0.000)
1. Married		0.216** (0.087)	0.183** (0.083)	0.176** (0.081)	0.186** (0.080)
Education Level					
2. Secondary		-0.024 (0.115)	-0.033 (0.112)	-0.038 (0.112)	-0.044 (0.113)
3. Tertiary		0.384*** (0.141)	0.373*** (0.139)	0.319** (0.140)	0.278* (0.142)
Experience		0.017* (0.010)	0.014 (0.010)	0.012 (0.010)	0.016 (0.010)
Experience square		-0.001 (0.000)	-0.001 (0.000)	-0.001 (0.000)	-0.001 (0.000)
Firm age				-0.006*** (0.001)	-0.006*** (0.001)
Capital-labour ratio (ln)				-0.003 (0.020)	-0.002 (0.020)
Firm size (ln)				0.084*** (0.027)	0.089*** (0.027)
Constant	0.346*** (0.0272)	-0.606* (0.323)	-0.868*** (0.316)	-0.737* (0.381)	-0.744* (0.382)
Observations	641	641	641	641	641
R-squared	0.131	0.213	0.255	0.299	0.313
Job Characteristics	NO	NO	YES	YES	YES
Firm Characteristics	NO	NO	NO	YES	YES

Notes: The dependent variable is the log of hourly wages. Informality is a dummy variable coded 1 for an informal wage worker and 0 for formal sector workers. 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, in column (4) we add firm controls. In column (5), we include a dummy variable for permanent workers, coded as 1 for permanent and 0 otherwise. Job characteristics include job allowance and methods of wage payment (the base comparison group is 'Per-time period') aimed to control for job quality. Firm controls include firm age, firm size, capital intensity, industry and location dummies. The sample is restricted to similar industries between formal and informal sectors. The regressions are based on the 2015 base year sample of the common support.

Asterisks denotes level of significance (** $p < 0.01$, * $p < 0.05$, * $p < 0.1$). Robust standard errors are in brackets.

Table A4. Robustness: Instrumental variable estimates of rent-sharing as a source of wage segmentation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Permanent (Yes=1)	0.191*** (0.047)	0.454 (0.616)	-0.682 (0.526)	0.186*** (0.047)	0.148*** (0.049)	1.022 (0.718)	-0.039 (0.707)
Union membership (Yes=1)	0.162*** (0.041)	0.152*** (0.042)	0.193*** (0.040)	0.789 (0.511)	-0.612 (0.492)	3.433*** (0.976)	0.695 (0.931)
Profit per worker	0.164*** (0.033)	0.145** (0.060)		0.196*** (0.040)		0.269*** (0.069)	
Permanent × Profit per worker		-0.026 (0.062)	0.084 (0.054)			-0.091 (0.072)	0.010 (0.072)
Union membership × Profit per worker				(0.051)	(0.049)	-0.348*** (0.100)	-0.071 (0.095)
Permanent × Union membership						-3.221*** (1.158)	-1.353 (1.208)
Permanent × Union membership × Profit per worker						0.347***	0.165
Constant	-2.001*** (0.377)	-2.002*** (0.631)	-4.018* (2.124)	-0.064 -2.300*** (0.435)	0.082* -3.965* (2.144)	(0.117) -2.866*** (0.625)	(0.122) -4.062* (2.107)
Observations	1,096	1,096	1,096	1,096	1,096	1,096	1,096
R-squared	0.222	0.208	0.592	0.223	0.592	0.232	0.597
Job Characteristics	YES	YES	YES	YES	YES	YES	YES
Firm Characteristics	YES	YES	YES	YES	YES	YES	YES
Firm fixed Effects	NO	NO	YES	NO	YES	NO	YES

Notes: The dependent variable is the log of *hourly wages*. Profit-per-worker is instrumented by cost of electricity. 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, capital-labour ratio). Asterisk denotes level of significance (***) $p < 0.01$, (**) $p < 0.05$, (*) $p < 0.1$. Standard errors are in brackets. The fitted values from the first-stage regression are used as instruments for both the endogenous variable (profit per worker) and the interaction terms (e.g. union * profit per worker). Specifically, the first stage involves regressing profit per worker on the instrument, which is the cost of electricity. From this regression, the fitted values of are obtained, representing the portion of profit per worker that is explained

by the exogenous variation in electricity costs. In the second stage, these fitted values, are used as instruments in the structural equation. In addition, the interaction terms are created by multiplying with fitted values, resulting in the instrumented interaction term. The advantage of this approach is that it ensures the exogenous component of profit per worker and its interaction is used, addressing the endogeneity problem without relying on stronger assumptions like conditional independence. The key assumption is that the instrument (cost of electricity) influences profit per worker but does not directly affect the dependent variable.

