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Employment transitions with high unemployment and a small informal sector

Examining worker flows during normal and recessionary periods in South Africa

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Abstract: This paper examines employment transitions in the South African labour market. Using the Post-Apartheid Labour Market Series, it analyses flows between the formal sector, informal sector, and unemployment, paying specific attention to how these flows differ during recessions. It explicitly considers heterogeneity within the informal sector by separately accounting for wage employment and self-employment as well as upper-tier and lower-tier informal sector segments. Transition probabilities are estimated using dynamic discrete choice models, and the extent to which transitions affect changes in real wages is estimated using a linear model. The results provide evidence of heterogeneity within the informal sector and segmentation between wage employment and self-employment. They also show a lag in the employment impacts following a recession. Finally, the paper provides suggestive evidence that the upper-tier segment of the informal sector acts as a buffer during recessionary periods by absorbing labour that would otherwise be unemployed or relegated to precarious lower-tier informal employment.

Key words: informal employment, employment transitions, recession, South Africa

JEL classification: J46, J62, O12, O17

Note: As the research is part of the author's PhD thesis, she will hold copyright to facilitate publication of the thesis.

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1 Introduction

The informal sector has traditionally been viewed as secondary or inferior to the formal sector, with the main role of providing jobs for those separated from the formal sector (Bosch and Maloney 2007; Fields 1975; Harris and Todaro 1970). However, the recent literature has sought to debunk this theory of informality, providing evidence for linkages between the formal and informal sectors (Bosch and Esteban-Pretel 2012; Leyva and Urrutia 2020), informal employment as a desirable alternative to formal sector jobs (Bosch and Maloney 2008; Gasparini and Tornarolli 2009; Ulyssea 2018), and large percentages of job-to-job transitions between formal and informal sectors, highlighting similar job and worker characteristics across sectors (Bosch et al. 2007). Given experiences of sluggish recovery from recessions in developing economies, there has also been an increased focus on the role of the informal sector as a potential recession buffer (Bosch and Maloney 2007; Bosch et al. 2007; Gasparini and Tornarolli 2009; Leyva and Urrutia 2020).

This literature on informal sector characteristics, particularly that which examines the role of the informal sector during recessions, focuses predominantly on Latin American and Caribbean countries. This paper therefore extends this lens to the African continent, with a focus on South Africa. South Africa presents an interesting case study given its distinct characteristics. Firstly, South Africa has the highest level of inequality in the world—a legacy of its Apartheid era. Secondly, despite high inequality, South Africa has a relatively small informal sector but has consistently high unemployment. Thus analysing worker transitions across sectors in this context is key to understanding the nature of unemployment. One can also argue that given this relatively small informal sector, evidence of an informal sector buffer effect is unlikely to be found in South Africa. This paper provides evidence which supports the existence of this recession buffer role, indicating that the informal sector may provide a similar easing of recessionary impacts in many other developing and emerging African economies which are characterized by larger informal sectors.

This paper therefore makes the following contributions to the empirical literature. It is one of the first to examine employment transitions between the formal and informal sectors for an African economy. While Danquah et al. (2021) present an initial analysis of employment transitions in four African countries using two waves of survey data, the analysis in this paper is based on 60 survey waves. Secondly, it is the first, to the best of my knowledge, to investigate the buffer role of the informal sector for an African country. Thirdly, it explicitly considers heterogeneity within the informal sector—a dynamic that has not yet been explored much in the recent literature. It also estimates the impact of employment transitions on labour earnings.

Three main findings emerge from these analyses. Firstly, the informal sector exhibits substantial heterogeneity. It is characterized by an 'upper tier', which offers higher wages and more opportunities for progression, and a 'lower tier', which absorbs lower-skilled workers and offers lower wages and limited opportunities for transitioning to better-paid jobs.[1] Secondly, across both the formal and informal sectors, there is segmentation between wage employment and self-employment. Wage-employed workers are more likely to remain employed and more likely to transition to jobs with higher wages and improved benefits, and there are lower barriers to entry for wage employment than self-employment. There is also limited transition across these two types of employment. Finally, following a recession, the upper-tier segment of the informal sector acts as an employment buffer. That is, while there are transitions out of both formal and lower-tier

[1] The terms 'upper tier' and 'lower tier' are adopted from Danquah et al. (2021).

informal jobs into unemployment, there are no significant movements out of upper-tier informal jobs. Instead, this informal segment continues to absorb additional labour. These findings emphasize that, contrary to the generic formal–informal distinctions, the focus of the literature and policy makers should be on more salient labour market divisions such as wage employment versus self-employment or upper-tier versus lower-tier employment. The view of the informal sector as an undifferentiated sector should be relinquished.

The remainder of this paper is organized as follows. Section 2 discusses related literature. Section 3 then presents an overview of the data, stylized facts, and the definition of informal employment used in this paper. Section 4 outlines the empirical methods, and sections 5 to 7 discuss the results of employment transitions with a particular focus on recessionary periods in Section 7. Section 8 concludes the paper.

2 Related literature

The work in this paper is linked to several strands of the literature. The paper combines insights from and tests hypotheses suggested by the literature on i) informal sector heterogeneity, ii) the role of the informal sector as a potential recession buffer, and iii) labour market dynamics in South Africa. These themes are discussed in more detail below.

2.1 Nature of informal employment

Traditionally, the 'productive' and 'legalistic' definitions of informality have prevailed. In productive terms the informal sector has been viewed as being characterized by low productivity and unskilled workers who cannot find work in the formal sector (Fields 1975; Harris and Todaro 1970; Hart 1973; Mazumdar 1976). In legalistic terms the informal sector has been defined as comprising businesses which are separated from formal labour market institutions, and which therefore do not comply with labour market regulations, and workers who are not covered by labour or social protection (Gasparini and Tornarolli 2009). More recently, given the adoption of the view that both skilled and unskilled workers operate in the informal sector and that formal firms also hire informal workers, informality has been more often defined on 'intensive' and 'extensive' margins (Ulyssea 2018; Ulyssea and Ponczek 2018). The extensive margin has been used to identify firms which operate without adherence to labour market regulations, while the intensive margin is used to refer to workers who do not possess formal contracts or are not covered under social protection regulations.

Furthermore, and applicable to the work in this paper, it has been recognized that there is heterogeneity in the informal sector in two key areas. Firstly, while some informal sector workers would prefer to work in the formal sector, and can therefore be characterized as involuntarily employed in the informal sector, not all informal employment is involuntary (Maloney 1999). Using data on the preferred type of jobs from the Mexican Labour Force Survey, Duval-Hernández (2022) argues that, while a substantial portion of the informally employed would prefer formal jobs, implying 'rationing of formal jobs' and segmentation in the labour market, one in five informal sector workers self-select into this sector. For Nicaragua and Costa Rica, Alaniz et al. (2021) estimate that even larger percentages—70 per cent and 34 per cent, respectively—of the informally self-employed voluntarily participate in the informal sector, while 56 per cent and 90 per cent of informal wage employment is found to be voluntary. Similar results are presented in Bosch and Maloney (2007, 2008) and Bosch et al. (2007), who note that transition rates between the formal and informal sectors are 'broadly procyclical and highly correlated with each other', indicating that most of the observed transitions into informality are in fact job-to-job transitions.

In their view this implies that both sectors provide similar jobs 'at the margin' and the informal sector is therefore not a 'disadvantaged sector in a segmented market'. These findings are in line with Ulyssea (2018), who emphasizes that a significant portion (over 40 per cent) of informal firms could operate profitably in the formal sector but remain in the informal sector to avoid the costs of formalization, implying that entrepreneurs and employees in the informal sector should not be viewed as queuing for formal sector employment (Fiess et al. 2006).

Secondly, not all informal work is equal. While informal employment includes individuals engaged in low-return subsistence activities, some of the informally employed are also engaged in profitable, high-return activities which may even be characterized by barriers to entry (Danquah et al. 2021; Fields 2019; Ulyssea 2018). Therefore, informal employment exhibits an 'internal duality' between a low-skilled, low-wage lower tier and a skilled, high-wage upper tier and this duality is observed both within wage and self-employment (Danquah et al. 2021). Combining evidence from four sub-Saharan African countries, Danquah et al. (2021) note that a substantial percentage of workers move from upper-tier informal employment into the formal sector, suggesting that upper-tier informal employment also acts as a 'stepping-stone' into formal employment rather than being purely voluntary. Conover et al. (2022), while not making a distinction between upper- and lower-tier informal employment, also find large percentages of transitions from informal wage employment into formal wage employment in Mexico, particularly among the well-educated, suggesting that those with more education are likely engaged in 'higher quality' informal employment and use this as a stepping-stone into formal employment.

On the other hand Danquah et al. (2021) note a high degree of stickiness within lower-tier, informal employment, suggesting that these workers are trapped in low-paying jobs due to limited opportunities. This is line with the finding of Conover et al. (2022) of lower-quality jobs among the less-educated, informally wage employed in Mexico. Bosch and Maloney (2007) similarly find that the search intensity for better jobs is higher in the informal sector, implying that for some individuals their informal employment is in fact disguised unemployment.

These studies provide evidence that, while there is some segmentation in developing country labour markets, the dualistic view—where the informal sector is an inferior, less desirable alternative—is not complete. Additionally, even within informal employment, there is a high degree of heterogeneity. A more nuanced view of informal employment is therefore necessary.

2.2 Informal employment as a recession buffer

The literature on informal employment, particularly studies based in Latin America, also views the informal sector as an operational 'buffer' during periods of recession—providing employment for those who would otherwise be unemployed. Bosch and Maloney (2007) and Bosch et al. (2007) use gross labour flows in Mexico and Brazil to examine this hypothesis. Estimated transition probabilities show that the informal sector does in fact mitigate against the extent of macroeconomic shocks in this economy. While job-finding rates decrease substantially in the formal sector during downturns, the informal sector does not stop creating jobs. Thus, despite increased separation from the informal sector into unemployment during recessions, the informal sector still absorbs a greater proportion of the unemployed during recessions relative to the formal sector. Using 100 household surveys across Latin American and Caribbean countries, Gasparini and Tornarolli (2009) similarly find that informal sector employment increases during expansions, which is consistent with the integrated, voluntary view of the informal sector, and that the relative size of the informal sector increases during recessions, which is consistent with its buffer role.

Other studies employ theoretical models to assess this hypothesis. Fiess et al. (2006) construct a small open-economy model characterized by a formal (tradeable) sector, an informal (non-

tradeable) self-employment sector with liquidity constraint to entry, and transition across sectors. They then test this model empirically using data from Brazil, Mexico, Argentina, and Colombia. Bosch and Esteban-Pretel (2012) use a two-sector search and matching model calibrated with Brazilian data. Similarly, Leyva and Urrutia (2020) construct small open-economy business cycle models with choices between formal salaried employment and (informal) self-employment, calibrated with Mexican data. Consistent across all analyses is the result that the informal sector expands pro-cyclically during expansions, but continues to absorb additional labour during downturns, resulting in an increase in the relative size of the informal sector during these times. Further, the counter-cyclicality of informal employment is driven primarily by the cyclicality of formal employment (Leyva and Urrutia 2020; Shapiro 2014). These findings highlight that, in the presence of large informal sectors, negative shocks are less able to penetrate the economy as there is very low passthrough of shocks from formal to informal sectors (Fernández and Meza 2015; Loayza and Rigolini 2006).

2.3 Labour market dynamics in South Africa

Three key elements characterize South Africa's labour market: high unemployment, a relatively small informal sector, and high worker flows. This paradox of high unemployment and a small informal sector makes South Africa an 'international outlier', as it is often assumed that the unemployed should be able to find work in the informal sector (Kingdon and Knight 2004).

Firstly, with regard to the nature of unemployment, Kingdon and Knight (2004) posit arguments for involuntary unemployment and find predicted per capita household income to be below informal sector wages for almost 90 per cent of the unemployed. In their view this suggests greater deprivation among the unemployed, induced by entry barriers to the informal sector. El Badaoui and Magnani (2020) similarly find a higher probability of being involuntarily unemployed among younger, less-educated, and Black South Africans.

