

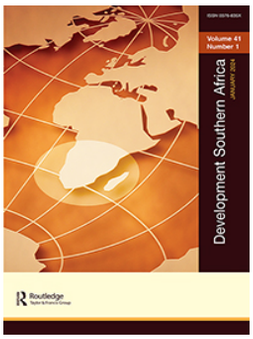
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Analysis of labour market impacts of the coronavirus pandemic: Evidence from Zambia

Adeola Oyenubi

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Analysis of the labour market impacts of the coronavirus pandemic: Evidence from Zambia

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ABSTRACT

This paper examines the short-term impact of the Coronavirus pandemic on firms in a developing country i.e. Zambia. This is motivated by the characteristics of the Labour market in developing countries where informality dominates, and female workers form a larger proportion of the informal workforce. The Zambian version of the World Bank Enterprise Survey conducted just before the pandemic (September 2019 to March 2020) and during the pandemic (June 6 to 17 July 2020) is used to explore the experience of firms in terms of changes in the number of employees and firm survival. Results suggest that informal workers are more likely to lose their jobs while firms that are at least partly owned/managed by females are also less likely to survive. It is argued that policy actions that protect informal workers are salient especially since future pandemics cannot be ruled out.

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COVID-19 pandemic; informality; firm survival

JEL
L25; L26; J08; J46

1. Introduction

The first case of the Coronavirus (COVID-19) was recorded in Zambia on the 18th of March 2020, by 1st July 2020 the country had recorded 1632 cases and 30 deaths due to the virus.[1] Like other countries, the Zambian Government adopted several measures to curb the transmission of COVID-19 (some of these measures came into effect immediately after the first confirmed case). However, unlike other countries, Zambia's response did not include a Nationwide lockdown as seen in other Southern African countries (e.g. South Africa, Botswana and Zimbabwe). The measures adopted by the Zambian Government included border closures, restriction of public gatherings of more than 50 people, constraints on economic activities (closing of bars, restaurants, nightclubs, cinemas and casinos),[2] restriction on religious institutions and closure of schools (Osakwe, 2021).

By the 26th of May, 2020 the Zambian Government had withdrawn some of the restrictions subject to adherence to public health measures including social distancing. Wearing a mask in public places became mandatory. Further, on 25 June, international airports were re-opened and a booster package for small and medium enterprises (SMEs) was declared as a means of regenerating the economy. However, public health measures appeared not to be effective in slowing down the spread of the virus, the second half of

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[1]See https://reliefweb.int/report/zambia/zambia-situation-report-6-july-2020.
[2]See https://www.theigc.org/blog/one-year-on-zambian-economy-during-covid-19/.
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2020 saw a significant increase in infection rate. By December 2020 the number of COVID-19 cases had crossed the 20 000 mark and reached 89 000 by April 2021. Even though economic restrictions were eased, the economy continued to haemorrhage.[3] Siwale (2021) reported that over the year 2020, copper earnings reduced by 14.8% (this is despite a 16.5% increase in copper export volumes). COVID-19 also led to disruption in supply chains (specifically for products coming from major trading partners like South Africa which imposed a more stringent lockdown (Siwale, 2021)). This led to a 30% decline in imports compared to the corresponding period in 2019 (Siwale, 2021).

One of the consequences of the pandemic was the increase in the rate of poverty (by about 2%) between 2019 and 2020 (Paul et al., 2021). While the pandemic affected everyone, evidence suggested that there are sectoral differences in the impact of the pandemic on labour market outcomes. For example, reports suggest that the mining and tourism sector were severely affected in Zambia (Osakwe, 2021). Further another World Bank Survey showed that in Zambia 71% of respondents in the tourism sector report experiencing job loss compared to 8% in the agricultural sector (Finn & Zadel, 2020). Therefore, while the pandemic had negative implications for firms and jobs in the economy, one might expect heterogeneous effects based on worker's characteristics, nature of job and firm characteristics.

It is important to note that while different countries in Africa adopted different approaches to curb the pandemic, the negative effects of the pandemic on the labour market were similar to a large extent. Specifically, the literature suggests that the negative labour market effect of the pandemic was stronger in developing countries because of the size of the informal economy in these countries (Oyenubi, 2023). Before the pandemic, a large percentage of the workforce in developing countries rely on the informal economy (Bonnet et al., 2019). Informal employment is particularly vulnerable in the context of the pandemic because it often involves face-to-face interaction. Therefore inequality in the ability to work remotely has been identified as one of the mechanisms through which the COVID-19 pandemic disproportionately affected labour market outcomes in developing countries (ILO, 2020; Nwosu et al., 2022). Further, vulnerable workers like women and young people were disproportionately affected (Koczan, 2022). For example, evidence from South Africa suggests that job losses due to the COVID-19 pandemic disproportionately affected women, manual workers and generally those in the bottom half of the income distribution (Jain et al., 2020; Rogan & Skinner, 2020; Ranchhod & Daniels, 2021).

This study aims to examine the negative consequences of the COVID-19 pandemic and associated restrictions on workers' employment and the survival of firms in Zambia. However, we pay particular attention to how the pandemic affected those who are informally employed and gender differences in the effects. Finn & Zadel (2020) report that the pandemic had a considerable impact on employment in Zambia. This impact operates through the imposition of public health measures including the closure of most businesses and the suspension of cross-border passenger services. Of the 72% of respondents that reported having a job before the imposition of the social and economic restrictions only 54% of them reported being in paid employment in June 2020 (Finn & Zadel, 2020). Most of the respondents who were no longer working (63%)

[3]See https://bfaglobal.com/covid-19/insights/zambia-msmes-during-covid-19/.

reported that the businesses they worked for closed due to COVID restrictions (Finn & Zadel, 2020). Given the foregoing, this paper seeks to assess how the lockdown affected firms in terms of survival and changes in the workforce.

This is important because the literature suggests that future pandemics cannot be ruled out (Marani et al., 2021). Understanding the full impact of the COVID-19 pandemic is therefore important for policymakers to know the consequences of the policy options utilised during this pandemic so that policy actions may be crafted to better manage similar situations in the future should they occur. For example, characteristics of firms that survive under the pandemic-induced shock may predict the kind of firms that may be sustainable in the future of work that may have to be compatible with such disruption.[4] Further, this paper looks at the possibility that the negative consequences of the pandemic on firms and individuals disproportionately affected vulnerable groups. Specifically, we examine if the effect of the pandemic disproportionately affected firms that are partly owned by women and workers who relied on informal employment.[5]

Informal employment accounts for a large percentage of employment in emerging and developing countries (Bonnet et al., 2019). As much as 90% and 67% of workers in emerging and developing countries (respectively) rely on the informal sector. Further in developing countries women are more likely to be informally employed when compared to men (92% versus 87%). This is important because findings elsewhere suggest that women and informal workers are more likely to be affected by the pandemic in terms of loss of employment, reduction in hours worked and consequently income loss (Rogan & Skinner, 2020; Oyenubi, 2023). This suggests that these characteristics (female gender and informality) may be penalised more heavily as a result of the COVID-19 pandemic in Zambia. Noting that most of the evidence that supports a larger negative impact for vulnerable working groups has relied on individual-level survey data, this paper examines a similar proposition from the firm data perspective.

Data is sourced from the World Bank Enterprise Survey, we use data collected just before the pandemic (September 2019 to March 2020) and during the pandemic (June 6 to 17 July 2020). Comparing the pre to post-pandemic period, our descriptive analysis shows that temporary or informal workers and workers working for female-owned firms were more likely to lose their job due to the COVID-19 pandemic. This confirms the negative impact of the COVID-19 pandemic on female (owned) firms and informal workers in Zambia, it also highlights the importance of the insurance provided by permanent employment contracts. Further, multivariate regression analysis suggests that exporting firms and firms that report higher sales in the previous year (2019) are more likely to reduce the number of full-time workers at follow-up. While having a female manager and being part of a multi-establishment firm increase the probability of shedding temporary workers. Other results show that firms that report adjusting their production because of the pandemic, older firms and firms that use digital channels (mobile money in this case) are more likely to remain open at follow-up.

[4]For example, some experts suggest that herd immunity may not materialize even with the vaccines because of the different variants of the virus in circulation https://theconversation.com/covid-19-herd-immunity-its-not-going-to-happen-so-what-next-165471.

[5]International statistical standards distinguish between employment in the informal sector and informal employment, the latter which is the concept of interest in this paper refers to the employment relationship and protection associated with the worker's job (Bonnet et al., 2019).

