Labour market impact of internal in-migration: A district level analysis of South Africa

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Abstract

Despite the lack of clarity in literature with regards to the question of whether internal in-migration is a desirable phenomenon for the labor market outcomes, in-migration is often resisted under the premise that it leads to tighter job markets for the locals. This study therefore attempts an empirical verification of the impact of in-migration on labour market outcomes in South Africa. The results of dynamic system GMM regression analysis indicate that in-migration decreases the labour market participation rate of the migrant receiving districts, highlighting migration for non-economic purposes as well as discouraged migrants not seeking work post-migration. While In-migration is not found to alter significantly the employment rate of the receiving areas, indications are that the employment rate is maintained through an expansion of the informal wage employment. There is evidence of non-linear relationship between in-migration and the labour markets of the receiving areas. While initial migration results in the expansion of the formal sector employment, sustained increase in in-migration leads to informalisation of the labour markets. There is hence little evidence of positive self-selection among internal migrants in South Africa. Our results corroborate the Harris-Todaro model's prediction that in-migration leads to increased informal sector share of the labour markets.

Keywords: internal migration, labour markets, Unemployment, Informal sector, Self-employment

JEL codes: J61, O17, R23

1 Introduction

There is lack of clarity in literature with regards to the question of whether internal in-migration is a desirable phenomenon for the labour market outcomes of the migrant receiving areas (Lall, Harris, & Shalizi, 2006). While on the one hand migration and urbanisation is seen as a pre-requisite for economic growth

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(Lewis 1954), on the other it is argued that excessive in-migration results in urban decay through the spread of informal settlements and increased urban unemployment leading to insidious social outcomes like crime and violence (Ray, 1998). Based on this premise, theoretical literature discusses extensively how rural-urban migration need to be curbed through various policy instruments such as physical restriction, rural wage subsidy, urban wage limitation etc. to prevent excessive pressure on high growth centres that attract migrants (Harrod & Todaro 1970, Fields 1975, Bhagwati & Srinivasan 1974).

The counter-argument to the prediction of migration led pressure on labour markets in migrant receiving areas is put forth based on the premise of positive self-selection among migrants (Borjas 1987). According to it, migrants imbibe specific characteristics and traits which differentiate them from non-migrants making the former more likely to participate in labour markets, find wage employment or engage in entrepreneurial activities. Moreover Fields (1975) extend the Harris-Todaro model to allow for more generalized job-search behaviour, an urban traditional sector, preferential hiring by educational level, and labour turnover considerations, and predict a much lower unemployment rate in the migrant receiving areas. Further, according to Chalmers and Greenwood (1985), net migration causes both labour supply and demand to increase (the former directly and the latter indirectly), its net effect therefore remains an empirical question. This uncertainty regarding the impact of migration has resulted in contradictory policies followed by various governments (eg., the Hukou system in China) many of which are without sound economic analysis of reality (Liu, 2005).

While there is extensive literature in the international context on the impact of immigration on the labour markets of receiving countries (Borjas 1987; Pischke & Velling 1997; Raghuram 2004; Longhi, Nijkamp & Poot, 2006; Rauh 2016) , empirical evidence is not just limited but mixed in the context of internal migration (Lall et al 2006). Wrage (1981) analysed the impact of internal migration on the receiving areas of Canada and finds that while migration appears to have little direct effect on wages, a one percent increase in migration into a region increases the unemployment rate by approximately 0.3 percent implying that the regions absorb about two out of every three migrants into the employed labour force. The study is pioneering in more ways than one, however it's findings are flawed as it fails to account for the endogenous nature of relationship between migration and labour market conditions in the receiving areas. While Knight, Song and Huaibin (1999) conclude that there is little competition for jobs between rural-urban migrants and local workers in China as the former hold jobs that the latter shun, Roberts (2001) concludes otherwise by highlighting the increased competition between migrant and local workers in the formal sector in Shanghai. Assessing the labour market impact of in-migration to rural Scotland; Findlay, Short and Stockdale (2000) provides evidence that migrants make rather than take jobs. Therefore there is no consensus within the limited research on the impact of migration on the labour markets of the receiving areas.

The Todaro paradox (Todaro 1969) which provides the foundation for the migration restriction argument rests on various questionable assumptions of the

Harris-Todaro model among them the treatment of informal employment as synonymous with unemployment (Lall et al 2006). This is highly contested in literature as increasingly the role of informal sector is acknowledged as distinct from unemployment sector (Banerjee 1983, Roberts 2001). Studies show the informal sector to be a targeted destination for some migrants as opposed to the traditional view of formal sector as the target of all migrants (Biaroch 1973, Banerjee 1983). Therefore the informal sector as a variable for exploration has become important in migration studies beyond the classical two-sector model (Mbatha & Roodt 2014). The expectation in literature is that migration leads to increased share of the informal sector in the receiving areas (Likic-Brboric 2013, Banerjee 1983, Kochar 2004).

Another interesting aspect of migrant impact on receiving area labour markets is through entrepreneurship (Giulietti, Ning & Zimmermann 2011, Sanders & Nee 1996). Evidence shows that self-employment is higher among migrants as compared to locals in many countries (OECD 2013, Kontos 2003). This could be because; a) migrants succeed less in accessing wage employment, more so formal sector jobs, as compared to locals and are hence forced into self-employment or; b) migrants through self selection process have observable and unobservable characteristics that allow them to identify a labour market opportunity and pursue it through self-employment relatively more successfully compared to the locals.