Other studies which examine the second key element—a small informal sector—also emphasize the existence of entry barriers. The main barriers to entry to the informal sector include insufficient start-up capital or lack of savings and limited access to formal as well as informal credit (Chandra et al. 2002; Cichello et al. 2005). These are binding constraints, as setting up informal businesses often requires substantial initial investments (Kingdon and Knight 2004). South Africa's history of Apartheid is also posited as a reason for its relatively small informal sector. During Apartheid, Black South Africans faced restrictions on entrepreneurial activities, segregated schools, discrimination within the labour market, and repression of informal activities (El Badaoui and Magnani 2020; Kingdon and Knight 2004). Kingdon and Knight (2004) argue that, in addition to portions of these laws still being in effect today, there are lingering effects of the 'repression and disempowerment' faced during this time which today result in lower levels of entrepreneurial and social skills as well as the confidence required to engage in informal self-employment.

In additional to informal sector entry barriers and historical legacies, Banerjee et al. (2008) note several structural changes in South Africa's labour market which account for high and rising unemployment. These include: i) an influx of low-skilled women into the labour market, coupled with a fall in demand for unskilled labour due a shift away from mining and agriculture; ii) difficulty among the youth in obtaining their first jobs, possibly due to search costs; and iii) technological changes which favour skilled workers and relegate the less-skilled to unemployment. They emphasize that, given the structural nature of these mismatches, a positive shock is not enough to reduce unemployment.

Finally, despite high unemployment and a small informal sector, the South African labour market exhibits substantial worker flows. Banerjee et al. (2008) note, using household surveys, that there

are a large number of transitions into and out of the informal sector, but that most of these are into unemployment as moves from the informal sector to formal sector are rare, particularly among the youth. Kerr (2018) presents additional formal sector evidence using administrative tax data. He finds that worker flows (the sum of hires and separations) account for about 54 per cent of the change in average employment, whereas job flows (gross job creation and destruction) account for about 24 per cent, suggesting significant churning in the labour market. Kerr (2018) notes further that both worker and job flows are higher for smaller, lower-wage, and non-public sector firms, concluding that the South African labour market is less rigid than previously suggested (Go et al. 2010); instead, firms can freely adjust employment levels. This is in line with evidence of a 'massive loss in employment despite a relatively mild recession in 2009' (Dadam and Viegi 2015; Kerr 2016: 4).

This paper explores transitions across formal and informal labour market segments and the extent to which these transitions differ during periods of recession, providing evidence of the potential buffer role of the informal sector during these times.

3 Data and stylized facts

To examine these employment transitions, I used version 3.3 of the Post-Apartheid Labour Market Series (PALMS). This dataset is compiled by the DataFirst team at the University of Cape Town, South Africa. PALMS harmonizes data from the South African October Household Survey (OHS), Labour Force Survey (LFS), and Quarterly Labour Force Survey (QLFS) with data available for 1994–99, 2000–07, and 2008–19, respectively. PALMS also includes data from the Project for Statistics on Living Standards and Development (PSLSD), conducted in 1993. Importantly, while each of these sets of surveys could be used separately or combined by the researcher, PALMS corrects for several documented issues, including changes in sampling methodology (Kerr and Wittenberg 2015) and inconsistency in measuring labour earnings (Burger and Yu 2007; Wittenberg 2017). The compiled dataset is thus a rotating panel which includes 69 waves of survey data covering the years 1993–2019.

There are two important considerations regarding the measurement of earnings. Firstly, earnings are imputed in the QLFS where respondents refused to give a specific earnings amount but gave a bracket response to the categorical question on earnings (Kerr and Wittenberg 2019). The DataFirst team corrects for these bracket responses by including a weight variable, which is used together with the earnings variable. Secondly, earnings data for the QLFS waves in 2008 and 2009 is unavailable. This data was not collected for the four waves in 2008 and first two waves in 2009 and it has not been released for the final two waves of 2009 (Kerr and Wittenberg 2019). Earnings data for 2018–19 has also not yet been released. Unfortunately, as these two periods are also the periods when South Africa faced recessions, changes in earnings during recessions cannot be estimated.

3.1 Sample restrictions

Some variables used to categorize informal workers[2] are only available in the LFS and QLFS which begin in the year 2000. Thus surveys before the year 2000 (PSLSD and OHS) are excluded. Survey data for the year 2000 is also excluded as the first survey in this year was a pilot survey which was

[2] These include Unemployment Insurance Fund (UIF) payments, the number of workers in establishments where individuals are employed, and whether employees have a written contract.

based on a smaller sample than the subsequent surveys. Additional restrictions are applied to ensure consistency of results. Firstly, individuals younger than 18 or older than 60 are excluded, limiting the sample to typical working-age individuals. The sample is further limited to those who are either unemployed or employed (not self-employed in the agricultural sector) with a categorization of self-employment or in wage work. As such, individuals who are employed but not categorized as either self-employed or working for a wage are excluded from the sample. All changes result in a reduction of the sample size from 6,022,548 to 2,603,980 individuals, for 60 survey waves from 2001 to 2019.

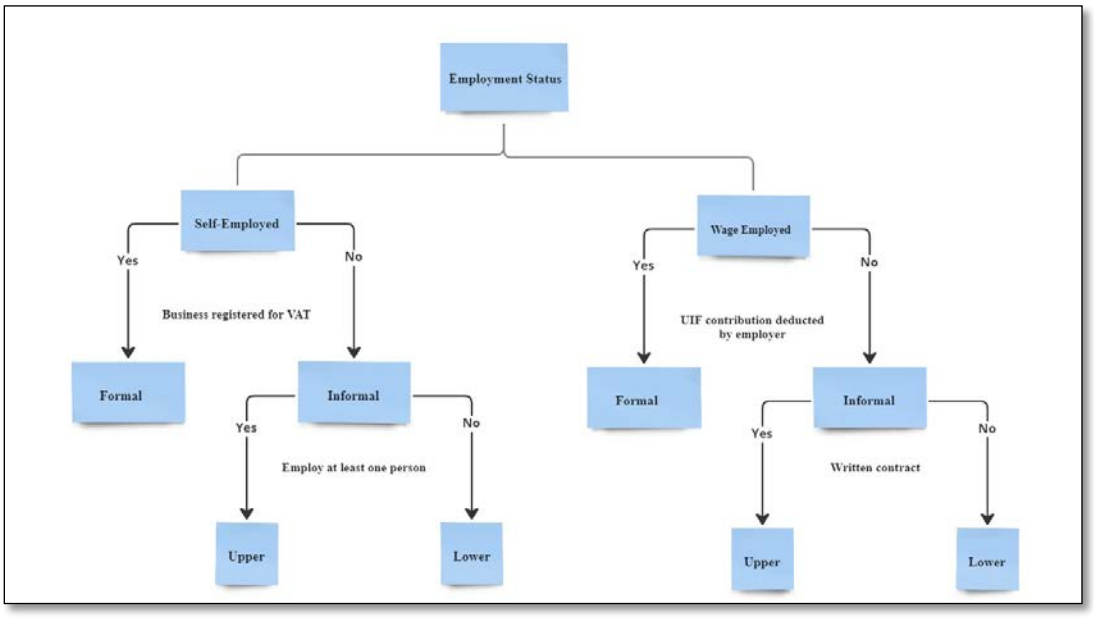
3.2 Defining the informal sector

The paper follows Danquah et al. (2021) and Fields (2020) in defining the employment status of workers. All employed individuals are firstly categorized as being self-employed or wage employed based on the type of job reported. Secondly, self-employed workers are categorized as formally employed if their business is registered for value-added tax (VAT); they are classified as informal otherwise. Similarly, wage-employed workers are classified as being in the formal sector if contributions to the UIF are deducted by their employers. Informal sector workers are further classified as being in upper-tier or lower-tier informal employment. Self-employed informal workers are designated as upper-tier if their business employs at least one other person; otherwise, they are designated as lower-tier. Similarly, wage-employed workers are classified as upper-tier if they hold a written contract; otherwise, they are classified as lower-tier.

Upper-tier and lower-tier designations enable an assessment of heterogeneity or duality in informal employment, as emphasized in the recent literature. More specifically, upper-tier informal employment may offer 'relatively high earnings and attractive employment conditions', comparable to formal employment, therefore relegating those who cannot access either of these options to lower-tier informal employment (Danquah et al. 2021: 5; Fields 2020). It is therefore worth considering as a separate type of informal employment.

Figure 1 presents the six defined employment states: i) formal wage employment, ii) upper-tier informal wage employment, iii) lower-tier informal wage employment, iv) formal self-employment, v) upper-tier informal self-employment, and vi) lower-tier informal wage employment.

Figure 1: Definition of employment status



Source: adapted from Figure 1 in Danquah et al. (2021: 7), which is under CC BY 4.0.

3.3 Descriptive statistics

Tables 1a and 1b show the percentages of workers in the six defined employment categories as well as unemployment across the sample period. Unemployment[3] accounts for between 53 per cent and 63 per cent of the sample, highlighting the issue of consistently high unemployment in the South African labour market (Banerjee et al. 2008; Kerr 2018). Among employed individuals the percentage of those in formal wage employment increased steadily from 45 per cent to 62 per cent between 2001 and 2019, while formal self-employment accounted for only up to 3 per cent. Concurrent with the rise in formal wage employment, the percentage of lower-tier wage employment declined from 28 per cent in 2001 to 16 per cent in 2019. On the other hand, as highlighted in Figure 2, the percentage of workers in upper-tier informal employment remained steady at around 9–11 per cent from 2001 to 2019.

Table 1a: Proportions of **sample** by employment status, 2007–19, %

			2001-Q1	2007-Q3	2008-Q1	2019-Q2
Wage employed	Formal		18.2	21.5	28.5	28.2
	Informal	Upper	3.5	3.0	3.4	3.2
		Lower	11.3	7.5	9.0	7.5
Self-employed	Formal		0.5	0.6	1.5	1.2
	Informal	Upper	1.2	1.2	0.9	1.3
		Lower	5.7	3.0	4.3	4.5
Unemployed			59.6	63.1	52.5	54.2
TOTAL			100	100	100	100

Source: author's calculations based on PALMS.

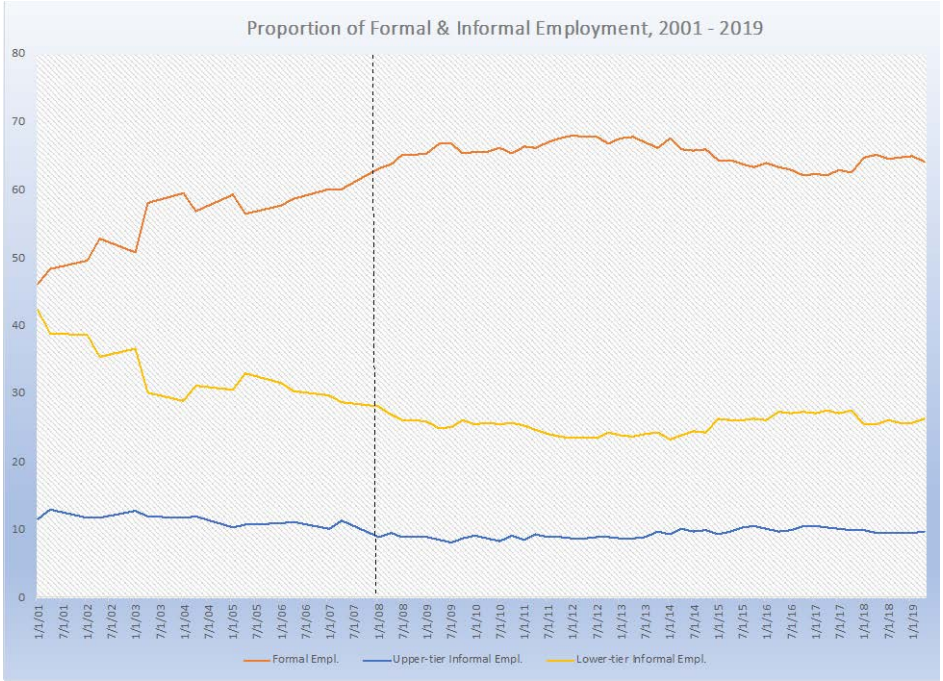
Table 1b: Proportions of **employed** by employment status, 2007–19, %

			2001-Q1	2007-Q3	2008-Q1	2019-Q2
Wage employed	Formal		45.0	58.3	59.9	61.6
	Informal	Upper	8.6	8.1	7.1	6.9
		Lower	28.1	20.4	18.9	16.3
Self-employed	Formal		1.2	1.7	3.2	2.6
	Informal	Upper	2.9	3.2	1.8	2.7
		Lower	14.2	8.2	9.2	9.9
TOTAL			100	100	100	100

Source: author's calculations based on PALMS.