2. Data and methodology

The data used for the analysis that follows is the World Bank Enterprise Survey (WBES) and the COVID-19 follow-up. Specifically, a World Bank Enterprise survey was conducted in Zambia between September 2019 and March 2020 (just before COVID-19 restrictions). The follow-up survey was conducted between June 6 and 17 July 2020 (targeting the same firms) with a 96.1% response rate (at follow-up). Note that the 2019 WBES for Zambia surveyed 601 firms. While several countries have COVID follow-up surveys, Zambia is in a unique position since it's pre-COVID survey was conducted just before the pandemic. For other countries their pre-COVID survey was conducted years before the pandemic. This is part of the motivation for considering Zambia in this paper. Exploiting the fact that these surveys are only months apart with the baseline survey conducted just before the pandemic began and the follow-up conducted as restrictions are being eased, this paper examines the relationship between firm characteristics before the pandemic and firm survival just after the pandemic began.

Table 1 shows the summary statistics for the outcome(s) and covariates used in the analysis disaggregated by firm's status in terms of being open (at follow-up) or having been permanently or temporarily closed. Note that most of the covariates were sourced from the baseline data.[6] Variables sourced from baseline data include sector, firm size, region, legal status, firm's age, log of last year's sales, export status, access to a bank loan, use of mobile money, dummy indicating firm has female owners, sector experience of the manager, manager's gender, dummy indicating whether firm adjusted production process because of the pandemic, a dummy indicating whether firm is part of a multi-establishment company and whether the largest shareholder also manages the business.

It is important to note the difference in the way changes in the number of temporary workers and permanent workers are measured in the data. For the former, firms were asked 'Since March 2020, has the number of this establishment's temporary workers increased, remained the same or decreased' (question D.3). While for the latter a series of questions were asked that enable the calculation of actual change in the number of full-time permanent workers (i.e. 'At the end of February 2020, how many permanent, full time employees did this establishment have?' (question D.0a), 'At the end of the last completed month, … , how many permanent, full time employees did this establishment have?' (question D.1)). Therefore, as reflected in Table 1, 'Decrease in temporary workers' is a dummy indicating decrease in the number of temporary workers while 'Difference in the number of full time workers' is a continuous variable that reflect actual change in the number of permanent workers with positive values indicating an increase in number of permanent employees, zero indicating no change and negative indicating a decrease in number of permanent employees. Most firms report a decrease in the number of permanent staff as shown by the negative mean value.

The last column of Table 1 shows that five variables are significantly different at baseline. Firms that are located at Kitwe or/and are partly owned (or managed) by women are more likely to be closed at follow-up. On the other hand, firms that report adjusting their

[6]Except for Adjust production for COVID, % decrease in sales, and the outcome variables which were sourced from the follow up data. COVID-19 reproductive rate was sourced from the Our World in Data (Ritchie et al., 2020).

Table 1. Descriptive statistics.

	N	Mean	SD	*N*	Mean	SD	Difference
	Temporarily/ permanently closed			Open			
Outcomes							
Firm currently open	159	0	0	442	1	0	
Decrease in temporary workers	91	.56	.5	432	.39	.49	
Difference in the number of full-time workers (before-after)	75	−9.04	28.77	428	−8.46	39.22	
Sector							
Food	159	.17	.38	442	.13	.33	0.04
Other Manufacturing	159	.21	.41	442	.2	.4	0.01
Retail	159	.2	.4	442	.21	.4	−0.01
Wholesale Agric	159	.02	.14	442	.07	.26	−0.05*
Other Services	159	.28	.45	442	.26	.44	0.02
Unknown	159	.12	.33	442	.14	.35	−0.02
Firm size							
Micro	159	.02	.14	442	.04	.19	−0.02
Small	159	.53	.5	442	.47	.5	0.06
Medium	159	.31	.46	442	.31	.46	−0.01
Large	159	.14	.35	442	.18	.39	−0.04
Region							
Kitwe	159	.26	.44	442	.13	.34	0.13***
Livingstone	159	.16	.37	442	.18	.38	−0.02
Lusaka	159	.45	.5	442	.5	.5	−0.05
Ndola	159	.13	.34	442	.18	.39	−0.05
Legal status							
Shareholding company	158	.2	.4	442	.22	.41	−0.02
Sole propri partne ~ p	158	.42	.49	442	.46	.5	−0.05
Part limited part	158	.39	.49	442	.32	.47	0.07
Firm characteristics							
Firm's age	155	17.39	11.55	436	19.51	14.64	−2.12
Log sales (last year)	148	14.49	2.31	416	14.83	2.52	−0.34
Export (direct or indirect)	159	.1	.3	442	.14	.35	−0.04
50% of the capital is from a bank	159	.04	.19	442	.03	.16	0.01
use mobile money	159	.15	.36	442	.2	.4	−0.05
female owner	158	.53	.5	436	.39	.49	0.14**
manager sector experience	159	16.1	9.58	435	17.82	10.92	−1.72
manager gender	159	.21	.41	441	.12	.33	−0.08*
Adjust production for COVID	159	.29	.45	442	.53	.5	−0.24***
Part of a multi-establishment	159	.15	.36	442	.17	.38	−0.02
the largest owner manages the firm	159	.75	.44	442	.78	.41	−0.03

Note: *N* refers to the number of observations while SD is the standard deviation.
*$p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.

production in response to COVID-19 and those that are involved with Agricultural Inputs & Equipment are more likely to remain open at follow-up. This result suggests that there are factors that are correlated with firm survival under COVID-19 restrictions.

2.1. Methodology

Our analysis is broken down into 2 segments, focused on 2 outcomes i.e. staying open at follow-up, and changes in the number of temporary and permanent employees (conditional on being observed at follow-up). In the first analysis, we present a description of the employment effect of the lockdown by type of employment (temporary and permanent workers). The logic here is that under COVID-19 restrictions, it might be easier

for firms to save costs by laying off temporary/informal/casual workers as against employees with a permanent contract because of the cost associated with contractual obligations.

The second analysis looks at predictors of firm survival and negative change in the number of employees (temporary and permanent workers) in a multivariate setting. We note that the preferred estimator in this setting is the Heckman selection model since the sample of firms observed at follow-up is a subsample of the firms interviewed before the pandemic began. However, this estimator requires variable(s) that satisfy the exclusion restriction (i.e. correlated with firm survival but uncorrelated with the change in number of firms). It is well-documented that variables that satisfy the exclusion restriction are often difficult to find (Clarke & Matta, 2018), and this application is not an exception. Even though we attempt estimation based on the Heckman selection model we relegate the result to the Appendix because the selection effect is not statistically significant suggesting that OLS is the appropriate estimator (see the Appendix for details). For our main analysis, we, therefore, rely on OLS regression.

3. Results

3.1. The implication of COVID-19 restriction for vulnerable workers (descriptive analysis)

We start with a description of the plight of temporary workers, this is done by examining changes in the number of employees based on their employment relationship with the firm. Note that the analysis is based on whether a firm report an increase, no change or decrease in the number of employees (for permanent workers this is computed from information provided in questions D.0a and D.1 as stated in Section 2). Figures 1 and 2 show reported changes in the number of employees based on employees' employment relationship with the firm before compared to after the pandemic began. While 2% and 56% of firms report an increase or no change (respectively) in the number of temporary workers, 42% report a decrease in the number of temporary workers. Contrasting this result with Figure 2 (which presents the same analysis for permanent workers), it is clear that firms are more likely to retain their permanent workers (68% vs 56%) and less likely to retain their temporary workers (42% vs 31%, note that the difference between these values are statistically significant as the confidence intervals do not overlap. The confidence intervals are (0.36–0.47) and (0.27–0.35) respectively).

Figures A1–A5 in the Appendix show that this pattern does not change when the analysis is done by the presence of female ownership (Figures A1(a) and (b)), firm size (Figures A2(a) to (d) and A3 (a) to (d)) or sector (Figures A4 (a) to (c) and A5 (a) to (c)). The implication is that temporary workers who are less likely to have employment-related benefits are more likely to lose their jobs due to COVID-19 restrictions.