In-migration, foreign and domestic, is often resisted under the premise that it leads to tighter job markets for the locals (Longhi et.al 2006, Wrage 1981). Similar conclusions are made in the South African context without any real analysis of the evidence (Neocosmos, 2008). The role of migrants in labour markets of receiving areas in South Africa is particularly sensitive given the high rates of unemployment of the country. Existing literature on the impact of migration in the South African context have focused on the migrant rather than the region. Studies analyse whether migration has resulted in a change in the odds of finding employment for migrants (Cornwell & Inder 2004, Mbatha & Roodt 2014). They do not assess the impact of migration on the labour market per se of receiving communities. A recent exception is Kollamparambil (2016), which analyses the impact of in-migration on the income inequality of the migrant receiving areas. While the study establishes increasing income inequality as a result of in-migration, it does not however make conclusive findings on the labour market mechanism responsible for this. There is hence a need to understand the role migrants play in the labour markets of the receiving community and to comprehend whether migration contributes to the labour market participation rate, employment rates, informalisation and entrepreneurship of the migrant receiving areas.

This study therefore attempts an empirical verification at the district level of the effects of in-migration on labour market outcomes in South Africa using National Income Dynamics Survey (NIDS) panel data. The research questions asked are:

1. Does internal in-migration impact on the labour force participation rate

of receiving areas?

2. Does internal in-migration impact on the employment rate of receiving areas?

3. Does internal in-migration lead to informalisation of the labour markets of receiving areas?

4. Does internal in-migration lead to increased entrepreneurship in the receiving areas?

The contribution of this paper is three-fold a) it analyses the hitherto unstudied impact of internal migration on the labour markets of receiving communities in South Africa at the district level b)It accounts for the persistent labour market effects by including the lagged dependent variable in the estimation model c) It uses an instrumental variable GMM technique that effectively addresses the strong endogeneity issues which the existing studies in other country contexts have ignored.

Rest of the paper is organised as follows: Section 2 undertakes a brief review of literature focussing on South African labour markets and migration. This is followed by a derivation of theoretical postulations in section 3. The discussion on data and methodology is undertaken in section 4. Descriptive data analysis is followed by multivariate regression analysis in section 5 and 6 respectively. Conclusions bring up section 7.

2   Review of Literature

The relationship between migration and labour markets is a complex one. While labour markets of the origin areas can contribute as one of the push factors that drive people to migrate out of low growth regions in search of better prospects in other regions, migration into regions can impact on the labour markets of the receiving areas. Todaro (1969) highlighted this latter phenomenon and showed how government interventions in reducing the informal sector share can ironically lead to higher in-migration and hence have the opposite effect of increasing both the informal sector share and the unemployment rate. While many studies have focussed on the role of unemployment as a push factor for driving migration, few have looked at the impact of internal migration on the labour markets of the receiving areas. This section briefly reviews studies on the South African labour markets with a view to relate it to the migration phenomenon in the country.

After a period of increasing labour market participation (LMP) in South Africa between 1995-2005, when the narrow LMP rate increased from 47.7 percent to 56.5 percent (Department of Labour, 2006) , recent statistics indicate a decline from 59.3% in 2008 to 55.7% in 2011 and a revival to 58.5% in 2015 (StasSA, 2016). While Lehutso-Phooko (2014) attributes the decline in LMP to "the new entrants to the workforce (i.e. youth and/or immigrants) who opt

to further their studies or are unable to participate due to disability, family, economic or other reasons", the study does not analyse these factors and their role in determining LMP. Analysis of LMP trends (Banerjee, Galiani, Levinsohn, McLaren & Woolard 2008, Casale 2004, Casale & Posel, 2002) have been undertaken focusing on gender, race, region, sectors of employment, age, level of education etc. but little attention has been paid to the role of migration in determining LMP rates.

The problem of unemployment in South Africa has been most vexing with high levels persisting over past decades. According to StatsSA (2016) the expanded and narrow measure of unemployment rate were 36.3% and 26.7% respectively. Studies into the causes of high unemployment have identified the low economic growth, capital intensive production systems and inflexibilities in labour market regulations on the demand side and low levels of education and skills on the supply side as the main contributors to unemployment in South Africa (Kingdom & Knight 2004, Banerjee et al 2008).

Large number of studies have highlighted the fact that unemployment is very inequitably distributed in South Africa, with race, educational attainments, gender and location being identified as important predictors of unemployment (Mlatsheni & Rospabe 2002, Kingdon & Knight 2004). A young uneducated African located in rural areas has the highest probability of being unemployed in South Africa. Kingdon and Knight (2004) highlight the peculiar characteristic of South African unemployment with rural unemployment being higher than urban unemployment. Furthermore, according to Mbatha and Roodt (2014), this rate has been rising in recent times. Therefore it is not surprising that the high rate of rural unemployment is used to explain the high rate of rural-urban migration in South Africa to a great extend (Posel 2010, Zuma 2013). Zuberi and Sibanda (2004) estimate that 59 per cent of the 20–55 year old urban males in South Africa in 1996 to be internal migrants. Analysing the post-Apartheid trends in internal migration, Posel (2004, 2010) highlight the increase in temporary labour migration and also increased feminization of migrants. A more recent survey by the World Bank revealed that the proportion of people living in urban areas increased from 52% in 1990 to 62% in 2011 (SAIRR, 2013). The evidence therefore points to the bulk of the migration being from rural to urban areas (Kollamparambil 2016).

Unemployment, informal sector employment and self-employment are closely related with the latter becoming part of survival strategies of the unemployed with high rates of unemployment triggering the growth of the informal sector. South Africa however presents a paradoxical case of very high unemployment rates coexisting with low-informal sector share, with literature highlighting the barriers to entry into the informal sector as an explanation for it (Heintz & Posel 2008, Kingdom & Knight 2004).

While Davies and Thurlow (2010) simulate the effect of international trade, wage subsidy and cash transfers on formal/informal employment in South Africa, the effect of migration on sectoral shares has largely gone un-investigated. The need to understand the relationship more closely is brought out by the findings of Budlender (2014) that even though employment rate is lower among internal

migrants as compared to locals, the former had lower informal sector shares as compared to locals. The same study also found self-employment among internal migrants to be marginally lower than the locals despite their higher unemployment rates.