[3] The PALMS dataset does not allow for the separation of individuals actively searching for jobs and those discouraged or outside the labour force. Hence, these categories are treated as one group throughout the paper.

Figure 2: Proportion of formal and informal employment, 2001–17



Note: the dotted line indicates where the (bi-annual) LFS ends and the (quarterly) QLFS begins.

Source: author's calculations based on PALMS.

Table 2 presents the individual characteristics of workers by employment status. In both formal and informal employment, the self-employed are older on average than the wage employed. Additionally, within wage employment and self-employment, older workers are engaged in the formal sector. It is also notable that the youngest individuals are found in unemployment, emphasizing the issue of youth unemployment resulting from challenges such as search costs and skill mismatches (Banerjee et al. 2008).

As with age levels, formal sector workers are also more educated than informal sector workers. However, within wage employment, education levels are not strikingly different across groups. While upper-tier informal wage workers have, on average, two additional years of education relative to lower-tier workers, formal and upper-tier informal workers have a difference of one additional year of education on average, suggesting that among the higher educated, informal wage contracts may be used as a screening mechanism for formal employment (Conover et al. 2022). On the other hand, within self-employment education, the levels of upper-tier and lower-tier informal workers are more closely aligned but there is a more pronounced education difference between formal and upper-tier informal workers. The self-employed are also more educated than the wage employed on average, signalling a degree of segmentation between these two employment categories.

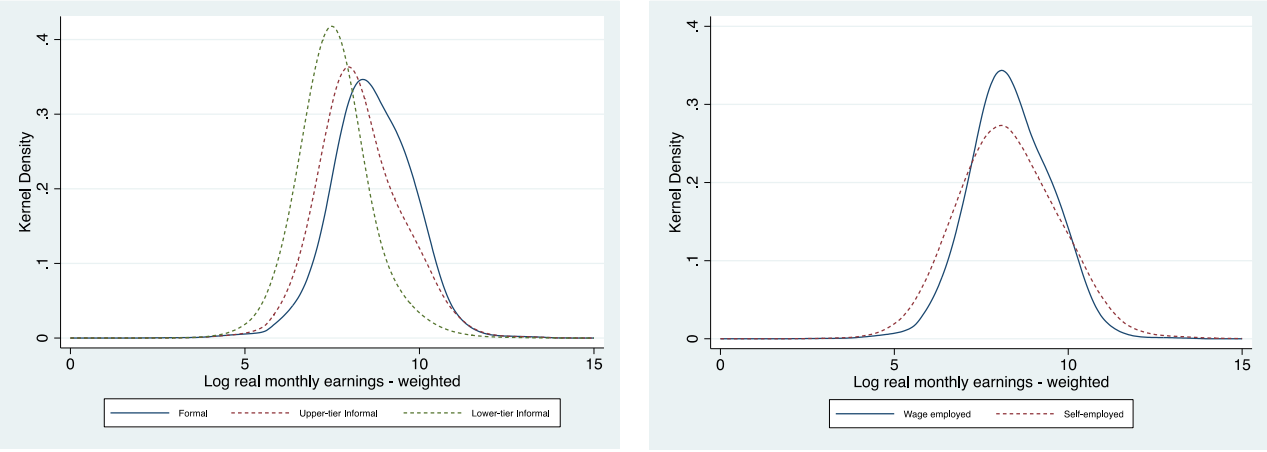
Table 2: Individual characteristics by employment status

	Overall	Wage employed			Self-employed			Unemployed
		Formal	Informal		Formal	Informal		
			Upper	Lower		Upper	Lower	
Average age	35.0	38.4	36.1	37.1	43.5	40.3	40.5	32.6
Percentage female	54.3	45.7	47.6	51.1	27.2	25.5	54.6	59.9
Percentage married	38.2	53.8	45.2	39.3	77.7	62.1	50.0	29.0
Average years of education	9.4	10.6	9.9	7.8	12.3	9.5	8.5	9.0
Percentage of race groups:								
Black	80.2	69.4	75.5	86.9	35.9	81.5	90.2	84.5
Coloured	11.3	16.2	12.0	10.7	8.6	5.7	4.1	9.8
Asian	2.2	3.1	2.9	0.9	9.7	3.5	1.5	1.9
White	6.2	11.3	9.6	1.4	45.8	9.3	4.1	3.8
Observations	2,603,980	661,393	79,584	198,938	27,038	26,574	97,845	1,512,519

Source: author's calculations based on PALMS.

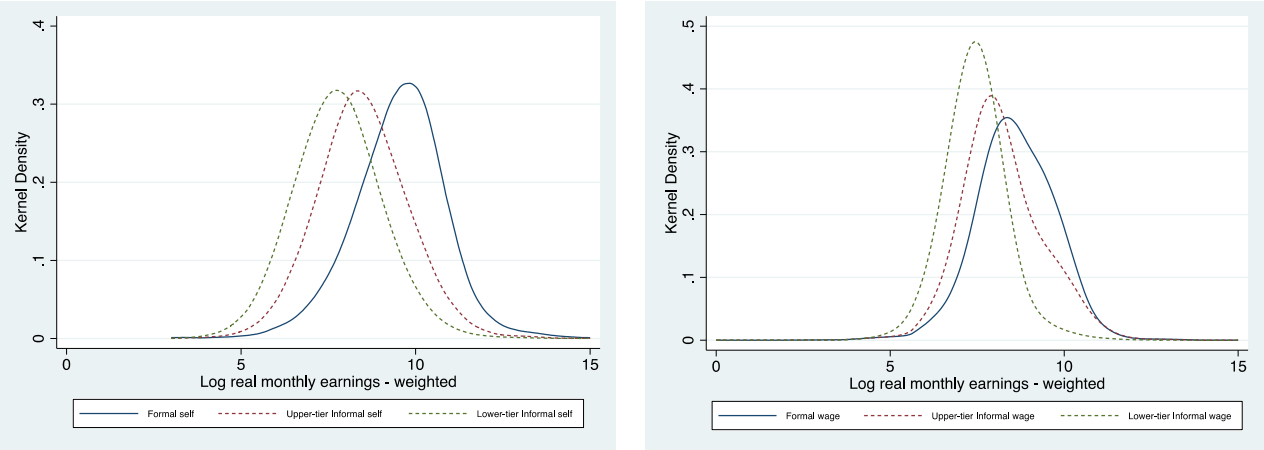
Race is also an important factor that distinguishes between the formally and informally employed in South Africa. As illustrated in Table 2, White South Africans are overrepresented in formal self-employment, accounting for almost 50 per cent of business owners who employ at least one other person, compared to their population share of 6 per cent. Black South Africans, on the other hand, account for approximately 80 per cent of the population but only 36 per cent of formal business owners and 90 per cent of lower-tier informal self-employment. Similar trends are observed in wage employment, with less stark differences. Here, Black South Africans are also overrepresented in the lower tier of informality, but they account for about 70 per cent of the formally employed, followed by 17 per cent accounted for by the Coloured race group. About 10 per cent of White South Africans are employed in both formal and upper-tier wage jobs, in line with their population percentages.

Figure 3: Kernel density of log real earnings by employment status



Source: author's calculations based on PALMS.

Figure 4: Kernel density of log real earnings by wage and self-employment status



Source: author's calculations based on PALMS.

Figure 3 shows wage differences by formality status as well as between wage and self-employment, while Figure 4 shows differences in wages within wage employment and self-employment. Unsurprisingly, within both wage employment and self-employment, wages are highest among formal workers and lowest among lower-tier informal workers. There is, however, substantial overlap across these segments, indicating less than complete segmentation between formal and informal employment. Interestingly, there are very few differences between the distributions of real wages in wage employment and self-employment, despite the differences in age and education noted above.

4 Empirical framework

To examine mobility patterns across the employment categories outlined during recession and non-recession periods, a range of estimations are applied. Firstly, I present simple transition matrices which estimate the number and probabilities of transitions across the defined categories of employment, conditional on individuals' current categories of employment. Secondly, I apply two dynamic discrete choice models—a multinomial logistic model and an ordered logistic model—to examine the probabilities of moving between employment categories, conditional on workers' current employment categories and individual characteristics. Thirdly, I examine the impact of employment transitions on changes in real labour earnings using a linear model. Finally, to analyse how the probabilities and directions of transitions differ during recessions, I re-estimate the ordered logistic model, including a binary variable representing periods of recession.

Dynamic discrete choice models

As is standard in the literature (Bosch and Maloney 2007; Bosch et al. 2007; Danquah et al. 2021; Maloney 1999), transitions are examined by estimating the probability of being in a particular employment category at time t+1, conditional on employment status at time t and individual demographic characteristics at time **t**. Hence, applying a **multinomial logistic model**, given seven possible states of employment $j = 1, \dots, J$, the probability of being in a state j at time t+1, $ES_{i,t+1}$, given employment status at time t, $ES_{i,t}$, and a vector of demographic characteristics, $X_{i,t}$ is estimated as:

$$\pi_{i,t+1,j} = \Pr\left(ES_{i,t+1} = j \,\middle|\, ES_{i,t}, X_{it}\right) = \frac{\exp\left(ES'_{i,t}\gamma_j + X'_{it}\beta_j\right)}{1 + \sum_{m=1}^{J} \exp\left(ES'_{i,t}\gamma_m + X'_{it}\beta_m\right)}$$

where X'_{it} includes an individual's age, gender, marital status, race, and the province in which they reside, γ_j is the vector of coefficients representing the extent to which employment status at t+1 is impacted by employment status at time t, and β_j is the vector of coefficients on individual demographic characteristics at time t.

To complement the above analysis, an **ordered logistic model** is also estimated. This entails two orderings. Firstly, wage employment and self-employment categories are aggregated to define a three-category ordering: $G_i = 1$ for lower-tier informal employment, $G_i = 2$ for upper-tier informal employment, and $G_i = 3$ for formal employment. Secondly, the four informal sector and two formal sector categories are aggregated to define, along with unemployment, three broad categories. These three categories are then ordered as $F_i = 1$ for unemployment, $F_i = 2$ for informal employment, and $F_i = 3$ for formal employment. The ordered logit model then estimates the probability of moving between each pair of employment categories from time t to time t+1.

Dynamics of labour earnings

To examine the impact of employment transitions on real labour earnings, the following linear model is estimated, also in line with the analysis conducted in Danquah et al. (2021):

$$\Delta y_{i,t+1} = \alpha + \zeta y_{i,t} + \vartheta\left(ES_{i,t} \times ES_{i,t+1}\right) + \theta X_{it} + \varepsilon_{it}$$

where $\Delta y_{i,t+1}$ is the change in real labour earnings at time t+1, which is predicted to be determined by real labour earnings at time t, $y_{i,t}$, a vector of individual demographic characteristics, X_{it}, and transitions across employment categories between time t and time t+1, represented by an interaction term of employment categories in those periods, $\left(ES_{i,t} \times ES_{i,t+1}\right)$. ε_{it} is an error term.

Transitions during recessions

Using the Bry and Boschan (1971) algorithm[4] and quarterly real gross domestic product per capita data, two periods of recession are identified: 2008q3 to 2009q1 and 2018q4 to 2019q2. To explore how transitions across employment categories change in times of recession, a binary variable, equal to 1 during recessionary periods and 0 otherwise, is included as an additional control variable in the vector X_{it} in **ordered logistic regressions**. Additional details are provided in Section 7 below.