3.2. Probability of staying open under COVID-19 restrictions (multivariate analysis)

This section examines the factors that influence the probability that a firm will stay open using the probit model. The outcome is a dummy indicating that the firm is open at

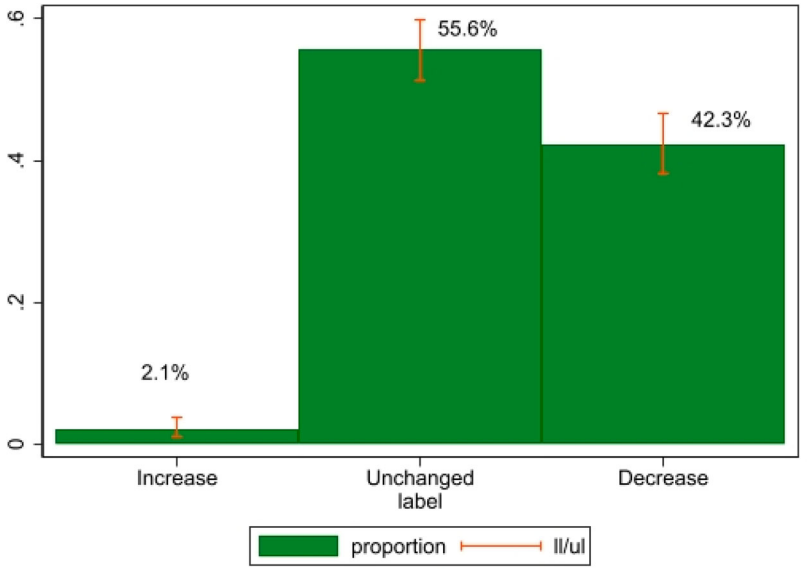


Figure 1. Change in the number of temporary workers.

follow-up and zero otherwise. Table 2 presents the marginal effects. The result shows that firms that are in the sector that deals with agricultural imputes are more likely to stay open. This may be because this sector falls under essential services and therefore firms in this sector might be less affected by COVID restrictions. The result also shows that location matters with firms outside of Kitwe (base category) being more likely to stay open. Firm's age, the value of last year's sales, the use of mobile money and being able to adjust the production process to adapt to COVID restrictions all increase the

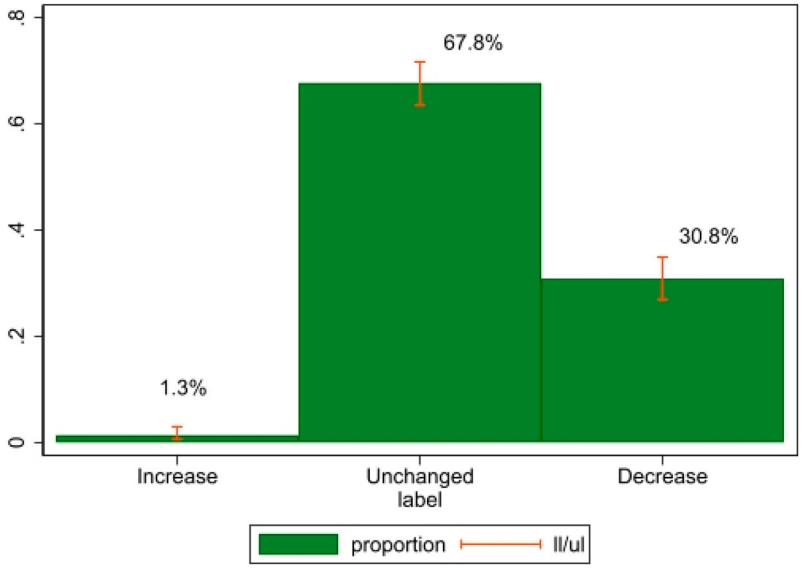


Figure 2. Change in the number of permanent workers.

Table 2. Probability of staying open (marginal effects).

VARIABLES	(1) Open	(2) Open	(3) Open	(4) Open
Sector (base Cat: Food manufacturing)				
Other Manufacturing	0.04			0.03
	(0.07)			(0.07)
Retail	0.04			0.06
	(0.07)			(0.06)
Wholesale of Agri Inputs & Equipment	0.22***			0.19**
	(0.07)			(0.07)
Other Services	0.02			0.01
	(0.06)			(0.06)
Unknown	0.06			0.00
	(0.07)			(0.07)
firm size cat (base: Micro)				
Small	−0.11			−0.11
	(0.09)			(0.08)
Medium	−0.12			−0.13
	(0.09)			(0.09)
Large	−0.10			−0.13
	(0.11)			(0.10)
Location (base: Kitwe)				
Livingstone	0.16**			0.12*
	(0.07)			(0.07)
Lusaka	0.16**			0.08
	(0.06)			(0.06)
Ndola	0.22***			0.19***
	(0.07)			(0.06)
Legal Status (base: Shareholding company)				
Sole propritorship & partnership	0.08			0.06
	(0.05)			(0.06)
Partnership & Limited partnership	0.01			−0.01
	(0.05)			(0.05)
Firm's age (yrs)	<0.01***			0.01***
	(0.00)			(0.00)
Log of last year's sales	0.02*			0.02*
	(0.01)			(0.01)
Export (direct or indirect)	0.04			0.03
	(0.06)			(0.06)
More than 50% of working capital is from a bank	−0.06			−0.10
	(0.11)			(0.12)
use mobile money	0.10**			0.09*
	(0.05)			(0.05)
Females amongst The Owners of The Firm		−0.10***		−0.10**
		(0.04)		(0.04)
Top Manager's sector experience		<0.01*		−0.00
		(0.00)		(0.00)
Is The Top Manager Female?		−0.06		−0.03
		(0.05)		(0.05)
Adjust production for COVID			0.19***	0.15***
			(0.03)	(0.04)
Multi-establishment Firm?				0.06
				(0.05)
Largest owner also managers firm				0.06
				(0.05)
Observations (*N*)	555	588	601	546

Note: Standard errors in parentheses.
***$p < 0.01$.
**$p < 0.05$.
*$p < 0.1$.

probability of staying open while female ownership has the opposite relationship with being opened at follow-up.

Three results are worth highlighting here. First, the finding that female ownership reduces the probability of staying open suggests that the kind of businesses women entrepreneurs are likely to be involved with are at higher risk of closing down due to the pandemic. This may be because women are more likely to be involved in the service sector (International Labour Organization, 2010). However, we note that this result remains significant even after controlling for the sector of employment. Another plausible reason for this finding is that due to sex roles, the burden of childcare may have increased more for women due to schools closing down (Nwosu, 2021; Casale & Shepherd, 2022). Second, the use of mobile money (before the pandemic) increases the probability of a firm staying open at follow-up. This suggests that firms that have bought into the digital mode of doing business may have a higher probability of surviving because they can move their operation into the digital space and reduce the effect of COVID-19 restrictions. Third, firms that were able to adjust production because of COVID-19 are also more likely to survive. This speaks to the flexibility of firms' operations i.e. firms that are capable of adapting to the new business environment may be more likely to survive compared to others.

3.3. COVID-19 pandemic and changes in the number of workers

In this section, we turn our attention to factors that are correlated with a decrease in the number of permanent workers (measured by the continuous variable that captures the difference in the number of permanent workers compared to before the pandemic) and a decrease in the number of temporary workers (measured by a dummy that indicates that the number of temporary workers has decreased compared to before the pandemic). This analysis sheds more light on our descriptive analysis by identifying firm characteristics that are correlated with a decrease in the number of workers (in a multivariate setting).

Table 3 shows the results and suggests that factors that are correlated with a decrease in employment are sensitive to the worker's relationship with the firm (this is consistent with our previous result). Specifically, being in the sector 'other services or Retail', being a large/medium firm, being located in Livingstone, being part of a multi-establishment firm and having a female manager increases the probability of reporting a decrease in the number of temporary employees but these factors are not statistically significant in explaining the decrease in the number of permanent employees. Instead, last year's sales and exporting firms are correlated with the shedding of permanent staff (note that negative estimates on these coefficients mean that having these attributes is correlated with reporting negative changes in the number of permanent workers). Other results show that firms' age reduces the probability of laying off temporary workers while owner-managed firms are more likely to retain their permanent staff.

4. Discussion

We consider the effects of the pandemic from the point of view of firms in Zambia. Our main hypothesis is that vulnerable workers and firms that employ them may be

Table 3. Correlates of decrease in the number of temporary and permanent employees.

VARIABLES	(1) Change in number of permanent workers. OLS	(2) Decrease in temporary workers. Logit (Marginal effects)
Sector (base Cat: Food manufacturing)		
Other Manufacturing	6.33	0.10
	(8.44)	(0.10)
Retail	2.34	0.21**
	(8.23)	(0.09)
Wholesale of Agri Inputs & Equipment	4.53	0.07
	(8.12)	(0.09)
Other Services	0.69	0.20**
	(7.72)	(0.09)
Unknown	−14.64*	0.10
	(8.51)	(0.10)
firm size cat (base: Micro)		
Small	4.49	0.07
	(9.12)	(0.10)
Medium	4.22	0.22**
	(9.85)	(0.11)
Large	1.82	0.28**
	(10.99)	(0.12)
Location (base: Kitwe)		
Livingstone	−1.69	0.40***
	(6.63)	(0.08)
Lusaka	3.12	0.08
	(5.80)	(0.07)
Ndola	−5.99	0.03
	(6.32)	(0.07)
Legal Status (base: Shareholding company)		
Sole propri & partnership	−1.97	−0.07
	(5.24)	(0.07)
Partnership & Limited partnership	−3.20	−0.05
	(4.90)	(0.06)
Firm's age (yrs)	0.12	>−0.01*
	(0.16)	(0.00)
Log of last year's sales	−2.45**	−0.02
	(0.96)	(0.01)
Export (direct or indirect)	−15.93***	−0.08
	(5.51)	(0.07)
More than 50% of working capital is from a bank	10.16	0.12
	(13.22)	(0.14)
use mobile money	−3.21	−0.01
	(4.35)	(0.06)
Females amongst The Owners of The Firm	−0.95	0.05
	(4.03)	(0.05)
Top Manager's sector experience	−0.11	<0.01
	(0.20)	(0.00)
Is The Top Manager Female?	−0.64	0.14**
	(5.31)	(0.07)
Adjust production for COVID	−4.38	0.04
	(3.71)	(0.05)
Multi-establishment Firm?	−3.71	0.10
	(4.82)	(0.06)
Largest owner also managers firm	12.30**	−0.02
	(4.78)	(0.06)
Constant	21.52	
	(18.93)	
Observations (N)	464	482
R-squared	0.14	