A review of literature highlights the absence of a study that has looked at the regional impact of internal migration on the labour market of the migrant receiving areas in the South African context. Given this backdrop, the relevance of answering the questions raised in the earlier section is undebatable.

3   Theoretical postulations

The theoretical postulations relating to the questions at hand is developed in this section.

3.1   Labour market participation rate

Labour market participation rate is defined as the employed and the unemployed who are actively searching for a job over the total labour force (L_T). L_T in turn is defined as those between the ages of 15-65 years. In the absence of migrants, the district labour market participation rate (D_p) is given by the labour market participation rate among the locals (P_r).

$D_p=P_r$

With migration, the district employment rate changes to $D‘_p$ in accordance with the labour market participation rate among migrants. It increases if the labour market participation rate is higher among the migrants (P_m) as compared to that of the locals (P_r).

$D‘_p \quad > D_p$ if $P_r <P_m$
$D‘_p \quad < D_p$ if $P_r >P_m$

3.2   Employment rate

In the absence of migrants, the district employment rate (D_e) is given by the employment rate among the locals (E_r). Employment rate is the proportion of employed labour force (L_e) over the total labour force (L_T).

$D_e=E_r$

Where employment rate among locals is given by

$E_r=L_{re}/(L_{rT})$, where L_{re} is the employed residents and L_{rT} is the total resident labour force.

With migration, the district employment rate changes to $D‘_e$, in accordance with the employment rate among migrants. It increases if the employment rate is higher among the migrants (E_m) as compared to that of the locals (E_r).

$D‘_e \quad > D_e$ if $E_r <E_m$
$D‘_e \quad < D_e$ if $E_r >E_m$

Where $E_m=L_{me}/L_{mT}$, where L_{me} is the employed migrants and L_{mT} is the total migrant labour force.

3.3 Informal sector employment rate

The share of informal sector employment at the district level (D_i), in the absence of migrants, is given by the proportion of resident labour force employed in the informal sector (L_{ri}) as a proportion to resident labour force employed in the formal (L_{rf}) and informal sectors.

$D_i = I_r$

Where $I_r = L_{ri}/(L_{rf}+L_{ri})$

With migration, the share of the informal sector changes to D'_i in accordance with the share of the informal sector employment among migrants. The share of informal sector at the district level increases if the proportion of migrants occupied in the informal sector (I_m) is higher than the locals.

$D'_i \quad > D_i$ if $I_r < I_m$

$D'_i \quad < D_i$ if $I_r > I_m$

Where $I_m = L_{mi}/(L_{mf}+L_{mi})$, where L_{mf} and L_{mi} are migrant labour force employed in the formal and informal sectors respectively.

3.4 Entrepreneurship

The level of entrepreneurship in a district (D_s) prior to migration is given by self-employed locals (L_{rs}) as a proportion of locals either self-employed or wage-employed (L_{rw}).

$D_s = S_r$

Where $S_r = L_{rs}/(L_{rs}+L_{rw})$

With migration, and assuming no change in employment status among locals, entrepreneurship in the district changes to D'_s. Entrepreneurship at the district level increases if entrepreneurship among migrants (S_m) is higher than the locals (S_r).

$D'_s \quad > D_s$ if $S_r < S_m$

$D'_s \quad < D_s$ if $S_r > S_m$

Where $S_m = L_{ms}/(L_{ms}+L_{mw})$, where L_{ms} and L_{mw} are self-employed and wage employed migrant labour respectively.

4 Data and Methodology

4.1 Data

The paper uses the National Income Dynamics Survey (NIDS) Wave 1, Wave 3 and Wave 4 datasets to create a balanced panel dataset spread over the years 2008, 2012 and 2014. NIDS is conducted by the South African Labour and Development Unit (SALDRU) at the University of Cape Town, in conjunction with the National Treasury. NIDS data has been used by Mulchy and Kollamprambil (2016) and Mbatha and Roodt (2014) to study the migration phenomenon, but both studies were undertaken prior to the release of Wave 4 data. Mulcahy & Kollamparambil (2016) study the subjective well-being impact of migration and did not use Wave 2 due to high attrition rate reported in that Wave in relation

to the other waves (National Planning Commission, 2013). Kollamparambil (2016) used Wave 1, 3 and 4 avoiding Wave 2 for the same reason. This study follows suit and avoids Wave 2 in the analysis.

Individuals between the ages of 15 and 59 years in the year 2008 are included in the study. This ensures that the sample does not include individuals over the age of 65 years in 2014. A migrant is defined as an individual whose district of location changed between Wave 3 (2012) and Wave 4 (2014). In doing so we stipulate that an individual is at least 18 years of age at the time of migration in order to ensure that move was out of her/his own free-will. Furthermore, following Mulcahy and Kollamparambil (2016), we stipulate that the individual had not moved in the last 10 years (prior to 2012) in order to avoid circular migration. Collinson, Tollman, Kahn, and Clark (2003) have reported high prevalence of circular migration in the South African labour market and therefore not excluding it may have biased our results.

As explained in Mulcahy and Kollamparambil (2016), NIDS follows a survey structure applied four times with two year intervals. As a result, there are certain biases that arise due to survey design, non-response, attrition and household changes (De Villiers, Brown, Woolard, Daniels, & Leibbrandt 2013). We apply the panel weight that have been provided by SALDRU in order to correct for these biases to all three waves. All variables used in the anaylsis, are derived from individual data to calculate district level aggregates, with the exception of the provincial level variables which were sourced from StatsSA. NIDS follows a stratified, two-stage cluster sample design where the explicit strata in the Master Sample are the 53 district councils (Leibbrandt, Woolard, de Villiers, 2009). Hence we believe district level analysis using the sample weights to correct for non-response, attrition and household changes will yield a representative sample (Kollamparambil 2016).