[4] The algorithm identifies local minima. Each minimum is then labelled as a trough and the preceding local maximum is labelled as a peak. The period between a peak and a trough is defined as a recession.

5 Employment transition probabilities

5.1 Counts

Table 3 presents the probabilities of transitions across the six defined employment categories as well as unemployment.[5] The probability of remaining in unemployment is highest, at 91.5 per cent, and those who do transition out of unemployment are most likely to move to formal wage employment (3.2 per cent) or lower-tier informal wage employment (2.8 per cent), suggesting lower barriers to entry into wage employment relative to self-employment. There is also a high probability of remaining in formal employment. However, this probability is higher for formal wage employment, at approximately 86 per cent, relative to formal self-employment, at 75 per cent, also suggesting that within the formal sector wage employment is a more stable alternative.

Table 3: Transition probabilities

			Wage employed			Self-employed			Unemp	TOTAL
			Formal	Informal		Formal	Informal			
				Upper	Lower		Upper	Lower		
Wage employed	Formal		85.9	3.6	2.8	0.2	0.2	0.4	6.9	100
	Informal	Upper	36.8	35.0	12.0	0.5	0.5	1.1	14.1	100
		Lower	12.9	5.8	58.9	0.2	0.7	1.7	20.0	100
Self-employed	Formal		5.9	1.4	1.2	75.4	6.6	5.3	4.3	100
	Informal	Upper	4.3	1.4	4.6	7.4	53.8	14.7	13.8	100
		Lower	2.9	0.9	3.3	1.5	3.8	70.2	17.5	100
Unemployed			3.2	0.8	2.8	0.1	0.3	1.4	91.5	100
TOTAL			27.2	3.0	7.3	1.1	1.0	4.0	56.4	100

Note: this table displays the probabilities of transitioning across the six defined categories of employment as well as unemployment. Percentages on the main diagonal represent the probabilities of remaining in the initial employment status for at least two consecutive waves.

Source: author's calculations based on PALMS.

Furthermore, the lower-tier informally employed (both wage employed and self-employed) are most likely to move into unemployment, suggesting that these categories of employment offer the least job security. This is expected as these individuals are those without employment contracts or those who run sole proprietorships. On the other hand the upper-tier informal wage employed are more likely to move into formal wage employment than to remain in informal employment. Hence upper-tier informal wage employment may be a stepping-stone to formal employment (Danquah et al. 2021). Nonetheless, even with distinctions between upper and lower tier, it is notable across all categories of informal employment that, relative to the formal employment categories, they are characterized by a greater probability of moving into unemployment. This highlights the precarious nature of informal employment, despite some segments being more closely aligned to formal employment.

[5] The number of transitions across employment categories are presented in Appendix Table A2.

5. 2 Multinomial logit and ordered logit

Table 4: Employment transitions, multinomial logistic regression

	(1) Formal wage (t+1)	(2) Upper-tier informal wage (t+1)	(3) Lower-tier informal wage (t+1)	(4) Formal self (t+1)	(5) Upper-tier formal self (t+1)	(6) Unemployed (t+1)
Formal wage (t)	**0.787*** (0.001)**	0.029*** (0.001)	0.000 (0.001)	-0.015*** (0.001)	-0.034*** (0.001)	-0.139*** (0.002)
Upper-tier informal wage (t)	0.316*** (0.002)	**0.331*** (0.002)**	0.092*** (0.002)	-0.012*** (0.001)	-0.031*** (0.001)	-0.074*** (0.003)
Lower-tier informal wage (t)	0.117*** (0.001)	0.055*** (0.001)	**0.501*** (0.002)**	-0.014*** (0.001)	-0.028*** (0.001)	-0.014*** (0.003)
Formal self (t)	0.069*** (0.003)	0.020*** (0.002)	0.005* (0.003)	**0.442*** (0.006)**	0.055*** (0.003)	-0.075*** (0.006)
Upper-tier formal self (t)	0.018*** (0.002)	0.008*** (0.001)	0.027*** (0.003)	0.040*** (0.002)	**0.383*** (0.005)**	0.003 (0.005)
Unemployed (t)	0.006*** (0.001)	-0.001** (0.001)	-0.005*** (0.001)	-0.015*** (0.001)	-0.032*** (0.001)	**0.665*** (0.002)**
Years of education	0.005*** (0.000)	0.000*** (0.000)	-0.003*** (0.000)	0.001*** (0.000)	0.000*** (0.000)	-0.003*** (0.000)
Age	0.006*** (0.000)	0.000*** (0.000)	0.004*** (0.000)	0.000*** (0.000)	0.001*** (0.000)	-0.014*** (0.000)
Age-squared	-0.007*** (0.000)	-0.001*** (0.000)	-0.005*** (0.000)	-0.000*** (0.000)	-0.001*** (0.000)	0.017*** (0.000)
Female	-0.011*** (0.000)	0.000 (0.000)	-0.003*** (0.000)	-0.002*** (0.000)	-0.005*** (0.000)	0.023*** (0.001)
Married	0.008*** (0.000)	-0.000 (0.000)	-0.004*** (0.000)	0.001*** (0.000)	0.002*** (0.000)	-0.009*** (0.001)
Race (base: Black African)						
Coloured	0.016*** (0.001)	0.002*** (0.001)	-0.008*** (0.001)	0.002*** (0.000)	-0.001*** (0.000)	0.000 (0.001)
Indian/Asian	0.013*** (0.002)	0.009*** (0.001)	-0.024*** (0.001)	0.006*** (0.000)	0.001 (0.000)	0.004** (0.002)
White	0.023*** (0.001)	0.010*** (0.001)	-0.034*** (0.001)	0.006*** (0.000)	0.001*** (0.000)	-0.002* (0.001)
Other	0.010 (0.119)	0.100 (0.103)	-0.075*** (0.000)	-0.010*** (0.000)	-0.010*** (0.000)	-0.025 (0.060)
Observations	1,342,791	1,342,791	1,342,791	1,342,791	1,342,791	1,342,791
Pseudo R2	0.527	0.527	0.527	0.527	0.527	0.527
Province Dummy	Yes	Yes	Yes	Yes	Yes	Yes

Note: the table reports average marginal effects. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Source: author's calculations based on PALMS.

Table 4 presents more robust estimates of transition probabilities from a multinomial logistic model, conditioned on current employment status and individual demographic characteristics including age, gender, marital status, race, and the province in which individuals reside. Tables 5a and 5b similarly present conditional transition probabilities from ordered logistic model estimations, with direct comparisons of the wage employed and self-employed.

Table 5a: Employment transitions, ordered logistic regression (unemp, informal, formal)

	(1)			(2)			(3)		
Formality status in t	Unemployment			Informal			Formal		
Formality status in t+1	Formal	Informal	Unemp	Formal	Informal	Unemp	Formal	Informal	Unemp
Employment status (base: self-employed)									
Wage employed	**-**	**-**	**-**	**0.065*** (0.001)**	**0.017*** (0.001)**	**-0.082*** (0.001)**	**0.131*** (0.004)**	**-0.055*** (0.001)**	**-0.076*** (0.002)**
Years of education	-0.000** (0.000)	-0.000** (0.000)	0.000** (0.000)	0.007*** (0.000)	0.001*** (0.000)	-0.007*** (0.000)	0.013*** (0.000)	-0.006*** (0.000)	-0.007*** (0.000)
Age	0.007*** (0.000)	0.010*** (0.000)	-0.016*** (0.000)	0.011*** (0.000)	0.001*** (0.000)	-0.012*** (0.000)	0.012*** (0.000)	-0.005*** (0.000)	-0.006*** (0.000)
Age-squared	-0.008*** (0.000)	-0.012*** (0.000)	0.021*** (0.000)	-0.012*** (0.001)	-0.001*** (0.000)	0.013*** (0.001)	-0.010*** (0.001)	0.005*** (0.000)	0.005*** (0.000)
Female	-0.012*** (0.000)	-0.018*** (0.000)	0.030*** (0.001)	-0.016*** (0.001)	-0.002*** (0.000)	0.018*** (0.001)	-0.017*** (0.001)	0.008*** (0.001)	0.009*** (0.001)
Married	0.004*** (0.000)	0.006*** (0.000)	-0.009*** (0.001)	0.015*** (0.001)	0.001*** (0.000)	-0.017*** (0.001)	0.021*** (0.001)	-0.010*** (0.001)	-0.011*** (0.001)
Race (base: Black African)									
Coloured	0.006*** (0.001)	0.009*** (0.001)	-0.015*** (0.001)	0.016*** (0.003)	0.001*** (0.000)	-0.018*** (0.003)	0.014*** (0.002)	-0.007*** (0.001)	-0.008*** (0.001)
Indian/Asian	-0.004*** (0.001)	-0.006*** (0.001)	0.011*** (0.002)	0.094*** (0.006)	-0.020*** (0.003)	-0.074*** (0.003)	0.028*** (0.003)	-0.013*** (0.001)	-0.015*** (0.002)
White	-0.008*** (0.001)	-0.011*** (0.001)	0.019*** (0.002)	0.110*** (0.004)	-0.028*** (0.002)	-0.082*** (0.002)	0.051*** (0.002)	-0.025*** (0.001)	-0.027*** (0.001)
Other	0.012 (0.046)	0.017 (0.062)	-0.029 (0.108)	0.336 (0.309)	-0.193 (0.262)	-0.143*** (0.047)	-0.207 (0.137)	0.079** (0.040)	0.128 (0.097)
Observations	760,084	760,084	760,084	205,341	205,341	205,341	377,366	377,366	377,366
Pseudo R2	0.0242	0.0242	0.0242	0.0236	0.0236	0.0236	0.0346	0.0346	0.0346
Province Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: the table reports average marginal effects. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Source: author's calculations based on PALMS.

Table 5b: Employment transitions, ordered logistic regression (lower, upper, formal)

	(1)			(2)			(3)		
Formality status in t	Lower informal			Upper informal			Formal		
Formality status in t+1	Formal	Upper informal	Lower informal	Formal	Upper informal	Lower informal	Formal	Upper informal	Lower informal
Employment status (base: self-employed)									
Wage employed	**0.093*** (0.002)**	**0.044*** (0.001)**	**-0.137*** (0.002)**	**0.213*** (0.004)**	**-0.050*** (0.002)**	**-0.162*** (0.003)**	**0.143*** (0.004)**	**-0.067*** (0.002)**	**-0.076*** (0.002)**
Years of education	0.003*** (0.000)	0.001*** (0.000)	-0.004*** (0.000)	0.013*** (0.001)	-0.005*** (0.000)	-0.008*** (0.000)	0.009*** (0.000)	-0.005*** (0.000)	-0.004*** (0.000)
Age	0.002*** (0.001)	0.001*** (0.000)	-0.003*** (0.001)	0.002 (0.001)	-0.001 (0.001)	-0.001 (0.001)	0.003*** (0.000)	-0.002*** (0.000)	-0.001*** (0.000)
Age-squared	-0.004*** (0.001)	-0.002*** (0.000)	0.005*** (0.001)	-0.001 (0.002)	0.000 (0.001)	0.000 (0.001)	-0.002*** (0.000)	0.001*** (0.000)	0.001*** (0.000)
Female	-0.022*** (0.002)	-0.010*** (0.001)	0.032*** (0.002)	-0.023*** (0.004)	0.009*** (0.002)	0.014*** (0.003)	-0.010*** (0.001)	0.005*** (0.000)	0.005*** (0.000)
Married	0.013*** (0.002)	0.006*** (0.001)	-0.019*** (0.002)	0.019*** (0.004)	-0.008*** (0.002)	-0.012*** (0.003)	0.009*** (0.001)	-0.004*** (0.001)	-0.004*** (0.000)
Race (base: Black African)									
Coloured	0.045*** (0.004)	0.018*** (0.002)	-0.063*** (0.006)	0.067*** (0.009)	-0.029*** (0.004)	-0.038*** (0.004)	0.016*** (0.002)	-0.008*** (0.001)	-0.008*** (0.001)
Indian/Asian	0.067*** (0.008)	0.025*** (0.003)	-0.092*** (0.011)	0.071*** (0.012)	-0.032*** (0.006)	-0.040*** (0.006)	0.012*** (0.002)	-0.006*** (0.001)	-0.006*** (0.001)
White	0.092*** (0.007)	0.033*** (0.002)	-0.125*** (0.009)	0.056*** (0.007)	-0.024*** (0.003)	-0.032*** (0.003)	0.022*** (0.001)	-0.011*** (0.001)	-0.011*** (0.001)
Other	-0.117*** (0.001)	-0.069*** (0.001)	0.187*** (0.001)	0.652*** (0.003)	-0.478*** (0.002)	-0.175*** (0.002)	-0.281** (0.137)	0.114*** (0.039)	0.167* (0.097)
Observations	122,381	122,381	122,381	46,412	46,412	46,412	351,682	351,682	351,682
Pseudo R2	0.0370	0.0370	0.0370	0.0384	0.0384	0.0384	0.0337	0.0337	0.0337
Province Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: the table reports average marginal effects. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Source: author's calculations based on PALMS.