Notes: Standard errors in parentheses.
***$p < 0.01$.
**$p < 0.05$.
*$p < 0.1$.

disproportionately affected by the pandemic given the prevalence of informality in Zambia. We note that being a developing country Zambia is not too dissimilar to other African markets in terms of characteristics of firms and workers. This suggests that the findings have implications for other African countries. Before the pandemic, informality is correlated with poverty (International Labour Organization, 2019) and women (and young workers) are disproportionately represented in the informal sector (Bonnet et al., 2019). While the pandemic affects all firms and workers to some degree, it can be argued that vulnerable workers and firms will feel this effect more. In terms of the effect on workers, firms may find it easier to part ways with temporary or informal workers since it may be more difficult to do this in the case of workers that have permanent contracts. This predicts that faced with the difficulty of the pandemic situation more temporary/informal/casual workers are likely to lose their jobs. The fact that female workers are more likely to work informally means that female workers are more likely to be affected by retrenchments that disadvantage temporary workers. These conclusions are supported by our analysis showing that informal workers and particularly informal workers in (at least partly) female-owned firms are disproportionately affected in terms of loss of employment.

In terms of the effect of the pandemic on firms, existing evidence suggests that women and men tend to choose different sectors both in terms of where to work or the type of business to own. This phenomenon is referred to as 'Horizontal Segregation' which is defined as the under (or over)-representation of a group of workers in occupations or sectors that are not ordered by any formal criterion (Maciel, 2020). This segregation may occur because of gender stereotypes, for example, a factor that may be relatively stronger in African societies. Further, this segregation has been found to have implication for the gender income gap (which disadvantage women) and gender differences in firm earnings (Roberts & Schöer, 2021; Lemma et al., 2023). Analysis based on WBES suggests that, in sub-Saharan Africa, female-owned firms report sales that are 31% lower compared to firms that are owned by their male counterparts (Islam et al., 2020). There is also evidence of hierarchical ordering in earnings based on whether firms are male or female owned or whether a firm operates in a male or female-dominated sector (Goldstein et al., 2019). These findings imply that if there are differences in the effect of the pandemic by sector or ownership then one should expect gender differences in the severity of the negative impact of the pandemic. Again, our results support this line of reasoning showing that female-owned businesses are less likely to survive the pandemic and are also more likely to retrench temporal workers (conditional on survival).

Another theme that emerges is that the adoption of digital platforms to aid business activity before the pandemic predicts survival. This suggests that firms that have embraced digital technologies as an alternative way of doing business before the pandemic were able to move their business online and avoid the negative effects of health measures adopted to curb the spread of the virus. Lastly, firms that were flexible enough to be able to adjust their business practices to cope with the pandemic are more likely to survive.

These findings have implications for the future world of work in Africa. The structure of African labour markets is such that it is dominated by informal employment. It turns out that workers who are at a disadvantage because they rely on the informal economy are more likely to be affected by the negative effects of a pandemic. This will only exacerbate existing inequality. One policy response that may lessen the impact of an economic shock like COVID in the

future is infrastructure improvement. For example, improvement in internet-related infrastructure will enable more firms to adopt digital channels where possible for their businesses (sales for example), even in normal times. Our results suggest that this may enable firms to survive economic shocks that require social distancing and the kind of regulations that were necessary at the height of the COVID-19 pandemic. Further, the scarcity of formal employment in developing countries means that the labour market scene will continue to be dominated by informal activities. This implies that similar to the case under the COVID-19 pandemic, in the event of another economic shock, effective Government response will be difficult. Osakwe (2021) noted that while measures introduced by the Zambian Government to mitigate the effects of the pandemic are welcome, they are largely geared towards formal activities to the exclusion of the informal economy where most micro and small firms operate (note not all firms in WBES are registered with government). There is a need for policymakers to have a system in place that gives an idea of the size of the informal economy so that government assistance in a period like this does not exclude firms that need it the most.

The analysis presented in this paper is not without limitations. Ideally, a panel data analysis will be a better way of estimating the relationships of interest. However, the data does not allow for panel data analysis since the COVID follow-up dataset focused on specific variables and not the full set of attributes recorded under the regular WBES. However, given the short period between the 2019 survey and the 2020 follow-up, and given that COVID has a major effect on businesses as documented in the literature, we believe that the analysis here captures the relationships of interest, and a large part of this relationship can be attributed to the COVID-19 pandemic. This shock is arguably exogenous to firms and individual workers (Posel et al., 2021).

Lastly, it should be noted that this analysis focuses on the short-term effect of the pandemic on firm survival and employment changes. Future research should look at the long-term effect to see if the effects discussed in this paper persist in the long run.

5. Conclusion

The pandemic signals the emergence of a new type of normal for how the world operates in terms of health and the economy. It is clear that informal employment as it is operated in developing countries is not designed for this new normal. It is therefore important for policymakers to look into ways in which the informal economy (with its peculiarities) can operate profitably in the future world of work which may have to be prepared to deal with pandemics. This study suggests that, if this is not addressed, informality may lead to more inequality and poverty going forward.

Disclosure statement

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have no financial interests Data availability: The datasets analysed during the current study are available in the WORLD BANK ENTERPRISE SURVEY repository, https://www.enterprisesurveys.org/en/survey-datasets.

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References

Bonnet, F, Vanek, J & Chen, M, 2019. Women and men in the informal economy: A statistical brief. International Labour Office, Geneva. http://www.wiego.org/sites/default/files/publications/files/women%20and%20men%20in%20the%20informal20.

Casale, D & Shepherd, D, 2022. The gendered effects of the Covid-19 crisis in South Africa: Evidence from NIDS-CRAM waves 1–5. Development Southern Africa 39(5), 644–63.

Clarke, D & Matta, B, 2018. Practical considerations for questionable IVs. The Stata Journal 18(3), 663–91.

Finn, A & Zadel, A, 2020. Monitoring COVID-19 impacts on households in Zambia. World Bank, Washington, DC.

Goldstein, M, Martinez, PG & Papineni, S, 2019. Tackling the global profitarchy gender and the choice of business sector. World Bank. https://documents1.worldbank.org/curated/en/734371558715932769/pdf/Tackling-the-Global-Profitarchy-Gender-and-the-Choice-of-Business-Sector.pdf Accessed 15 August 2021.

Heckman, JJ, 1979. Sample selection bias as a specification error. Econometrica: Journal of the Econometric Society 47(1), 153–61.

Heckman, J, 1990. Varieties of selection bias. The American Economic Review 80(2), 313–8.

ILO, 2020. ILO monitor: COVID-19 and the world of work. Updated estimates and analysis. International Labour Organization, Geneva.

International Labour Organization, 2010. Women in labor markets: Measuring progress and identifying challenges. International Labour Organization, Geneva.

International Labour Organization, 2019. Informal income gap in Zambia. https://www.ilo.org/wcmsp5/groups/public/—africa/—ro-abidjan/—ilo-lusaka/documents/publication/wcms_697953.pdf Accessed 15 August 2021.

Islam, AM, Gaddis, I, Palacios López, A & Amin, M, 2020. The labor productivity gap between formal businesses run by women and men. Feminist Economics 26(4), 228–58.

Jain, R, Budlender, J, Zizzamia, R & Bassier, I, 2020. The labor market and poverty impacts of Covid-19 in South Africa. NIDS-CRAM wave 3 report.

Koczan, Z, 2022. Not all in this together? Early estimates of the unequal labour market effects of Covid-19. Applied Economics 54(44), 5021–34.

Lemma, TT, Gwatidzo, T & Mlilo, M, 2023. Gender differences in business performance: Evidence from Kenya and South Africa. Small Business Economics 60(2), 591–614.

Linka, K, Peirlinck, M & Kuhl, E, 2020. The reproduction number of COVID-19 and its correlation with public health interventions. Computational Mechanics 66(4), 1035–50.

Maciel, FT, 2020. Occupational segregation and wage differentials by gender and race in Brazil: Evidence from a quantile decomposition. International Journal of Manpower 42(5), 810–41.