Table 1 present the sample of the study comprising of individuals within the age group of 15-59 years in 2008 who were matched between Waves 1, 3 and 4 and fell into either the local or migrant group. From this, we dropped all individuals with missing observations under any of the required data variable categories. The eligible sample, which is used in our analysis, reflects a complete and balanced panel of observations. As the panel weighting takes into account attrition bias and survey design bias, we are confident that the initial sample is nationally representative. Although a sample bias can arise from dropping those with missing information if they follow a systematic pattern, we have no reason to suspect that this is not random (Kollamparambil 2016). Table 1 shows that we have a large enough sample of locals and migrants with the latter comprising 5.24 per cent of the total sample of individuals to conclude statistically significant results. These individuals were then mapped to their location of residence at the district level. The nine provinces in South Africa are divided into metropolitan and district municipalities. The largest metropolitan areas are governed by 8 metropolitan municipalities, while the rest of the country is divided into 44 district municipalities (Kollamparambil, 2016). For the purpose of the study we collectively call them as districts. South Africa has 52 districts of which 51 are included in the sample. The district uMzinyathi dis-

trict of Kwa-Zulu-Natal (KZN) province is excluded from the sample as zero population is recorded in our 2008 sample.

Table 2 presents the labour market and population characteristics at the provincial level. While Kwa-zulu-natal stands out as the most populous province, Gauteng province has the largest proportion of in-migrants to locals ratio. This is not surprising as the Gauteng province is considered the economic and financial powerhouse of the country, accounting for over 33% of South Africa's GDP (StatsSA, 2014). Western Cape and Gauteng have the highest employment rates while Eastern Cape and Limpopo have the lowest. There seems to be a negative relationship between employment rate and entrepreneurship in provinces. Provinces with low employment rate are observed to have high rates of entrepreneurship and provinces with high employment rate have low levels of entrepreneurship.

The top and bottom ten districts based on the criterion of in-migration is presented in table 3. The top and bottom 10 districts account for over 50% and less than 4% of total in-migration respectively. Almost one-third of total migration within South Africa flows into Gauteng province.

4.2 Descriptive Statistics

A brief summary of the various characteristics of our sample of 7589 individuals is provided in this section. Over 75% of the migrants fall within the age category of 18-34 years at the time of migration post 2012 (Table 4). It is not surprising to note the very high share of the young among the immigrants as the young is more likely to venture out in search of employment opportunities or, furthering education. On average, the national population of South Africa consists of 48.2% of males and 51.7% of female as indicated by 2011 census (StatsSA 2016). Our sample therefore has more females than males than warranted for a nationally representative sample. However it needs to be pointed out that a similar 55%-45% female-male ratio among migrants is observed in the NIDS sample set used in Mulcahy and Kollamparambil (2016) which, defined a migrant as an individual who had changed his location between NIDS wave 1 and NIDS wave 3, unlike the current study that considers migration between Wave 3 and Wave 4. A race-wise classification indicates our sample to be nationally representative. The share of black race among migrants is seen to be well above what would be warranted by the population distribution. The average household size is seen to be just over 5 members. A drastic reduction in this is noticed among migrants post migration in 2012 which would indicate that individuals leave behind their families when they migrate. Whether migrants migrate as temporary labour migrant or move permanently with their dependants will, to a great extent, determine the impact of migration on the labour market participation rate of the migrant receiving areas.

Table 5 shows the share of individuals with no schooling to be lower among migrants as compared to non-migrants. The share of population with matric and above qualifications has increased substantially over time for both migrants and non-migrants, however the increase is much more impressive among migrants.

This clearly points to positive self-selection among migrants that differentiate them from non-migrants and also to the fact that access education can be the immediate purpose behind migration rather than employment opportunities. It is evident that there is hence a need to consider the possibility of migration for non-labour market purposes like education which is interrogated through the labour market participation next.

For the purpose of analyzing the labour market impact we calculate at the district level the labour market characteristics of the sample panel (Table 6). The labour force participation rate has been increasing over time both for migrants and non-migrants. However the labour force participation rate of migrants are lower than that of non-migrants both before and after migration indicating that migration also occurs for non-employment purposes like education or marriage. However, this may also be due to the discouraged migrants withdrawing from labour market participation on finding themselves inadequate to participate in the labour markets of their new location.

Interesting differences in the rate of employment between migrants and non-migrants as well as change over time of employment rate among migrants can be highlighted. Firstly, the employment rate is lower for migrants compared to the locals before migration in 2008 and 2012. Secondly, migrants have a higher rate of employment as compared to non-migrants post migration in 2014. Thirdly, the rate of fall of unemployment is higher for non-migrants as compared to migrants over the period 2012-2014 implying that migration has improved substantially the employment probability.

The share of informal sector employment for both migrants and locals seem to be declining over time but there doesn't seem to be a statistically significant difference (at 5% significance level) between migrants and locals in this regard. A similar pattern with regards to entrepreneurship is observed from Table 6.

The average income is higher for migrants post migration even though their income is lower than non-migrants before and after migration (Table 6). The rate of increase of income of migrants, between the period 2012-2014, is higher than that of non-migrants, indicating that while some migrants remain unemployed post-migration, others are able to improve their incomes dramatically.

5 Methodology

Next we discuss the methodology for a multivariate econometric estimation of the impact of in-migration on the employment rates, share of informal sector and entrepreneurship in South Africa.

5.1 Estimation issues

Endogeneity bias arising from reverse causality between the choice of migration destination and the labour market conditions is the single most important factor that drives the choice of methodology. The bidirectional relationship that may exist in our specification is not just restricted to proportion of migrants and

the labour market conditions. Simultaneity between the dependent variable on the one side and other independent variables like average income levels, rate of economic growth of the province, share of province in the national GDP, and educational attainment variables also needs to be accounted for in the estimation.