The results from the multinomial logistic regression in Table 4 are in line with the simple transition matrices presented in Table 3 but show some adjustments once individual characteristics are controlled for. Two sets of findings are apparent. Firstly, there is substantial heterogeneity within the informal sector. Individuals in upper-tier informal wage employment are about as likely to move to formal wage employment as they are to remain in upper-tier informal employment, with significantly lower or negative probabilities of transitioning to any other employment category. This suggests, as noted above, that upper-tier informal wage employment may act as a stepping-stone or a screening mechanism for formal wage employment (Conover et al. 2022; Danquah et al. 2021). This result also implies that, for some individuals, employment in this segment of the informal sector may be their job of choice, in line with arguments about voluntary informal sector employment in the Latin American literature (Alaniz et al. 2021; Duval-Hernández 2022; Fiess et al. 2006; Maloney 1999; Bosch et al. 2007). On the other hand individuals in lower-tier informal wage unemployment are more likely to remain than to transition to either upper-tier informal or formal wage employment. But when do they move, they are most likely to move into formal sector wage employment, again highlighting the stability of formal sector wage employment. Together these findings emphasize the importance of not viewing the sector as undifferentiated or making policy prescriptions without consideration of this heterogeneity.

Secondly, the South African labour market exhibits some segmentation between wage employment and self-employment. Individuals employed in formal wage employment have the highest probability of remaining. As above, this is significantly higher than the probability of remaining in formal self-employment. However, in contrast to the count transitions presented above, this is also higher than the probability of remaining in unemployment. Hence formal sector wage employment presents the most stable employment alternative. Accordingly, the formal self-employed, when they move, are most likely to move to formal wage employment.

Additionally, the wage employed, both formal and informal, have significantly lower probabilities of moving into any type of self-employment. The results in Table 5b from the ordered logistic regression also show patterns that suggest significant distinctions between wage employment and self-employment. In particular, the wage employed are more likely to move upwards (from lower tier to upper tier and from upper tier to formal), while the self-employed are more likely to move downwards (from formal to upper tier and from upper tier to informal). Correspondingly, Table 5a shows that the wage employed are also less likely to move into unemployment.

Individual characteristics also differ across employment sectors and impact transition probabilities. More educated, married, and older individuals are most likely to be in formal wage employment and are also more likely to transition upwards (from lower tier to upper tier and from upper tier to formal) than downwards (from formal to upper tier and from upper tier to informal). Additionally, compared to Black South Africans, those individuals in the White, Asian, and Coloured race groups are more likely to be in formal wage employment and are also more likely to transition upwards than downwards. On the other hand females have a higher probability of being unemployed and, when employed, are more likely to transition out of formal into upper- and lower-tier informal employment, in line with previous evidence of gender-related differences in the South African labour market (Chapelle 2012; Magidimisha and Gordon 2015; Niymbanira and Sabela 2019).[6]

6 Income transitions

Table 6 presents the average marginal effects of employment transitions and individual characteristics on changes in log real earnings.[7] These results are also summarized graphically in Figure 5. Upward transitions (from lower tier to upper tier and from upper tier to formal) have statistically significant positive impacts on changes in real income. Increases in income from transitioning upwards are greater than the period-to-period increase from staying in the respective employment categories. Additionally, transitions to the formal sector result in a significantly higher improvement in real earnings relative to transitions to upper-tier informal employment.

[6] Transition probabilities are also estimated by race and gender. The results are the same as those outlined here, and therefore have not been included.

[7] Results using all six defined employment categories are presented in Appendix Table A1.

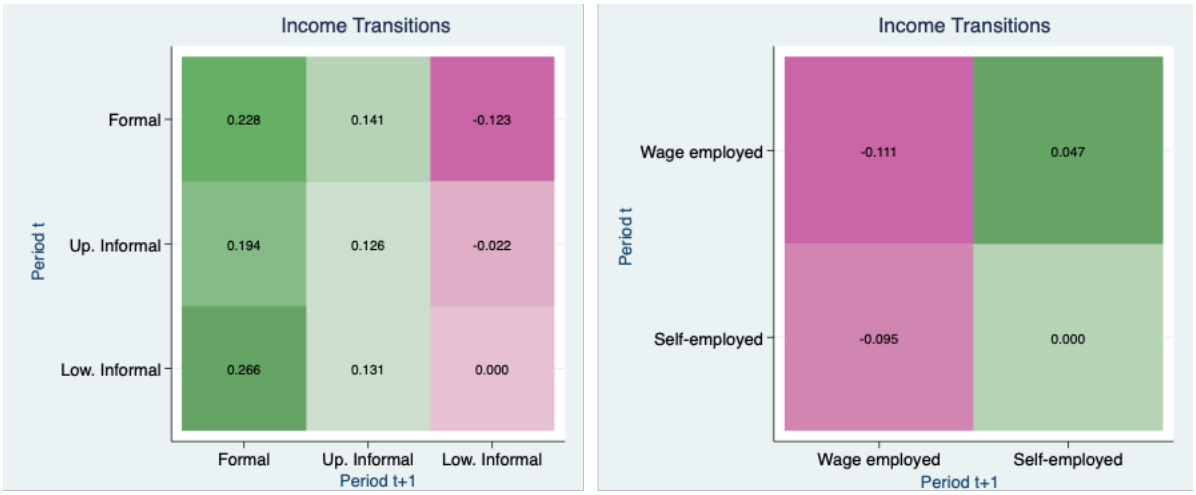
Table 6: Income transitions—by employment status

Dependent variable: change in log real earnings	(1)	(2)
Log real earnings	-0.289***	-0.293***
	(0.002)	(0.002)
Formality status at time t (base: lower informal at time t & t+1)		
Formal (t) x Formal (t+1)	0.182***	0.228***
	(0.003)	(0.004)
Formal (t) x Upper informal (t+1)	0.106***	0.141***
	(0.008)	(0.008)
Formal (t) x Lower informal (t+1)	-0.144***	-0.123***
	(0.009)	(0.009)
Upper informal (t) x Formal (t+1)	0.155***	0.194***
	(0.007)	(0.007)
Upper informal (t) x Upper informal (t+1)	0.116***	0.126***
	(0.006)	(0.006)
Upper informal (t) x Lower informal (t+1)	-0.030***	-0.022*
	(0.012)	(0.012)
Lower informal (t) x Formal (t+1)	0.231***	0.266***
	(0.008)	(0.008)
Lower informal (t) x Upper informal (t+1)	0.124***	0.131***
	(0.011)	(0.011)
Employment status at time t (base: self-employed at time t & t+1)		
Wage employed (t) x Wage employed (t+1)		-0.111***
		(0.005)
Wage employed (t) x Self-employed (t+1)		0.047**
		(0.020)
Self-employed (t) x Wage employed (t+1)		-0.095***
		(0.018)
Years of education	0.030***	0.030***
	(0.000)	(0.000)
Age	0.006***	0.005***
	(0.001)	(0.001)
Age-squared	-0.003***	-0.002**
	(0.001)	(0.001)
Female	-0.075***	-0.071***
	(0.002)	(0.002)
Married	0.031***	0.028***
	(0.003)	(0.003)
Race (base: Black African)		
Coloured	0.015***	0.018***
	(0.004)	(0.004)
Indian/Asian	0.130***	0.123***
	(0.008)	(0.008)
White	0.186***	0.178***
	(0.005)	(0.005)
Other	-0.308	-0.311
	(0.221)	(0.230)
Constant	1.790***	1.908***
Observations	353,831	353,831
R-squared	0.154	0.156
Province Dummy	Yes	Yes

Note: robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Source: author's calculations based on PALMS.

Figure 5: Impact of employment transitions on changes in log real earnings.



Note: remaining in lower-tier employment and remaining in self-employment are used as base categories. Cells with negative coefficients are coloured pink, while cells with positive coefficients are coloured green. The intensity of each colour represents the magnitude of the coefficients.

Source: author's calculations based on PALMS.

Figure 5 also shows that moving from wage employment to self-employment results in an increase in earnings. This is despite similar average real wages across both types of employment. This suggests that, while separation from wage employment into unemployment is the choice of the firm (Kerr 2018), separation into self-employment may be the worker's choice. Additionally, individuals who move from self-employment to wage employment experience a decline in real earnings, and a similar decline is experienced by individuals who remain in wage employment across periods. Hence, while wage employment presents the more stable option given a higher probability of remaining, transitions to self-employment are more lucrative, possibly reflecting the return to the additional risk associated with self-employment.

7 Employment transitions during recessions

This section presents conditional transition probabilities, paying particular attention to how these transitions differ during recessionary periods.

As noted in Section 4, ordered logistic regressions are applied to estimate the probability of transitions during recessions, conditioned on current employment status and individual demographic characteristics. Three employment categories aggregated by wage and self-employment are considered: i) informal employment, ii) formal employment, and iii) unemployment. Results with informal employment further broken into lower tier and upper tier are also presented.

I conduct three separate estimations to ascertain how transitions across sectors change during recessionary periods. Firstly, I estimate the probability of transitioning one period ahead; that is, if there is a recession in period t, where are individuals likely to transition to in the following period (t+1)? Secondly, I estimate the probability of transitioning two periods ahead (t+2) and, finally, the probability of transitioning three periods ahead (t+3). These results are presented in Table 7

Adjustment does not happen immediately during recessions. More specifically, given that there is a recession in period t, in t+1 there is an elevated probability of remaining in the formal sector

compared to non-recessionary periods, indicating that recession-induced separation from formal employment is not yet being experienced in this period. Similarly, there is a positive probability of moving from the informal sector to the formal sector in period t+1, indicating increased job opportunities in the formal sector. This probability is higher than the probability of remaining in the informal sector or moving into unemployment.[8] Together these findings contrast with labour market theories which predict a rise in separation rates from formal sector employment during recessions However, the opposite is true in periods t+2 and t+3. Column 3 of Table 7 panel B shows that individuals are 2.9 per cent less likely to remain in the formal sector in period t+2, and instead have a higher probability of transitioning to informal sector employment (1.2 per cent) or into unemployment (1.7 per cent). These probabilities are more pronounced in period t+3, as shown in column 3 of Panel C. Given a recession in period t, these workers have a 4 per cent lower probability of remaining in the formal sector in period t+3, but 1.5 per cent and 2.6 per cent higher probabilities of moving to the informal sector and unemployment, respectively.

As with formal sector employment, given a recession in period t, in period t+2 the transitions from the informal sector are most likely to be into unemployment, as shown in column 2 of Panel B. However, the probability of transitioning out of the informal sector is lower and less significant in period t+2 and bears no statistical significance in period t+3, relative to the probability of moving out of the formal sector. This suggests that during recessionary periods, there is less adjustment or more stability in the informal sector relative to the formal sector.

Additionally, the probabilities of transitioning out of the formal sector in periods t+2 and t+3 are substantially higher than the transition probabilities in period t+1, indicating that there is an adjustment period and that transitions are therefore more likely to occur at least two periods following the onset of a recession. It is also interesting that during recessions there is still a positive probability of moving out of unemployment into either the formal or informal sectors, indicating that the substantial worker flows in and out of unemployment noted in Banerjee et al. (2008) and Kerr (2014) still happen even during recessionary periods. As Kerr (2014) emphasized, these flows are indicative of wage stickiness but simultaneous limited rigidity in the labour market. Firms therefore have the freedom to adjust employment levels rather than wages in response to shocks. These results are summarized in Figure 6.