Marani, M, Katul, GG, Pan, WK & Parolari, AJ, 2021. Intensity and frequency of extreme novel epidemics. Proceedings of the National Academy of Sciences 118(35), e2105482118.

Nwosu, CO, 2021. Childcare and depression during the coronavirus pandemic in South Africa: A gendered analysis. PLoS One 16(8), e0255183.

Nwosu, CO, Kollamparambil, U & Oyenubi, A, 2022. Socio-economic inequalities in ability to work from home during the coronavirus pandemic. The Economic and Labour Relations Review 33(2), 290–307.

Osakwe, P, 2021. COVID-19 and the challenge of developing productive capacities in Zambia. UNCTAD Division for Africa, LDCs and Special Programmes. https://unctad.org/system/files/official-document/ser-rp-2021d6_en.pdf.
Oyenubi, A, 2023. The COVID-19 pandemic and polarisation of income distribution in South Africa. The Economic and Labour Relations Review 34(1), 1–22.
Paul, BV, Finn, A, Chaudhary, S, Mayer Gukovas, R & Sundaram, R, 2021. COVID-19, poverty, and social safety net response in Zambia.
Posel, D, Oyenubi, A & Kollamparambil, U, 2021. Job loss and mental health during the COVID-19 lockdown: Evidence from South Africa. PLoS One 16(3), e0249352.
Ranchhod, V & Daniels, RC, 2021. Labour market dynamics in South Africa at the onset of the COVID-19 pandemic. South African Journal of Economics 89(1), 44–62.
Ritchie, H, Mathieu, E, Rodés-Guirao, L, Appel, C, Giattino, C, Ortiz-Ospina, E, Hasell, J, Macdonald, B, Beltekian, D & Roser, M, 2020. Coronavirus pandemic (COVID-19). Our world in data.
Roberts, G & Schöer, V, 2021. Gender-based segregation in education, jobs and earnings in South Africa. World Development Perspectives 23, 100348.
Rogan, M & Skinner, C, 2020. The COVID-19 crisis and the South African informal economy: 'Locked out' of livelihoods and employment. National Income Dynamics Study–Coronavirus Rapid Mobile Survey (NIDS CRAM), Cape Town.
Siwale, T, 2021. One year on: Zambian economy during COVID-19. International Growth Centre. https://www.theigc.org/blog/one-year-on-zambian-economy-during-covid-19/ Accessed 22 May 2021.

Appendix

A1.1. Heckman selection model

This section repeats the multivariate analysis using the Heckman selection model. The Heckman selection model is used to account for possible bias due to endogenous selection (Heckman, 1979, 1990). The Heckman model involves two equations, the first equation models selection (i.e. survival in our case), while the second models the outcome accounting for selection by including the inverse mills ratio. Heckman models require the inclusion of at least one variable in the selection equation (first equation), that does not appear in the outcome equation (second equation) i.e. instruments. This variable(s) should satisfy the exclusion restriction i.e. influence the probability of firm survival without directly influencing the outcome. In our analysis, we propose the 21 days lag value of the COVID-19 positive rate as on the day the firm was interviewed as instrument.

First, the analysis that follows assumes that (the 21-day lag) of COVID positive rate influences a firm's survival (or decision to stay open for business) because it is correlated with government response in terms of stringency of lockdown regulations. This is because COVID positive rate is one of the factors that guide changes in containment measures (Linka et al., 2020), and the tightening or relaxation of restrictions often lags this variable. Second, we assume that the 21-day lag in COVID reproductive rate does not directly affect changes in the workforce (an assumption that is less plausible for the contemporaneous value of the variable) except through its effect on the probability of the firm remaining in operation (which operates through lockdown restrictions). In our analysis, we find that while this variable is significant in predicting the operational status of firms, the inverse mill's ratio (lambda in Table A1) is not statistically significant suggesting that OLS is the appropriate estimator.

Apart from some estimates (specifically sector estimates for selection equation in the case of temporary workers column (4)), the substantive inference from the Heckman selection model is largely similar to the OLS results presented in Tables 2 and 3.

Table A1. Heckman selection model results.

	(1) Decrease in Permanent workers	(2) Open (Selection equation)	(3) Decrease in Temporary workers	(4) Open (Selection equation)
VARIABLES	Permanent workers		Temporary workers	
Sector (base Cat: Food manufacturing)				
Other Manufacturing	4.81	−0.93**	0.16	−1.06**
	(8.95)	(0.44)	(0.31)	(0.42)
Retail	3.05	−0.86**	0.39	−0.96**
	(8.66)	(0.44)	(0.30)	(0.42)
Wholesale of Agri Inputs & Equipment	2.72	−0.68	0.08	−0.80*
	(8.57)	(0.43)	(0.30)	(0.42)
Other Services	−1.12	−0.94**	0.32	−1.08***
	(8.22)	(0.42)	(0.29)	(0.41)
Unknown	−17.18*	−1.02**	0.22	−1.17***
	(9.13)	(0.44)	(0.32)	(0.43)
firm size cat (base: Micro)				
Small	3.46	−0.28	−0.07	−0.37
	(9.86)	(0.40)	(0.33)	(0.39)
Medium	3.75	−0.37	0.29	−0.42
	(10.74)	(0.43)	(0.35)	(0.41)
Large	5.66	−0.09	0.58	−0.17
	(11.92)	(0.49)	(0.39)	(0.46)
Location (base: Kitwe)				
Livingstone	2.21	0.57**	0.91***	0.46**
	(7.86)	(0.24)	(0.23)	(0.23)
Lusaka	7.42	0.49**	0.25	0.32
	(7.01)	(0.22)	(0.21)	(0.21)
Ndola	−2.54	0.85***	0.15	0.76***
	(7.69)	(0.24)	(0.23)	(0.24)
Legal Status (base: Shareholding company)				
Sole propritorship & partnership	−0.55	0.23	−0.26	0.34*
	(5.72)	(0.22)	(0.18)	(0.20)
Partnership & Limited partnership	−1.51	−0.12	−0.24	−0.15
	(5.42)	(0.20)	(0.17)	(0.18)
Firm's age (yrs)	0.11	0.02***	−0.00	0.03***
	(0.17)	(0.01)	(0.01)	(0.01)
Log of last year's sales	−2.40**	0.05	−0.04	0.04
	(1.06)	(0.04)	(0.04)	(0.04)
Export (direct or indirect)	−19.40***	0.26	−0.13	0.29
	(6.02)	(0.25)	(0.21)	(0.25)
More than 50% of working capital is from a bank	7.62	−0.53	−0.32	−0.54
	(14.33)	(0.51)	(0.45)	(0.48)
use mobile money	−4.12	0.33*	0.08	0.28
	(4.82)	(0.19)	(0.16)	(0.19)
Females amongst The Owners of The Firm	−0.34	−0.28*	−0.12	−0.31**
	(4.59)	(0.16)	(0.15)	(0.15)
Top Manager's sector experience	−0.08	0.00	0.00	0.01
	(0.21)	(0.01)	(0.01)	(0.01)
Is The Top Manager Female?	−1.36	−0.13	0.28	−0.21
	(6.13)	(0.20)	(0.20)	(0.20)
Adjust production for COVID	−4.30	0.21	0.16	0.32**
	(4.10)	(0.15)	(0.13)	(0.15)
Multi-establishment Firm?	−5.28	0.23	0.28	0.25

(*Continued*)

Table A1. Continued.

	(1) Decrease in Permanent workers	(2) Open (Selection equation)	(3) Decrease in Temporary workers	(4) Open (Selection equation)
VARIABLES	Permanent workers		Temporary workers	
	(5.32)	(0.21)	(0.18)	(0.21)
Largest owner also managers firm	11.69**	0.23	0.08	0.18
	(5.39)	(0.20)	(0.18)	(0.20)
21-day lag in COVID positive rate		−17.82***		−19.77***
		(6.24)		(5.98)
Lambda	3.82			
	(5.44)			
Constant	17.02	0.42	−0.57	0.85
	(21.08)	(0.87)	(0.68)	(0.84)
Observations (*N*)	394	504	391	507

Notes: Standard errors in parentheses.
***$p < 0.01$.
**$p < 0.05$.
*$p < 0.1$.