Apart from the fact that labour market conditions within various areas influence the destination choice of the migrant, each region has individual specific time invariant characteristics that can determine migrant choice. These unaccounted for fixed effects in the OLS estimation also causes endogeneity leading to biased estimates. The panel data fixed effects estimation separates out the time invariant characteristics from the rest of the explanatory variables but would continue to yield biased results in the presence of endogeneity arising from bidirectional causal relationship between variables. An instrumental variable GMM approach to estimation is effective in countering this issue and therefore it is considered to be most appropriate for our estimation. Furthermore, a dynamic GMM estimation has the additional advantage of being able to incorporate the persistent nature of labour markets by including the lagged dependent variable in the estimation model.

As explained in Kollamparambil (2016), Arellano-Bond (1991) developed the dynamic difference-GMM estimator for panel data that involved estimation of a system of equations (one for each time period) in first difference, with the endogenous variables instrumented with suitable number of lags of their own levels. The Arellano and Bover (1995) outlined an augmented version of difference GMM which was later fully developed by Blundell and Bond (1998) and came to known as dynamic system-GMM (Roodman 2006). Under this approach the difference GMM estimator is further augmented with original equations in levels added to the system resulting in increased efficiency through the additional moment conditions. In these equations, predetermined and endogenous variables in levels are instrumented with suitable lags of their own first differences. This allows the introduction of more instruments and can dramatically improve e?ciency. This study hence uses the one-step dynamic system GMM estimator. The overall appropriateness of the instruments can be verified by the Difference in Hansen test for over-identifying restrictions.

5.2   Estimation models:

Based on the review of literature and theoretical postulations developed in Sections 2 and 3 respectively, we evaluate empirically the impact of internal in-migration on the labour markets of the receiving areas using the function below:

$$Lmkt_{it} = f(propmig, migsq, \qquad X_{it})$$

$Lmkt_{it}$ is the measure of labour market characteristics in district i at time t using six variables: labour market participation rate ($lmpr$), employment rate ($empratio$), share of informal sector($empifpop$), share of formal sector employment ($empfpop$), entrepreneurship ($selfempprop$) and informal sector entrepre-

neurship (*selfempifprop*). Our target variable of interest is *propmig* indicating the proportion of net in-migrants into each district. In addition we include *migsq,* which is the squared *propmig* variable to incorporate the non-linear effect of in-migration on the labour markets of the receiving communities. Based on our initial statistical analysis we expect *propmig* to have a positive impact on the employment rate of the district. Sustained impact of migration (*migsq*) is however expected to have a negative effect on both labour market participation (*lmpr*) and employment rate (*empratio*) of migrant receiving districts. The impact of in-migration on informal sector and entrepreneurship is less clear from our descriptive statistics. However, expectations based on Todaro framework is that while initial in-migration will improve the formal sector employment rate, sustained in-migration will increase the informal sector, both through informal employment and self-employment, of the migrant receiving areas. The expectation based on the positive self-selection of migrants is that entrepreneurship is positively impacted by in-migration.

In addition, we include a set of control variables, X_{it} based on our review of literature in Section 2. These include the average income level of the receiving areas (*avdistindinc*), the proportion of population with educational qualifications over matric level, (*abovMatricratio*), the proportion of population with educational qualifications with matric level (*matric*). In addition, we include some provincial level variables like the provincial share of the district in the national GDP of South Africa (*provnatshare*) and the rate of economic growth of the province of the district (*gdpgr*). The reason to include provincial level variables is to account for the reality of individuals residing and working in different districts within a province. Long-distance commute to work is a reality that continues in South Africa which may be considered a relic of the Apartheid Group Areas Act (Mahlangeni 2013).

The expected sign of the coefficients of the control variables with respect to the various labour market indicators is discussed next. The average income of the district (*avdistindinc*) is expected to positively impact : labour force participation rate, employment rate, as well as self-employment rate of the district through the demand effect. It is however expected to negatively impact on the share of informal sector of the district. Districts with a high share of labour force with educational qualifications above matric (*abovMatricratio*) is likely to have higher labour market participation rate and employment rate and; lower informal sector employment as well as informal sector self-employment rate. The opposite is true for our expectations regarding the sign of the *matric* variable.

A detailed description of the variables is provided in Appendix A1. All variables are included in log form in the econometric model to account for non-linearity.

$$Lmkt_{it} = \alpha_1 + \alpha_2 \Pr opmig_{it} + \alpha_3 Migsq_{it} + \phi X_{it} + \varepsilon_{it} \qquad (1)$$

Model I incorporates our target variables of interest, *propmig,* to assess the impact of in-migration on the labour markets, using a multivariate ordinary least squares (OLS) regression. We include the control variables mentioned earlier

in the section and undertake a robust estimation to correct for heteroscedasticity. This estimation can however potentially suffer from autocorrelation and endogeneity issues arising from suspected bidirectional causality as well as unaccounted for district level fixed effects.

$$\Delta Lmkt_{it} = \beta_1 \Delta \Pr opmig_{it} + \beta_2 \Delta Migsq_{it} + \gamma \Delta X_{it} + \varepsilon_{it} \qquad (2)$$

The OLS estimates is improved upon with fixed effects estimation using eq 2. Fixed effects method takes care of the endogeneity bias arising from unspecified fixed effects by separating out the time variant and invariant variables. This is achieved by undertaking the first difference between time periods, due to which the time invariant individual specific effect is effectively erased from the estimation. The fixed effects estimation however still suffer from suspected bias arising from reverse causality and autocorrelation arising from misspecification by not including the lagged dependant variable in the estimation.

$$\Delta Lmkt_{it} = \varphi_1 \Delta Lmkt_{i,t-1} + \varphi_2 \Delta \Pr opmig_{it} + \varphi_3 \Delta Migsq_{it} + \lambda` \Delta X_{it} + \eta_i + \varepsilon_{it}$$
$$(3)$$

Eq 3 includes the lagged dependant variable as an explanatory variable to explore the persistence of the labour market conditions. A dynamic panel data estimation using system-GMM allows an unbiased estimation of Eq 3. The system-GMM method of dyanamic panel data estimation effectively addresses issues relating to endogeniety as well as autocorrelation.