[8] Transition probabilities between period t–1 and period t were also estimated. The results show the same dynamics as in the transition probabilities for periods t to t+1, indicating that the expected employment impacts are also not experienced in the period prior to the recession.

Table 7: Employment transitions during recessions, ordered logistic regression

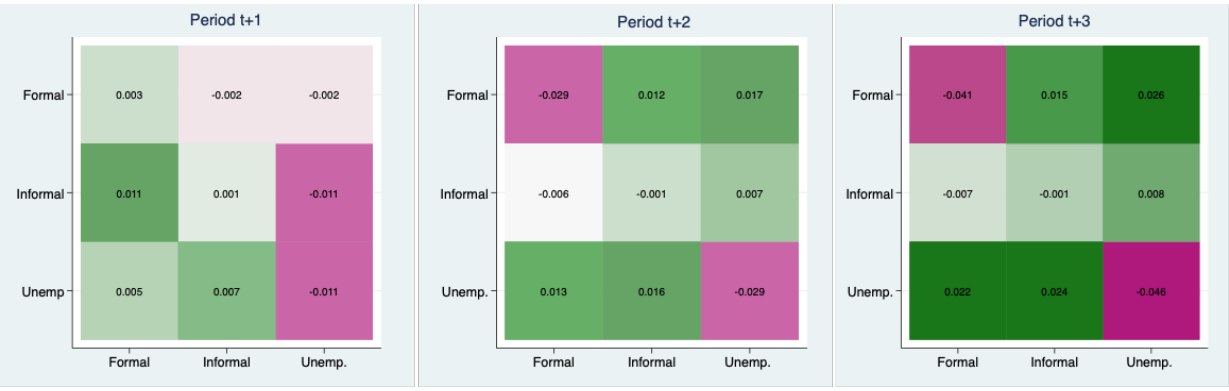
Panel A: Period t +1									
	(1)			(2)			(3)		
Formality status in t	Unemployment			Informal			Formal		
Formality status in t +1	Formal	Informal	Unemp	Formal	Informal	Unemp	Formal	Informal	Unemp
Employment status (base: self-employed)									
Wage employed				0.065*** (0.001)	0.017*** (0.001)	-0.082*** (0.001)	0.131*** (0.004)	-0.055*** (0.001)	-0.076*** (0.002)
Recession (t)	0.005*** (0.000)	0.007*** (0.001)	-0.011*** (0.001)	0.011*** (0.002)	0.001*** (0.000)	-0.011*** (0.002)	0.003** (0.002)	-0.002** (0.001)	-0.002** (0.001)
Observations	760,084	760,084	760,084	205,341	205,341	205,341	377,366	377,366	377,366
Panel B: Period t +2									
	(1)			(2)			(3)		
Formality status in t	Unemployment			Informal			Formal		
Formality status in t +2	Formal	Informal	Unemp	Formal	Informal	Unemp	Formal	Informal	Unemp
Employment status (base: self-employed)									
Wage employed				0.067*** (0.002)	0.013*** (0.001)	-0.080*** (0.002)	0.133*** (0.005)	-0.051*** (0.002)	-0.082*** (0.003)
Recession (t)	0.013*** (0.001)	0.016*** (0.001)	-0.029*** (0.002)	-0.006** (0.003)	-0.001* (0.000)	0.007** (0.003)	-0.029*** (0.003)	0.012*** (0.001)	0.017*** (0.001)
Observations	378,974	378,974	378,974	104,734	104,734	104,734	201,299	201,299	201,299
Panel C: Period t +3									
	(1)			(2)			(3)		
Formality status in t	Unemployment			Informal			Formal		
Formality status in t +3	Formal	Informal	Unemp	Formal	Informal	Unemp	Formal	Informal	Unemp
Employment status (base: self-employed)									
Wage employed				0.071*** (0.003)	0.014*** (0.001)	-0.085*** (0.003)	0.129*** (0.008)	-0.043*** (0.002)	-0.086*** (0.006)
Recession (t)	0.022*** (0.002)	0.024*** (0.002)	-0.046*** (0.003)	-0.007 (0.005)	-0.001 (0.001)	0.008 (0.006)	-0.041*** (0.004)	0.015*** (0.002)	0.026*** (0.003)
Observations	164,368	164,368	164,368	45,964	45,964	45,964	87,438	87,438	87,438

Note: the table reports average marginal effects. Robust standard errors are in parentheses. Control variables are excluded from results.*** p<0.01, ** p<0.05, * p<0.10.

Source: author's calculations based on PALMS.

When the informal sector is broken into upper tier and lower tier (see Table A3 in Appendix A), a few interesting results emerge. Firstly, in periods t+2 and t+3, there are positive probabilities of moving from the formal sector into unemployment as well as into both upper- and lower-tier informal employment. Hence, while recessions result in some adjustment from the formal sector into unemployment, some formal sector labour is also absorbed into both segments of the informal sector. Notably, recessions have no statistically significant impact on movements out of upper-tier informal employment, indicating that this segment of the informal sector grows during recessions as it absorbs labour but there are no recession-induced movements out of the segment. On the other hand there are flows both into and out of lower-tier informal employment following the onset of a recession, and transitions outwards are most likely to be into unemployment. These results are summarized in Figure 7.

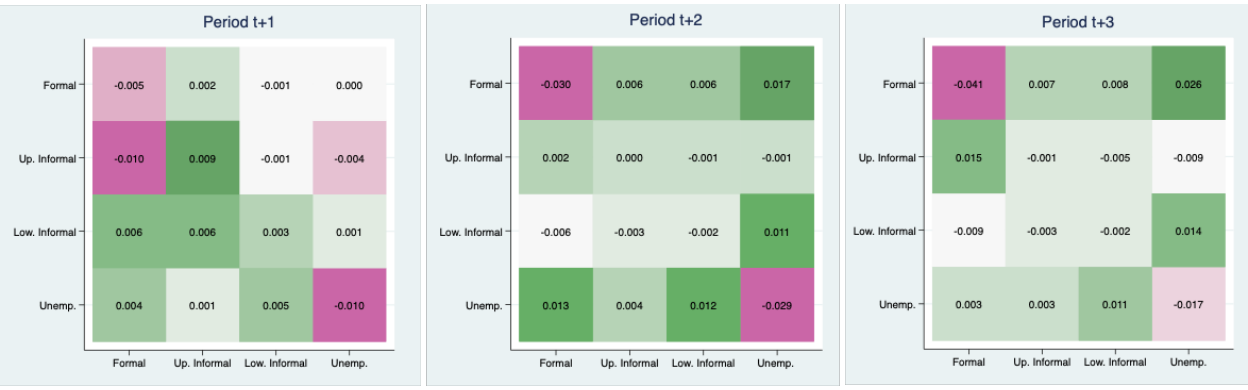
Figure 6: Transition probabilities following a recession—reflecting results presented in Table 7.



Note: cells with negative coefficients are coloured pink, while cells with positive coefficients are coloured green. The intensity of each colour represents the magnitude of the coefficients.

Source: author's calculations based on PALMS.

Figure 7: Transition probabilities following a recession—reflecting results presented in Table A3.



Note: cells with negative coefficients are coloured pink, while cells with positive coefficients are coloured green. The intensity of each colour represents the magnitude of the coefficients.

Source: author's calculations based on PALMS.

These results suggest that it is in fact the upper-tier segment of the informal sector that acts as a recession buffer by absorbing additional labour, without higher probabilities of job separation, during recessions. One may conclude, for example, that workers do not leave the formal sector to 'sell on the street'. Instead, during a recession, a portion of those that do not move into unemployment start small, unregistered businesses (hiring a few workers) or accept jobs with written contracts but no social security benefits. These options are less precarious than lower-tier informal employment and offer a wage closer to the formal sector wage, but they lack the security of formal sector jobs.

In line with the results above, Figures B3 and B4 in Appendix B show that up to 50 per cent of those who transition from the formal sector to the lower-tier segment of the informal sector during a recession are relegated to the trade and domestic services industries, and that the majority of these workers are therefore employed as domestic workers and craft and related trade workers, and in other elementary occupations. On the other hand, as displayed in Figures B1 and B2, those who transition from the formal sector to the upper-tier segment of the informal sector are spread across a variety of industries including finance, trade, services, manufacturing, and construction. These workers are then almost equally distributed across occupations which require various levels

of education and qualifications, such as managers, technical and associate professionals, clerks, service workers, shop attendants, craft and trade workers, as well as in other elementary occupations. These results emphasize the existing heterogeneity within the informal sector, which is a higher-paid and job-secure segment and which provides a haven from recessionary impacts, alongside a more precarious, low-paid, low-skilled segment.

8 Concluding remarks

This paper examined employment transitions in the South African labour market. Using the Post-Apartheid Labour Market Series (PALMS), it analysed flows between the formal sector and the informal sector and unemployment, paying particular attention to how these flows differ during recessions. Heterogeneity within the informal sector was explicitly considered by separately accounting for wage employment and self-employment as well as upper-tier and lower-tier informal sector segments. Employment transitions were estimated using multinomial logistic and ordered logistic models. The impact of employment transitions on real wages was also estimated using a linear model.

The results confirmed heterogeneity within the South African informal sector. They firstly showed that those employed in the upper-tier segment of the informal sector were as likely to move to formal employment as they were to remain in upper-tier informal employment, suggesting that upper-tier informal employment may act as a stepping-stone to formal employment and may also be indicative of voluntary informal employment. On the other hand the lower-tier informally employed were more likely to remain than to move into the formal sector. As expected, upward transitions (from lower tier to upper tier and from upper tier to formal) had statistically significant positive impacts on changes in real income. Transitions to the formal sector also resulted in a significantly higher improvement in real earnings relative to transitions to upper-tier informal employment.

The results also suggest a degree of segmentation between wage employment and self-employment. More specifically, the wage employed were more likely to move upwards (from lower tier to upper tier and from upper tier to formal), while the self-employed were more likely to move downwards (from formal to upper tier and from upper tier to informal). Self-employment was also characterized by higher average earnings, and there was a very low probability of moving from wage employment to self-employment or vice versa.

When transitions during recessionary periods were considered, the results indicated an adjustment period. That is, the probability of leaving the formal sector only became positive at least two periods following the onset of a recession. In response it was the upper-tier segment of the informal sector that acted as a recession buffer by absorbing labour that might otherwise be unemployed. Given that the upper-tier informal segment is characterized by small businesses not registered for VAT and by employees with formal contracts but no social security benefits, policy responses to recessions which include tax breaks on small businesses or short-term government coverage of employee social security benefits for the most affected business could be beneficial. These measures would ensure that businesses are able to weather periods of recession, maintaining maximum employment and with limited concern for external demands on business income, and have the potential to benefit the government and wider economy through taxes and employment once the recession subsides. They would also ensure that employees remain protected during these periods and have a lower probability of moving from more stable and well-compensated formal sector employment into the informal sector.