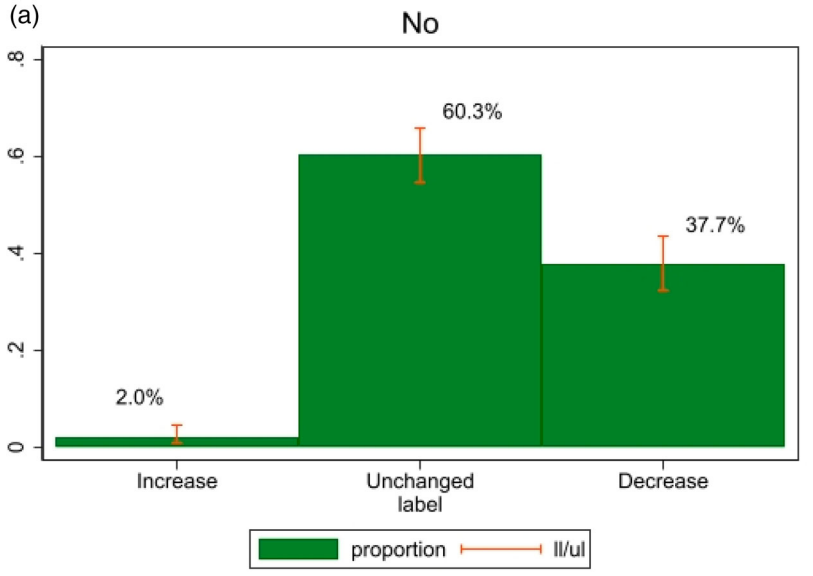


Figure A1. (a): Change in the number of temporary workers by ownership gender (male); (b): Change in the number of Temporary workers by ownership gender (female).

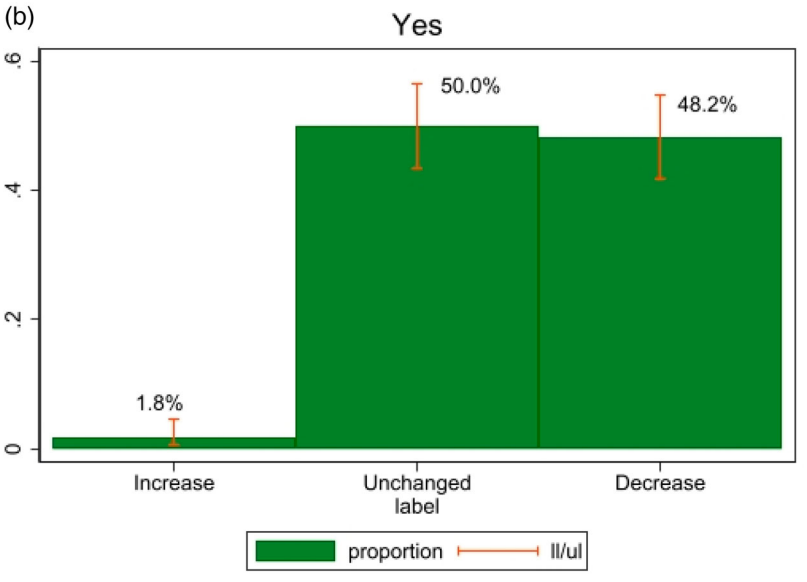


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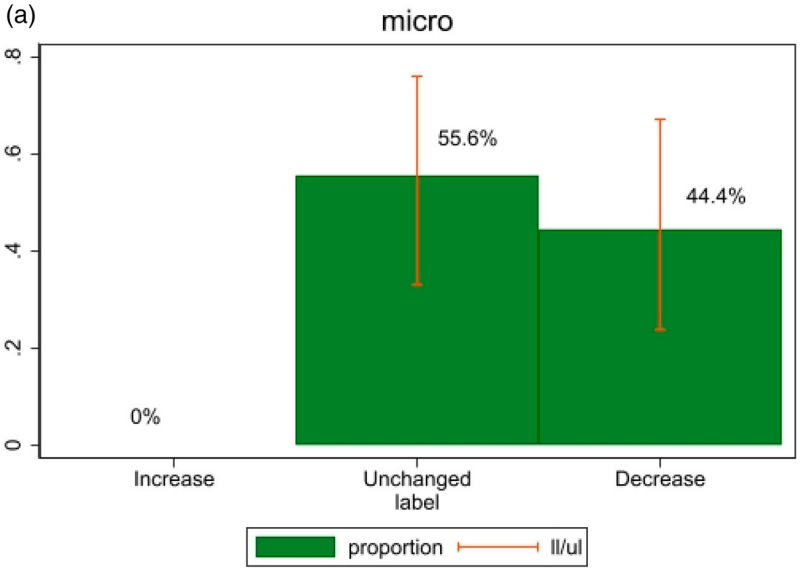
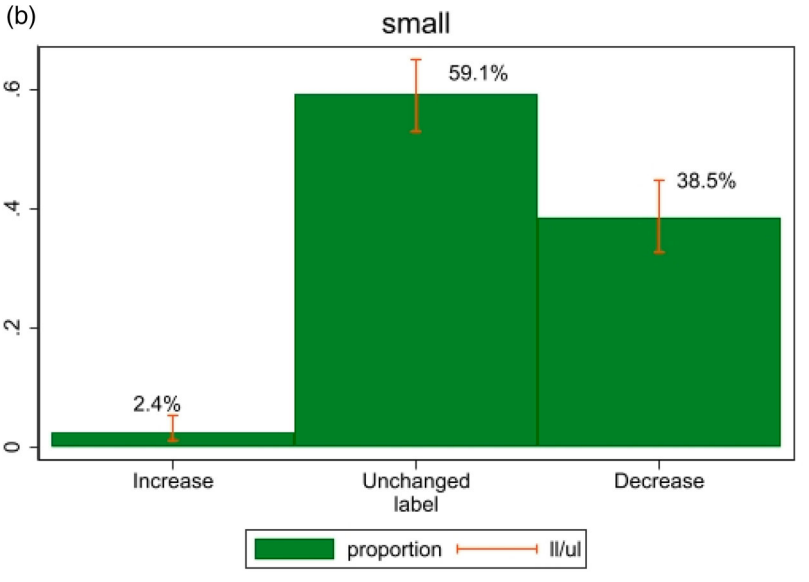


Figure A2. (a): Change in the number of temporary workers by size (micro); (b): Change in number of temporary workers by size (small); (c): Change in the number of temporary workers by size (medium); (d): Change in the number of temporary workers by size (large).



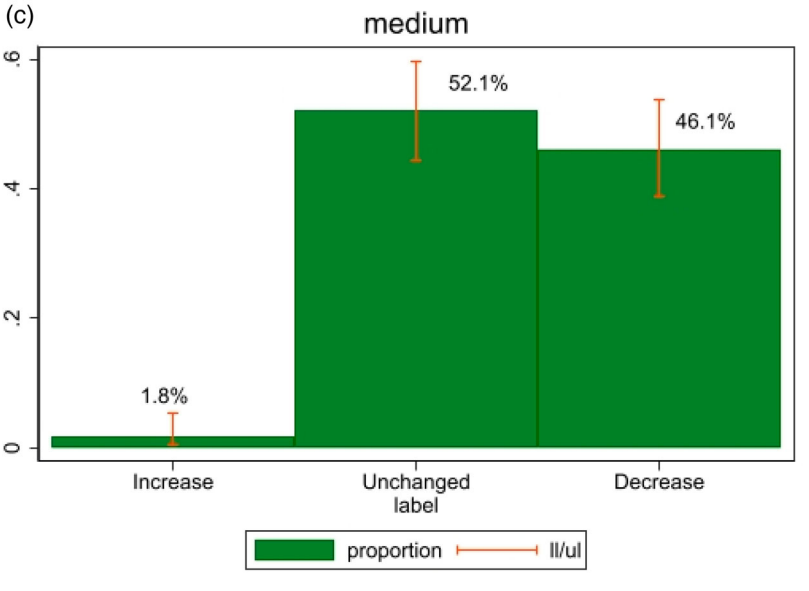


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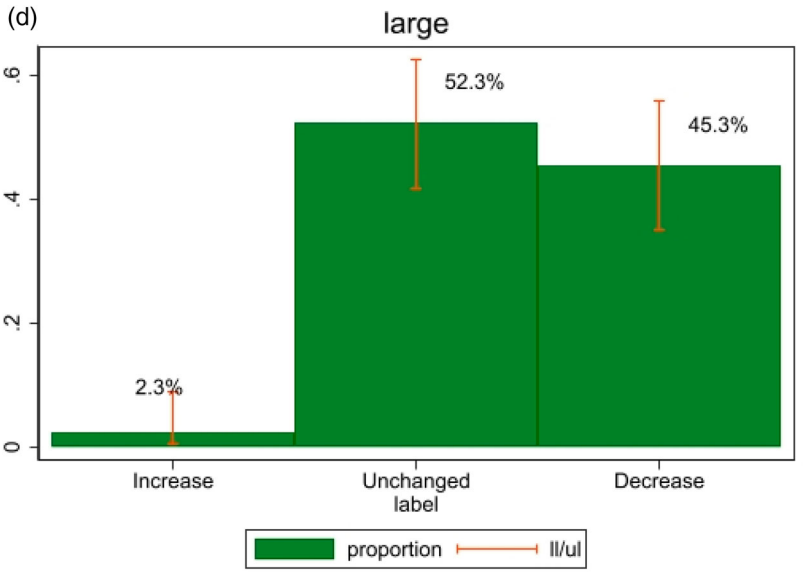


Figure A2. *Continued*.