6 Results

We present the results from OLS and fixed effects estimation in Appendix (Tables A2 and A3 respectively) for the purpose of comparison with the system-GMM results. Based on our concerns about endogeneity issues and observed autocorrelation in OLS and panel data estimation we consider dynamic system-GMM as the appropriate estimation methodology.

While on the one hand the estimation shows that the in-migration significantly reduces the labour market participation rate of the migrant receiving districts, on the other our findings indicate that internal in-migration does not significantly change the employment rate in the receiving communities. Therefore it can be concluded that the lower labour market participation is not due to lower employment rate of migrants but rather due to the fact that migration also occurs for non-employment purposes as discussed in section 4 or, due to larger discouraged labour force among migrants as compared to local residents.

The lack of impact of in-migration on the employment rate (*empratio*) of the district however does not mean in-migration has no impact on its labour markets. In-migration seems to impact the labour markets of the receiving districts in a nuanced way with initial in-migration (*propinmig*) being absorbed in the formal sector increasing the formal sector share in employment (*empfpop*). However, a sustained increase in in-migration (*migsq*) leads to a decline in the share of formal sector employment (*empfpop*) and causes an increase in the

share of informal sector wage employment (*empifpop).* The increase in the formal sector wage employment rate is 0.06% following a one per cent increase in in-migration. However the non-linear relationship between in-migration and formal sector wage employment rate is indicated by the negative and significant coefficient of *migsq.* The sustained increase in in-migration leads to a decline in the share of formal sector wage employment with a 1% increase in former leading to a 0.02% decline in latter. A corresponding increase in informal sector wage employment (*empifpop*) is observed with a 1% increase in sustained in-migration causing a 0.05% increase in the informal sector wage employment. Thus, although in-migration does not change the employment rate, the structure of the labour markets is altered as a result of in-migration.

Next we assess the impact of our variables of interest on the entrepreneurship activity in the receiving districts. Again, although in-migration is not found to be statistically significant in determining the, self-employment rate of the receiving districts, initial in-migration is seen to significantly and negatively impact on the informal sector self-employment rate. These findings are in line with our expectations and previous findings that indicate that internal migrants in South Africa are less engaged in self-employment activities as compared to the locals as well as foreign migrants (Budlender 2014, Kollamparambil 2016). Sustained in-migration however leads to a positive albeit, insignificant impact on informal sector self-employment.

The pecking order impact of in-migration on the labour markets of migrant receiving districts is evident now, with first preference being formal sector employment. However sustained in-migration in search of formal sector employment is not successful and leads to the growth of informal sector wage employment. Those not lucky enough to find wage employment then resort to informal sector wage employment as the last resort survival strategy. The explanation that wage employment is preferred to informal sector self-employment is corroborated by the findings of Gill (2009) that self-employment dominates informal work in areas of reduced wage employment opportunities.

Among the control variables included in the estimation, education related variables had the strongest impact on determining the labour market participation and employment rate, with higher education having a positive and lower education having negative impact on the labour market participation rate and employment rate of the receiving areas. A one percent increase in the share of individuals with education levels higher than matric increased employment rate by 0.61 percent, while a one percent increase in the share of individuals with education levels lower than matric decreased employment rate by 0.58 percent. Districts with higher average levels of income had higher employment rate implying the demand side effect to be significant in creating jobs. Furthermore an increase in GDP growth of the province of the district had a negative and significant impact on employment rate with a 1 per cent increase in GDP growth resulting in a 0.16% decrease in employment rate. This finding is counter intuitive, but can be explained through the jobless growth observed in South Africa in recent times (Mahadea & Simson 2010, Altman 2003).

The other significant variables determining the informal sector employment

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rate is the higher education variable. A one percent increase in the proportion of individuals with higher education is seen to increase employment rate by 0.6%. Formal sector employment rate on the other hand is positively determined by the average income of the district. An increase in the average income level of the district results in an increase in the formal sector employment through the demand effect. The drivers of informal sector self-employment are very different. An increase in the share of the province in the nation's GDP reduces the share of informal sector self-employment. A one percent increase in the share of individuals with higher education leads to a 0.97 percent reduction in the share of informal sector self-employment while a 1% is increase in the share of individuals with lower levels of education leads to a 1.13 percent increase in the share of informal sector self-employment in the district.

7 Summary and Conclusions

This paper analysed the impact of internal in-migration on the labour markets of the receiving areas at the district level in South Africa. The motivation of the study is to provide empirical evidence to counter the often incongruent theoretical arguments regarding the impact of in-migration on the labour markets of the receiving areas. Existing studies on the impact of migration in the South African context do not address the impact of in-migration on the labour markets of the migrant receiving areas.

The estimations show that in-migration reduces the labour force participation in migrant receiving areas, indicating migration for non-economic purposes or discouraged workers. While In-migration is not found to alter significantly the employment rate of the receiving areas, indications are that the employment rate is maintained through an expansion of the informal wage employment. There is evidence of non-linear relationship between in-migration and the labour markets of the receiving areas. While initial migration results in the expansion of the formal sector employment, sustained increase in in-migration leads to informalisation of the labour markets. Our results corroborate the Harris-Todaro model's prediction that sustained in-migration leads to increased informal sector share of the labour markets. However, our analysis made a distinction between the unemployed sector and informal sector and the results indicate that migration does not decrease employment rate but does result in increased informalisation of the labour market. Informal sector self-employment is found to be the last refuge of the migrants and resorted to only if wage employment, either in the formal or informal sector, is not obtained. Furthermore, the findings of the study indicate that lower labour market participation rates rather than reduced employment rates explain the increased individual income inequality impact of in-migration noted by Kollamparambil (2016).