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Appendix A

Table A1: Income transitions—by employment status (6 categories)

Dependent variable: change in log real earnings	(1)
Log real earnings	-0.292***
	(0.002)
Employment status at time t (base: lower informal self-employed at time t & t+1)	
Formal wage (t) x Formal wage (t+1)	0.124***
	(0.006)
Formal wage (t) x Upper informal wage (t+1)	0.032***
	(0.009)
Formal wage (t) x Lower informal wage (t+1)	-0.210***
	(0.010)
Formal wage (t) x Formal self (t+1)	0.375***
	(0.060)
Formal wage (t) x Upper informal self (t+1)	0.146**
	(0.063)
Formal wage (t) x Lower informal self (t+1)	-0.256***
	(0.043)
Upper informal wage (t) x Formal wage (t+1)	0.090***
	(0.009)
Upper informal wage (t) x Upper informal wage (t+1)	0.016**
	(0.008)
Upper informal wage (t) x Lower informal wage (t+1)	-0.100***
	(0.012)
Upper informal wage (t) x Formal self (t+1)	0.248**
	(0.121)
Upper informal wage (t) x Upper informal self (t+1)	0.085
	(0.087)
Upper informal wage (t) x Lower informal self (t+1)	-0.094
	(0.067)
Lower informal wage (t) x Formal wage (t+1)	0.150***
	(0.009)
Lower informal wage (t) x Upper informal wage (t+1)	-0.008
	(0.011)
Lower informal wage (t) x Lower informal wage (t+1)	-0.100***
	(0.006)
Lower informal wage (t) x Formal self (t+1)	0.548***
	(0.142)
Lower informal wage (t) x Upper informal self (t+1)	0.358***
	(0.049)
Lower informal wage (t) x Lower informal self (t+1)	0.144***
	(0.034)
Formal self (t) x Formal wage (t+1)	0.104*
	(0.061)
Formal self (t) x Upper informal wage (t+1)	0.210*
	(0.116)
Formal self (t) x Lower informal wage (t+1)	-0.315***
	(0.108)
Formal self (t) x Formal self (t+1)	0.234***
	(0.013)
Formal self (t) x Upper informal self (t+1)	0.227***
	(0.038)
Formal self (t) x Lower informal self (t+1)	0.000
	(0.045)

Upper informal self (t) x Formal wage (t+1)	0.104*
	(0.057)
Upper informal self (t) x Upper informal wage (t+1)	-0.012
	(0.081)
Upper informal self (t) x Lower informal wage (t+1)	-0.292***
	(0.047)
Upper informal self (t) x Formal self (t+1)	0.210***
	(0.036)
Upper informal self (t) x Upper informal self (t+1)	0.147***
	(0.013)
Upper informal self (t) x Lower informal self (t+1)	0.005
	(0.030)
Lower informal self (t) x Formal wage (t+1)	0.341***
	(0.036)
Lower informal self (t) x Upper informal wage (t+1)	0.136**
	(0.065)
Lower informal self (t) x Lower informal wage (t+1)	-0.166***
	(0.033)
Lower informal self (t) x Formal self (t+1)	0.130***
	(0.046)
Lower informal self (t) x Upper informal self (t+1)	0.160***
	(0.030)
Years of education	0.030***
	(0.000)
Age	0.005***
	(0.001)
Age-squared	-0.002**
	(0.001)
Female	-0.070***
	(0.002)
Married	0.028***
	(0.003)
Race (base: Black African)	
Coloured	0.017***
	(0.004)
Indian/Asian	0.122***
	(0.008)
White	0.177***
	(0.005)
Other	-0.308
	(0.230)
Constant	1.900***
	(0.022)
Observations	353,831
R-squared	0.157
Province Dummy	Yes

Note: the table reports average marginal effects. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Source: author's calculations based on PALMS.

Table A2: Number of transitions

			Wage employed			Self-employed			Unemp	TOTAL
			Formal	Informal		Formal	Informal			
				Upper	Lower		Upper	Lower		
Wage employed	Formal		313,568	13,106	10,221	884	571	1,482	25,221	365,053
	Informal	Upper	15,104	14,369	4,920	216	201	462	5,790	41,062
		Lower	12,883	5,756	58,939	184	647	1,683	19,977	100,069
Self-employed	Formal		896	206	179	11,497	1,003	809	661	15,251
	Informal	Upper	595	191	634	1,008	7,370	2,016	1,894	13,708
		Lower	1,516	467	1,739	817	2,045	37,329	9,295	53,208
Unemployed			24,239	6,315	21,527	602	2,031	10,363	700,755	765,832
TOTAL			368,801	40,410	98,159	15,208	13,868	54,144	763,593	1,354,183

Note: this table displays the number of transitions across the six defined categories of employment. Cells on the main diagonals represent individuals who remained in their initial employment status for at least two consecutive waves.

Source: author's calculations based on PALMS

Table A3: Employment transitions during recessions

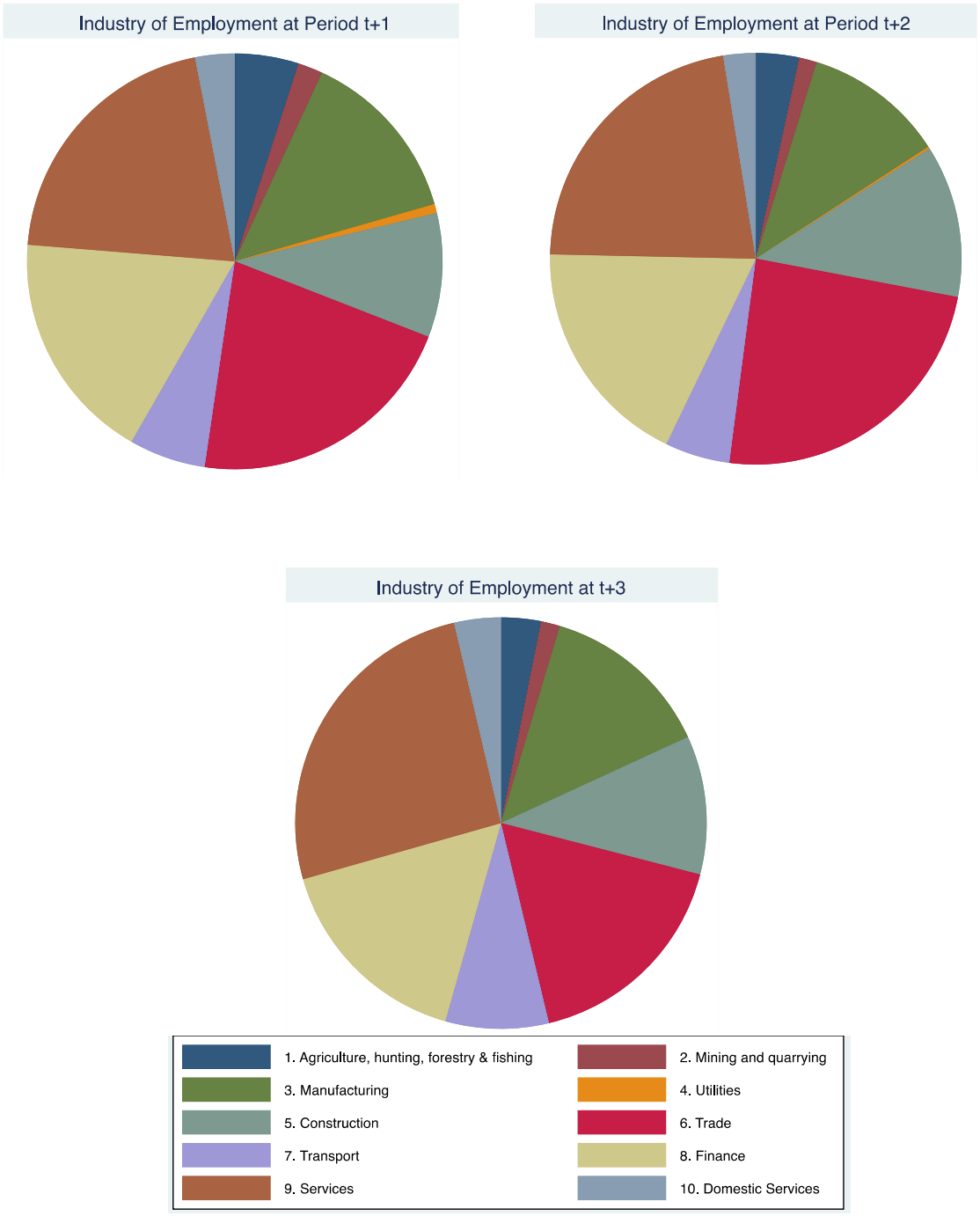
	(1) Unemployment				(2) Lower-tier Informal				(3) Upper-tier Informal				(4) Formal			
Panel A: Period t + 1																
	Formal	Upper	Lower	Unemp	Formal	Upper	Lower	Unemp	Formal	Upper	Lower	Unemp	Formal	Upper	Lower	Unemp
Wage employed					0.031***	0.031***	0.015***	0.011***	-0.058***	0.147***	0.015***	-0.060***	-0.102***	0.131***	-0.027***	-0.028***
					(0.001)	(0.001)	(0.000)	(0.000)	(0.002)	(0.003)	(0.001)	(0.001)	(0.002)	(0.004)	(0.001)	(0.001)
Recession (t)	0.004***	0.001***	0.005***	-0.010***	0.006***	0.006***	0.003***	0.001***	-0.010***	0.009*	-0.001	-0.004*	-0.005*	0.002	-0.001	-0.000
	(0.000)	(0.000)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.000)	(0.002)	(0.005)	(0.000)	(0.002)	(0.003)	(0.002)	(0.000)	(0.000)
Observations	760,084	760,084	760,084	760,084	151,324	151,324	151,324	151,324	151,324	54,018	54,018	54,018	54,018	377,365	377,365	377,365
Panel A: Period t + 2																
	(1) Unemployment				(2) Lower-tier Informal				(3) Upper-tier Informal				(4) Formal			
	Formal	Upper	Lower	Unemp	Formal	Upper	Lower	Unemp	Formal	Upper	Lower	Unemp	Formal	Upper	Lower	Unemp
Wage employed					0.033***	0.014***	0.010***	-0.057***	0.142***	0.007***	-0.052***	-0.097***	0.133***	-0.025***	-0.026***	-0.082***
					(0.001)	(0.001)	(0.001)	(0.002)	(0.004)	(0.001)	(0.002)	(0.003)	(0.005)	(0.001)	(0.001)	(0.003)
Recession (t)	0.013***	0.004***	0.012***	-0.029***	-0.006***	-0.003***	-0.002**	0.011***	0.002	-0.000	-0.001	-0.001	-0.030***	0.006***	0.006***	0.017***
	(0.001)	(0.000)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.004)	(0.008)	(0.001)	(0.003)	(0.005)	(0.003)	(0.001)	(0.001)	(0.001)
Observations	378,974	378,974	378,974	378,974	77,053	77,053	77,053	77,053	27,681	27,681	27,681	27,681	201,299	201,299	201,299	201,299
Panel A: Period t + 3																
	(1) Unemployment				(2) Lower-tier Informal				(3) Upper-tier Informal				(4) Formal			
	Formal	Upper	Lower	Unemp	Formal	Upper	Lower	Unemp	Formal	Upper	Lower	Unemp	Formal	Upper	Lower	Unemp
Wage employed					0.038***	0.014***	0.010***	-0.062***	0.147***	0.009***	-0.047***	-0.109***	0.129***	-0.020***	-0.023***	-0.086***
					(0.002)	(0.001)	(0.001)	(0.004)	(0.007)	(0.002)	(0.002)	(0.006)	(0.008)	(0.001)	(0.001)	(0.006)
Recession (t)	0.003***	0.003***	0.011***	-0.017***	-0.009**	-0.003**	-0.002	0.014**	0.015	-0.001	-0.005	-0.009	-0.041***	0.007***	0.008***	0.026***
	(0.000)	(0.000)	(0.001)	(0.002)	(0.004)	(0.002)	(0.001)	(0.007)	(0.014)	(0.001)	(0.004)	(0.008)	(0.004)	(0.001)	(0.001)	(0.003)
Observations	368,519	368,519	368,519	368,519	33,890	33,890	33,890	33,890	12,075	12,075	12,075	12,075	87,438	87,438	87,438	87,438

Note: the table reports average marginal effects. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.10. Control variables excluded from results.

Source: author's calculations based on PALMS.