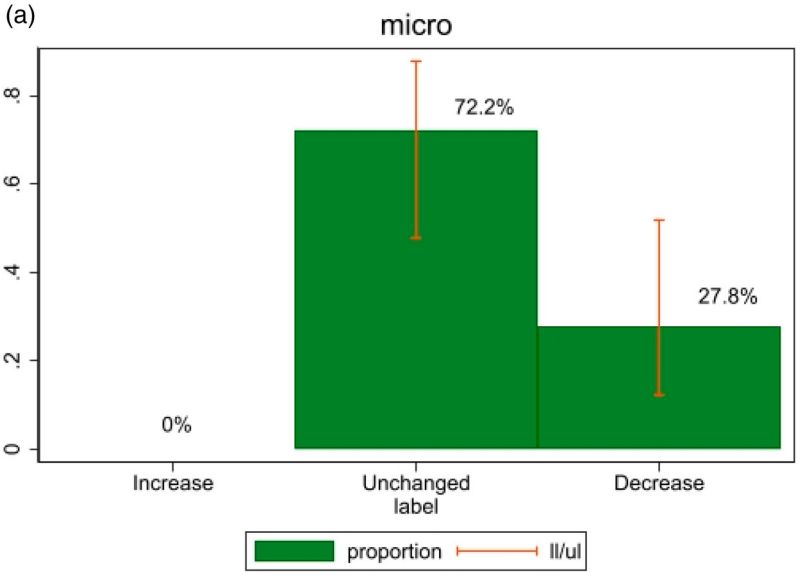


Figure A3. (a): Change in the number of permanent workers by size (micro); (b): Change in the number of permanent workers by size (small); (c): Change in the number of permanent workers by size (medium); (d): Change in the number of permanent workers by size (large).

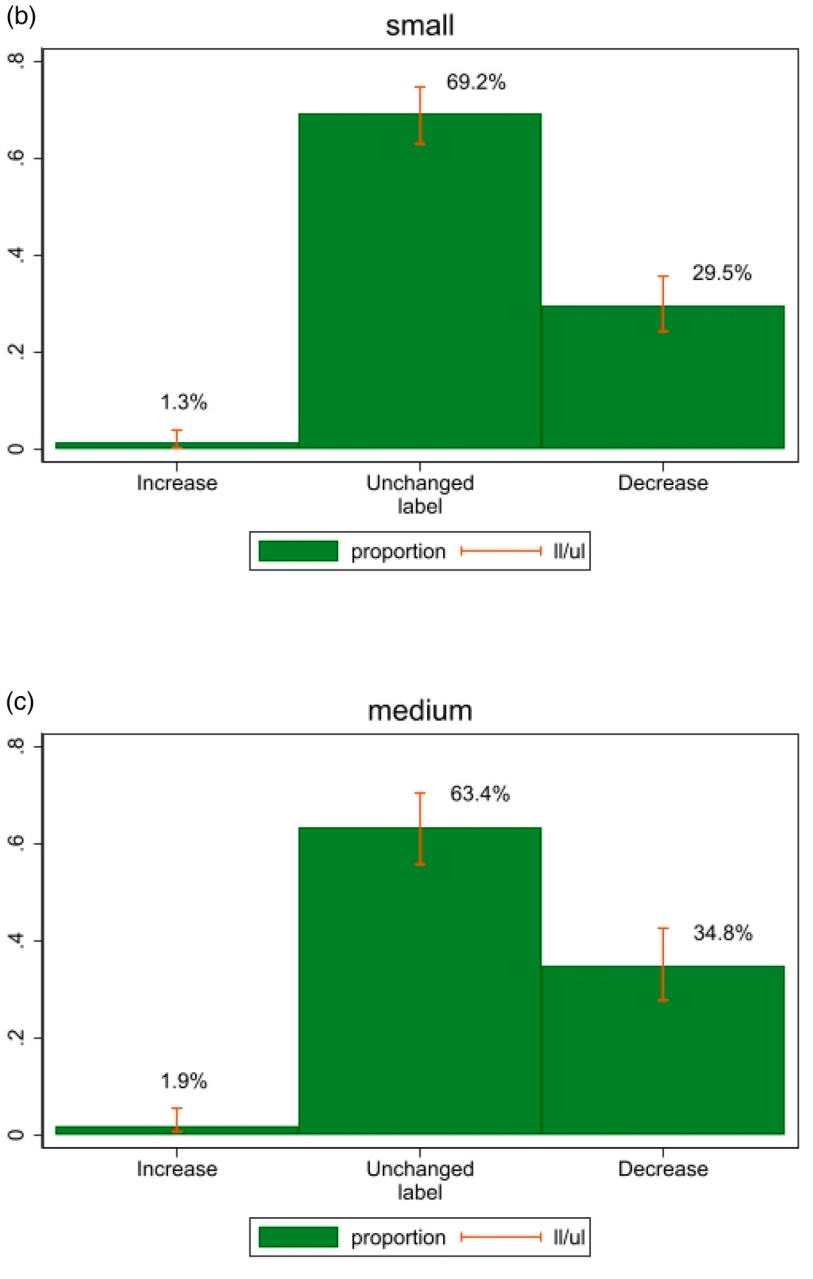


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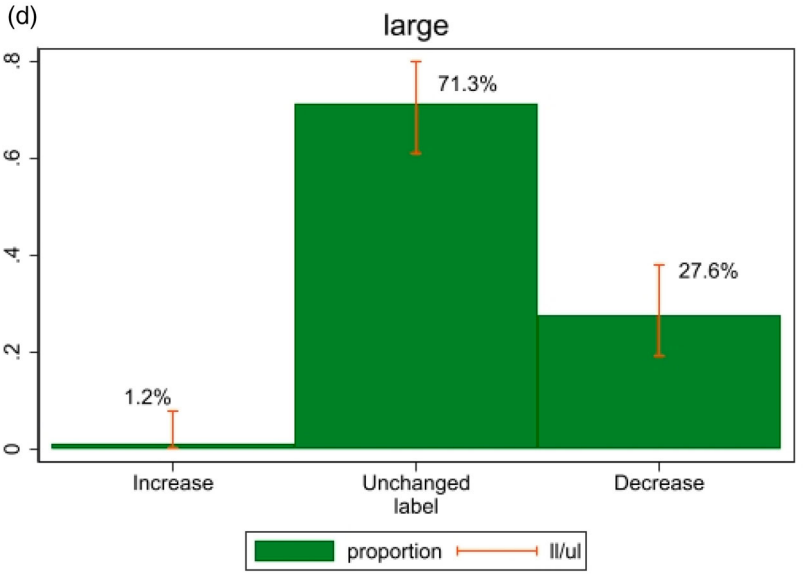


Figure A3. *Continued*.

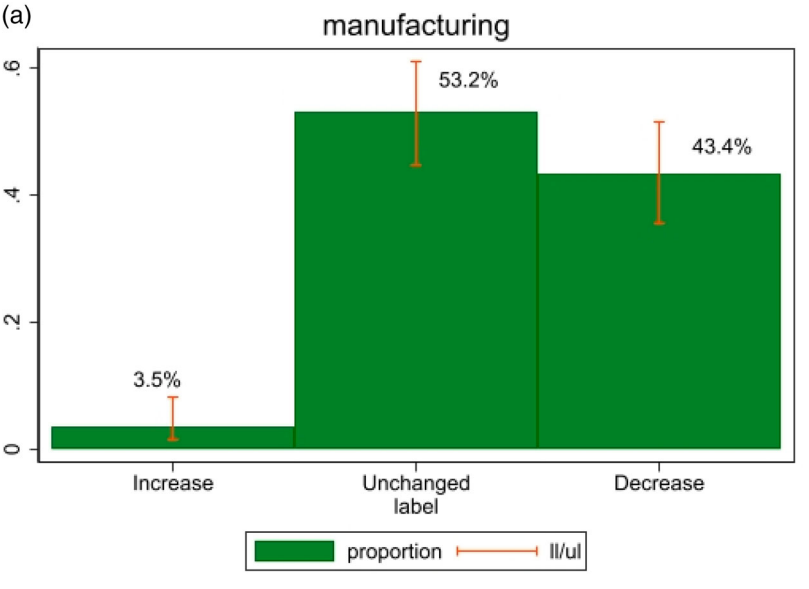


Figure A4. (a): Change in the number of temporary workers by sector (manufacturing); (b): Change in the number of temporary workers by sector (retail); (c): Change in the number of temporary workers by sector (other services).