Educational attainments of the labour force and the economic status of the province to which the district belongs come out as the other variables driving labour market conditions in the districts of South Africa. These findings reinforce the supply and demand side factors identified in literature as the determi-

nants of the labour market conditions in South Africa. This research however highlights the need to improve the capabilities of migrants through better access to education in the migrant sourcing regions to prevent further informalisation of the labour markets of the migrant receiving regions. As predicted by the Todaro paradox, urban-dominated strategies to counter the informal sector is likely to be counterproductive as interventions required are very often in the migrant sourcing areas. This calls for long-term national level intervention to improve the capabilities of the labour force that can lead to higher employment rate through creation of formal sector employment.

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Table 1: Sample size by group			
	Stayers	Migrants	Total
Unweighted (number) %	7163 94.39	426 5.61	7589 100
Weighted (number) %	7191.25 94.76	397.75 5.24	7589 100

Table 2: Internal migration and Labour market characteristics of Provinces					
Province	Proportion of net in-migrants (%)	Labour market participation rate (%)	Employment rate (%)	Entrepreneur ship (%)	Informal sector share (%)
Eastern Cape (EC)	5.9	51.8	35.8	15.8	22.2
Free State (FS)	3.1	65.1	47.3	13.9	20.1
Gauteng (GP)	15.4	71.5	54.7	13.8	21.1
KwaZulu-Natal(KZN)	5.6	53.6	39.2	13.1	24.3
Limpopo (LP)	2.9	54.1	36.4	20.8	22.9
Mpumalanga (MP)	4.2	65.3	47.7	15.9	19.2
North West (NW)	3.9	59.5	41.6	14.3	25.7
Northern Cape (NC)	1.9	56.9	45.1	10.1	23.1
Western Cape (WC)	3.6	65.6	58.1	7.5	20.7
Total	5.6	63.8	44.5	13.2	22.4

Table 3: District-wise distribution of in-migration							
Top 10 districts	Province	Share of district in total migration %	migrant to stayer ratio %	Bottom 10 districts	Province	Share of district in total migration %	migrant to stayer ratio%
City of Johannesburg	GP	12.6	6.9	Central Karoo	WC	0	0
City of Tshwane	GP	10.6	10.22	Namakwa	NC	0	0
Ekurhuleni	GP	6.56	7.04	Lejweleputswa	FS	0.05	0.18
eThekwini	KZN	6.17	3.88	Siyanda	NC	0.86	1.06
Eden	WC	5.5	24.8	Xhariep	FS	0.11	2.64
Alfred Nzo	EC	4.6	25.9	Pixley ka seme	NC	0.12	1.98
West Rand	GP	4.01	10.1	Zululand	KZN	0.13	0.74
City of Cape Town	WC	3.57	2.94	Overberg	WC	0.14	1.38
Nkangala	MP	3.47	7.8	Frances Baard	NC	0.13	0.97
Waterberg	LP	2.8	11.04	Sedibeng	GP	0.86	1.06

Table 4: Individual and Household Characteristics			
	All	Stayers	Migrants
Age in 2008 %			
15-30	44,33	42,44	76,12
31-45	31,57	32,59	14,42
46-61	24,10	24,96	9,46
Gender	%		
Male	36,58	36,09	44,68
Female	63,42	63,91	55,32
Race	%		
African	80,70	79,99	92,72
Coloured	15,70	16,34	4,93
Indian/Asian	1,20	1,27	0,00
White	2,40	2,40	2,35
Average Household size(numbers)			
2008	5.0	5.0	4.6
2012	4.9	4.9	4.2
2014	4.7	4.9	2.4

Table 5: Level of Education (%)			
	All	Stayers	Migrants
No schooling			
2008	8.6	8.9	3.1
2012	8.1	8.5	2.6
2014	8.0	8.3	2.3
Below Matric Schooling			
2008	67.6	67.4	71.1
2012	62.1	62.2	60.2
2014	58.3	58.7	50.2
Matric			
2008	15.9	15.6	20.7
2012	15.5	15.1	22.8
2014	14.3	13.7	23.9
Above Matric			
2008	7.9	8.1	5.2
2012	14.3	14.3	14.4
2014	19.5	19.2	23.5

Table 6: Labour Market Characteristics			
	All	Stayers	Migrants
Labour Force Participation rate (%)			
2008	54.7	54.9	52.5
2012	63.0	63.1	60.7
2014	67.5	67.6	66.1
Employment rate (broad measure %)			
2008	39.7	39.8	37.8
2012	45.8	45.9	43.1
2014	53.3	53.3	52.5
Informal sector employment (%)			
2008	23.9	24	23.1
2012	20.9	20.9	20.9
2014	20.8	20.8	21
Average individual Broad income (Rands)			
2008	2013.6	2020.8	1884.4
2012	2714.5	2689.1	1998.7
2014	3764.7	3777.9	3512.7
Entrepreneurship %			
2008	15.2	15.1	16.8
2012	12.8	12.8	13.9
2014	12.8	12.9	12.7