Appendix B

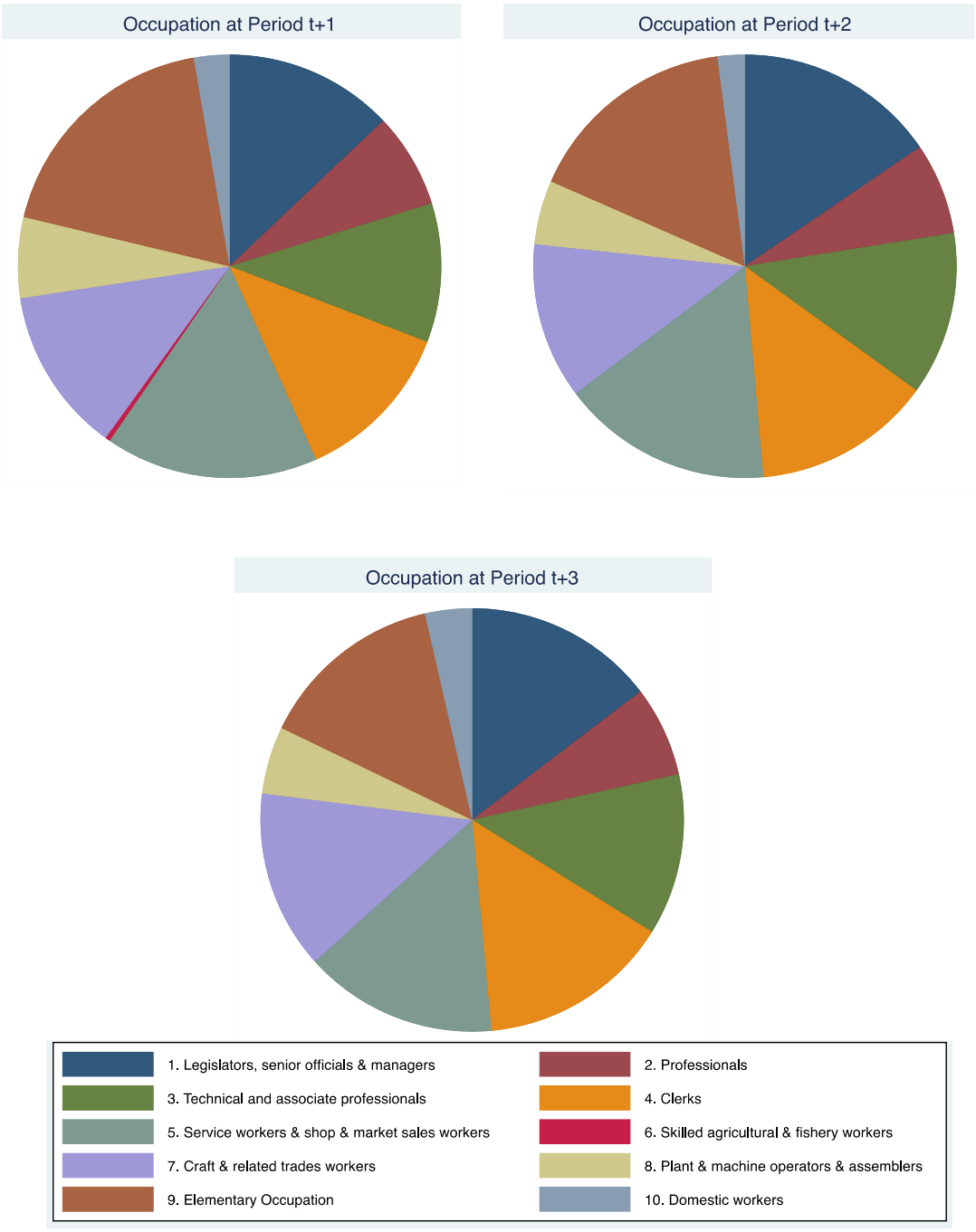
Figure B1: Industry shares of employment during recessions—upper-tier informal sector



Note: this figure shows the industries and share of employment in each industry for those who transition from the formal sector to the upper-tier segment of the informal sector between periods t and t+1, periods t and t+2, and periods t and t+3, respectively.

Source: author's calculations based on PALMS.

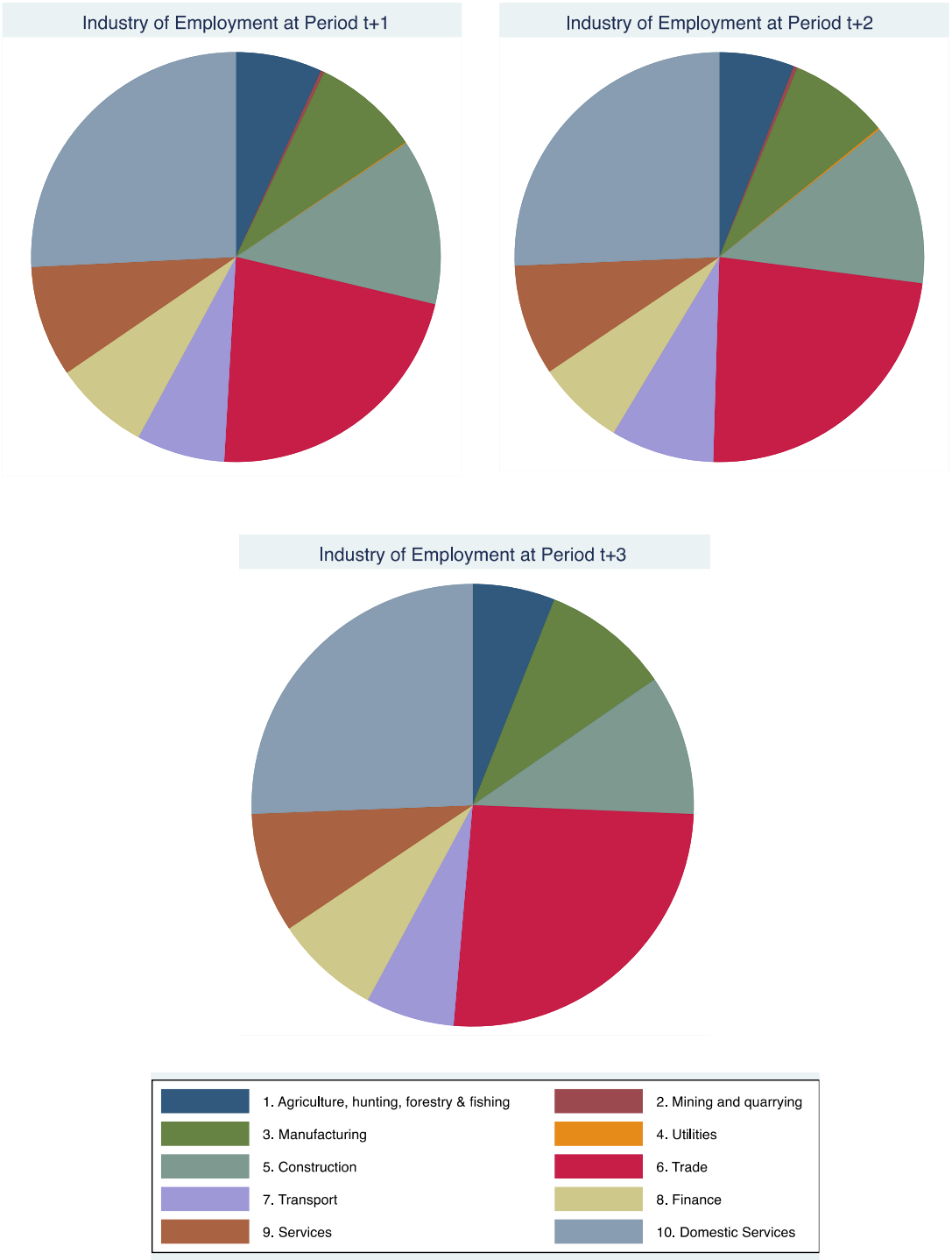
Figure B2: Occupation shares of employment during recessions—upper-tier informal sector



Note: this figure shows the occupations and share of employment in each occupation for those who transition from the formal sector to the upper-tier segment of the informal sector between periods t and t+1, periods t and t+2, and periods t and t+3, respectively.

Source: author's calculations based on PALMS.

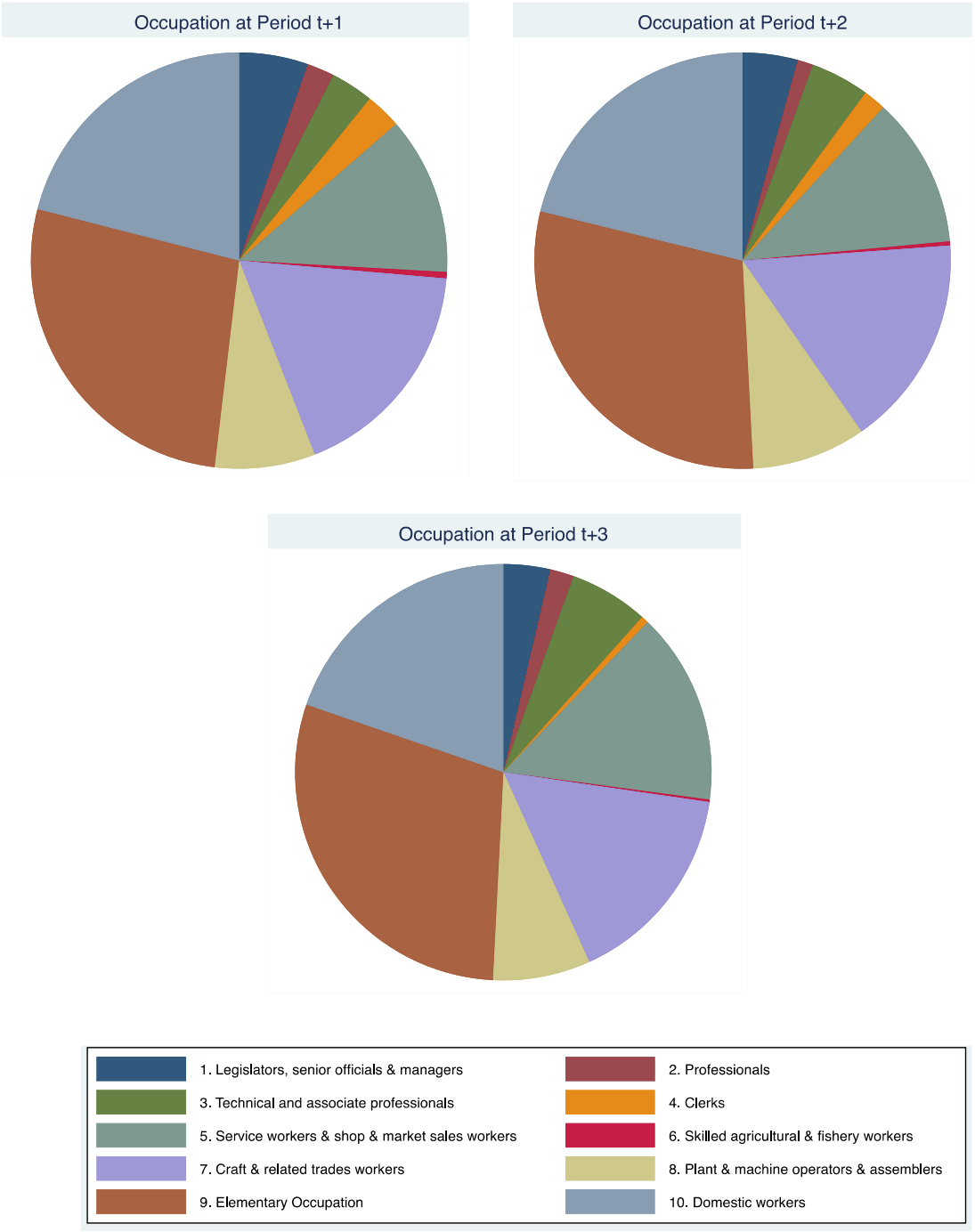
Figure B3: Industry shares of employment during recessions—lower-tier informal sector



Note: this figure shows the industries and share of employment in each industry for those who transition from the formal sector to the lower-tier segment of the informal sector between periods t and t+1, periods t and t+2, and periods t and t+3, respectively.

Source: author's calculations based on PALMS.

Figure B4: Occupation shares of employment during recessions—lower-tier informal sector



Note: this figure shows the occupations and share of employment in each occupation for those who transition from the formal sector to the lower-tier segment of the informal sector between periods t and t+1, periods t and t+2, and periods t and t+3, respectively.

Source: author's calculations based on PALMS.