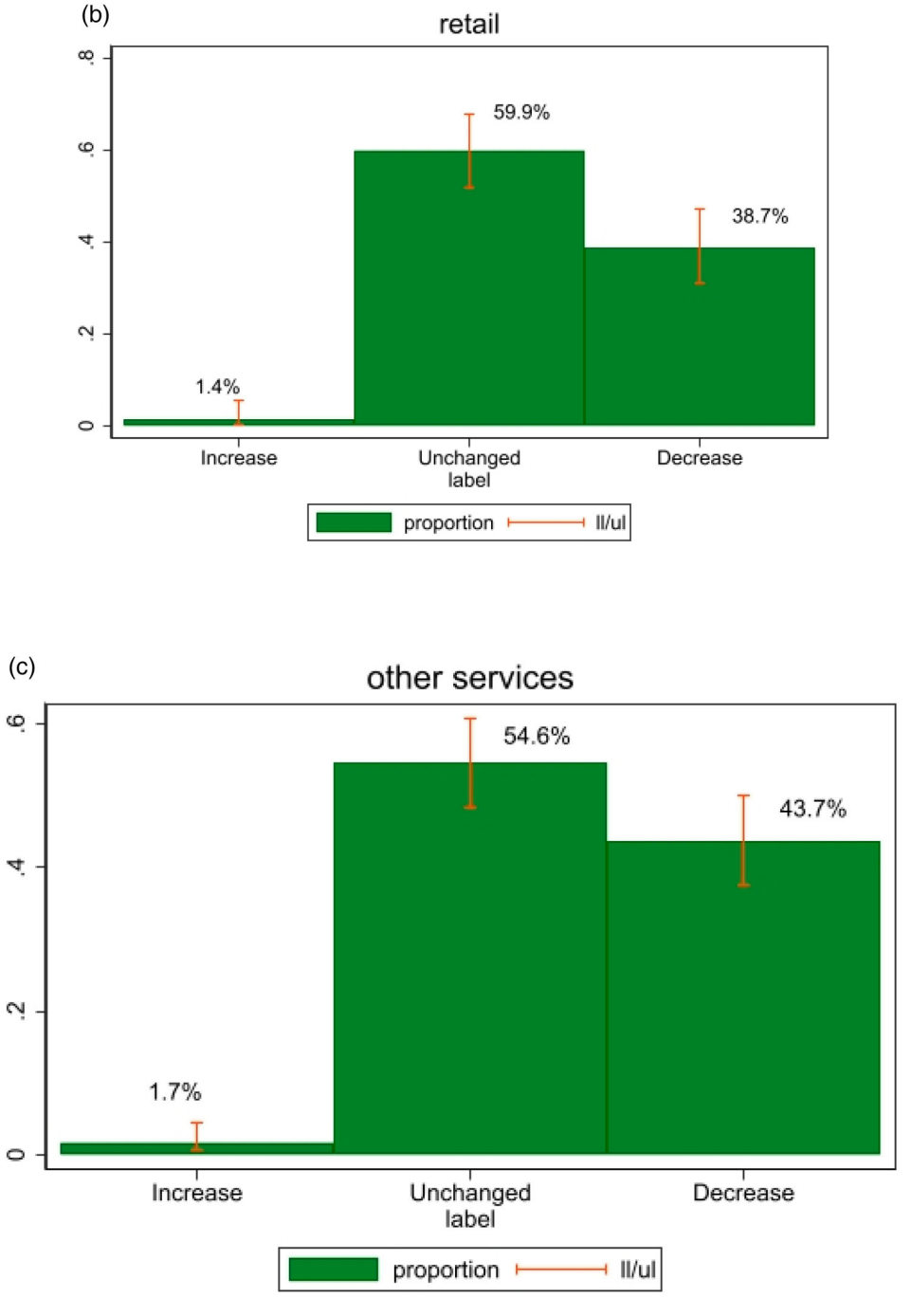


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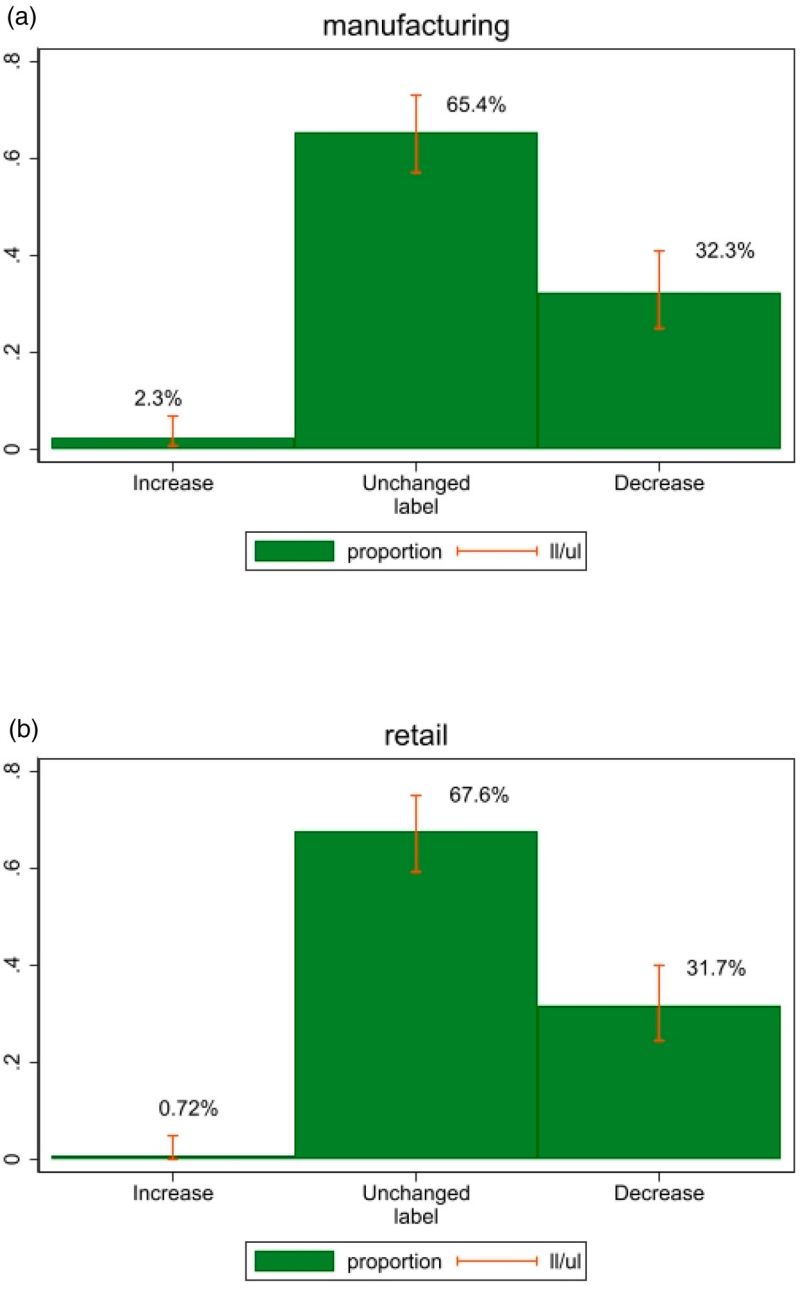


Figure A5. (a): Change in the number of permanent workers by sector (manufacturing); (b): Change in the number of permanent workers by sector (retail); (c): Change in the number of permanent workers by sector (other services).

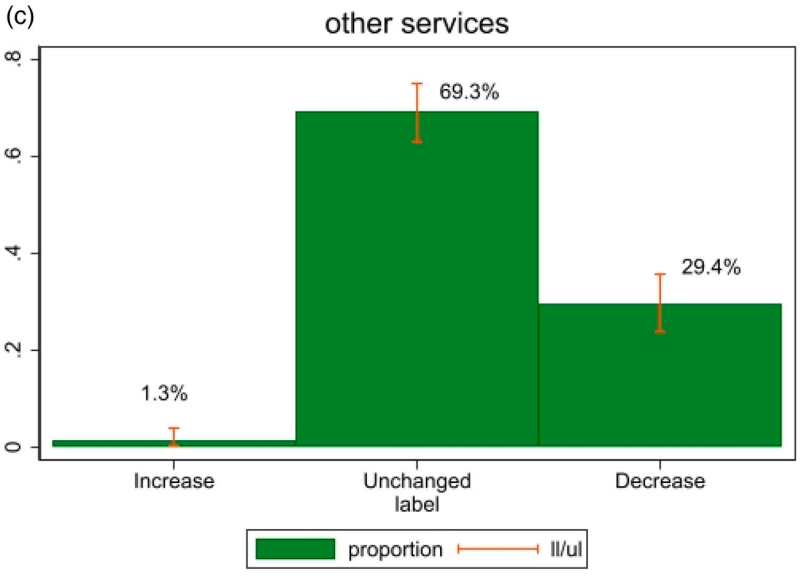


Figure A5. *Continued.*