Table 7: System GMM estimation results[1]						
VARIABLES	*lmpr*	*empratio*	*empifpop*	*empfpop*	*selfempprop*	*selfempifpop*
L.Dependant Variable	0.289***	0.384***	-0.209	0.292***	0.423***	0.116
	(0.075)	(0.0955)	(0.163)	(0.0863)	(0.115)	(0.173)
propinmig	-0.0466**	-0.0334	-0.0339	0.0577*	-0.00113	-0.223**
	(0.0195)	(0.0264)	(0.0592)	(0.0298)	(0.0383)	(0.0992)
migsq	0.0162	0.0202	0.0456**	-0.0240**	0.00513	0.0648
	(0.01)	(0.0124)	(0.0231)	(0.0121)	(0.0146)	(0.0409)
matric	-0.436***	-0.586***	0.241	0.404*	0.660***	1.136
	(0.127)	(0.21)	(0.359)	(-0.215)	(0.206)	(0.725)
abovMatricratio	0.435***	0.613***	-0.256	0.506**	-0.697***	-0.838
	(0.148)	(0.23)	(0.394)	(0.223)	(0.224)	(0.746)
avdistindinc	0.182***	0.246***	-0.346***	0.257***	-0.231***	-0.426**
	(0.0433)	(0.0641)	(0.124)	(0.0637)	(0.0707)	(0.194)
gdpgr	-0.122***	-0.163***	0.348**	0.115	0.192***	-0.447**
	(0.0391)	(0.0594)	(0.166)	(0.0892)	(0.0574)	(0.194)
provnatshare	0.0409**	0.0297	-0.0505	-0.0496	-0.0422*	0.0943
	(0.019)	(0.0241)	(0.0704)	(0.0353)	(0.0233)	(0.114)
Constant	-1.654***	-2.050***	0.302	-2.825***	1.844***	2.747
	(0.445)	(0.633)	(1.177)	(0.547)	(0.686)	(1.773)
Observations	102	102	102	102	102	102
Number of distcode	51	51	51	51	51	51
Hansen test	15.29	11.69	11.25	15.62	15.09	13.1
Difference Hansen	6.67	1.16	7.89	9.08	1.7	6.69
Wald Chi2	449.76***	361.05***	36.5***	367.9***	313.3***	33.53***

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[1] Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Appendix

A 1: Variable definitions	
Dependent variables	Definition
lmpr	Ratio of employed or actively seeking job over the population aged between 15-65 years.
empratio	Ratio of employed over total district labour force.
empifpop	Ratio of informal employment over total employment.
empfpop	Ratio of formal employment over total employment.
Selfempprop	Ratio of self-employed over total employment.
selfempifpop	Ratio of informal self-employment over total self-employment.
Independent variables	Definition
propinmig	Ratio of net in-migrants over locals in each district
migsq	*Propinmig* squared
avdistindinc	Average individual income in each district
abovMatricratio	Ratio of individuals with above matriculation qualifications over the total district population
matric	Ratio of individuals with matriculation level qualifications over the total district population
provnatshare	Share of province to the national GDP
gdpgr	Annual rate of growth of provincial GDP, in percent.

A2: Ordinary Least Squares Results						
VARIABLES	lmpr	empratio	empifpop	empfpop	selfemptpop	selfempifpop
propinmig	-0.0566**	-0.0304	0.0512	0.0191	0.0304	-0.175*
	(0.02)	(0.034)	(0.063)	(0.036)	(0.035)	(0.089)
migsq	0.0298**	0.0412***	-0.0007	-0.013	-0.0412***	0.0769
	(0.01)	(0.015)	(0.039)	(0.017)	(0.015)	(0.058)
avdistinb	0.269***	0.415***	-0.164*	0.475***	-0.415***	-0.572***
	(-0.03)	(0.044)	(0.084)	(0.059)	(0.0442)	(0.142)
abovmatricratio	(0.4	-0.618	0.173	0.714	0.617	-0.167
	-0.47)	(0.666)	(0.651)	(0.741)	(0.666)	(0.84)
matricratio	0.367	0.594	-0.088	-0.756	-0.594	0.52
	(0.47)	(0.663)	(0.626)	(0.732)	(0.663)	(0.822)
provnatshare	0.0435**	0.0302	-0.0499	-0.00491	-0.0302	-0.0152
	(0.02)	(0.026)	(0.056)	(0.033)	(0.0262)	(0.112)
gdpgr	-0.114***	-0.049	0.289***	-0.169***	0.0495	-0.022
	(0.03)	(0.058)	(0.105)	(0.06)	(0.0583)	(0.195)
Constant	-2.653***	-4.041***	-0.169	-4.252***	4.039***	3.723***
	(0.24)	(0.397)	(0.897)	(0.614)	(0.397)	(1.269)
Observations	153	153	153	153	153	153
R-squared	0.562	0.53	0.111	0.517	0.53	0.143
$F_{(7, 145)}$	25.27***	20.81***	2.12**	12.46***	20.79***	3.46***
Woolridge autocorrelation test	4.987***	12.434***	0.082	6.281**	10.709***	0.098

Robust standard errors in parentheses *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table A3: Fixed Effects Estimation Results						
VARIABLES	*lmpr*	*empratio*	*empifpop*	*empfpop*	*selfemptpop*	*selfempifpop*
propinmig	-0.0194	-0.0428	0.0353	-0.0199	0.0429	-0.124
	(0.0283_	(0.038)	(0.093)	(0.051)	(0.038)	(-0.157)
migsq	0.0321*	0.0712***	-0.0067	0.0256	-0.0713***	0.00135
	(0.0171)	(0.023)	(0.056)	(0.031)	(0.023)	(0.094)
avdistinb	0.249***	0.336***	-0.164	0.363***	-0.336***	-0.386
	(0.065)	(0.089)	(0.216)	(0.119)	(0.089)	(0.364)
abovmatricratio	-5.096***	-5.731**	1.149	7.440**	5.732**	13.96
	(1.752)	(2.38)	(5.773)	(3.181)	(2.385)	(9.712)
matricratio	5.388***	6.523***	-1.57	-5.850*	-6.528***	-16.1
	(1.794)	(2.44)	(5.913)	(3.258)	(2.443)	(9.948)
provnatshare	0.419	0.374	1.185	-0.453	-0.375	4.427**
	(0.316)	(0.429)	(1.04)	(0.573)	(0.43)	(1.75)
gdpgr	-0.0783*	-0.0411	0.233	-0.144*	0.041	-0.0316
	(0.0459)	(0.062)	(0.151)	(0.083)	(0.062)	(0.255)
Constant	-1.821	-0.257	-5.325	5.588	0.239	-19.63*
	(2.004)	(2.725)	(6.603)	(3.638)	(2.728)	(11.11)
Observations	153	153	153	153	153	153
R-squared	0.487	0.472	0.137	0.444	0.472	0.139
Number of distcode	51	51	51	51	51	51

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1