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South-South Migration and the Labor Market: Evidence from South Africa

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South–South migration and the labor market: Evidence from South Africa

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Abstract

Using census data for 1996, 2001 and 2007 we study the labor market effect of immigration in South Africa. In this period the share of foreign born over the total population has grown by almost fifty percent, and both the characteristics and geographical distribution of immigrants show substantial variation over time. We exploit these features of the data to carry out an analysis that combines both the "spatial correlation" approach pioneered by Card (1990) and the variation across schooling and experience groups used by Borjas (2003). We estimate that increased immigration has a negative effect on natives' employment outcomes, but not on total income. Furthermore, we find that skilled South Africans appear to be the most negatively affected subgroup of the population.

JEL classification numbers: F22, J61 Keywords: Immigration, Labor market effects, South Africa.

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"...They come from all over, and they are of all sorts, the new African migrants. There are the professionals – the doctors and academics, highly educated and hoping that in this country their skills can at last earn them a living wage. There are the traders, buying up what the shopping malls have to offer, and traveling home twice a month with bulging suitcases... There are the hawkers and the hustlers, who travel south out of desperation... And then there are the criminals; the drug dealers, the pimps and fraudsters." (Phillips 2002)

1 Introduction

Following the demise of the Apartheid regime, important political changes have swept South Africa, leading to the 1994 democratic election of a majority government. At the same time, the country's position as a regional economic superpower has made it a very attractive destination for migrant workers from the surrounding areas in search of new job opportunities. Until 2002, migration was disciplined by the "Aliens Control Act" of 1991, a piece of legislation which was rooted in the "control and expulsion" mentality of the Apartheid era, inspired by a fundamentally racist and anti–semitic perspective (Peberdy and Crush 1998). After 2002, with the introduction of the new Immigration Act (Act 13), and its subsequent amendment in 2004, the policy stance changed substantially. Today South Africa sees the inflow of foreign workers (and especially of skilled ones) as a tool of economic growth, and this is a significant break from the control–oriented framework of the past.

Still, xenophobic episodes against immigrants are common place (McDonald 2000 and Friebel, Gallego, and Mendola 2010) and suggest that natives often perceive immigrants as a threat. While several studies have provided a qualitative assessment of recent migration to South Africa, remarkably little evidence exists on the labor market effect of foreign immigration to the country. The purpose of this paper is to help fill this gap and to provide what is – to the best of our knowledge – the first systematic study of the labor market effects of immigration to this country.

In carrying out our analysis, we use three large datasets provided by Statistics South Africa and covering 1996, 2001 and 2007. We start by documenting the patterns of immigration to South Africa. First, we find that the inflow of immigrants has increased substantially over the period we are considering. In 1996, about 2 percent of the population (or 4.7 percent of the male labor force) was made up by foreigners, and that share had increased to almost 3 percent of the population (or 6.1 percent of the male labor foce) in 2007. Second, and contrary to widespread beliefs in the country (Crush and Williams 2010), foreign male workers in South Africa are relatively highly educated. In particular, as of 2007, they are approximately two times more likely than native workers to have attained a college degree. The importance of foreign workers is even higher when we look at individuals at the very top of our skill classification, i.e. individuals who are not only highly educated, but also have a long labor market experience. Third, we find that other African countries are becoming an increasingly important source of immigrants (note that we are able to observe this information only for the first two years of our sample). Thus, the overall picture that emerges is one in which South Africa has been able to turn itself into a very attractive destination for highly skilled workers coming mostly from the surrounding regions.

We turn then to the analysis of natives' labor market outcomes. We exploit the variation both in the distribution of immigrants across districts within the country and over the three years of our sample. Our rich dataset allows us to identify 56 districts. We follow Borjas (2003) to define a skill level as being characterized by both educational achievement and labor market experience, thus identifying 32 skill levels. We find that immigration had on average a large and negative impact on natives employment status. In our benchmark specification, a ten percent increase in the labor supply of a skill group brought about by immigration leads to a 6.7 percent decrease in natives' total employment. At the same time, we do not find a significant effect of immigration on our monetary compensation measure. One important caveat in interpreting the latter finding is that our data only provides information on individual total income and, as a result, it is not possible for us to disentangle changes in wages from changes in the number of hours worked. One possible explanation of the two above results is labor market rigidities, which are widespread in South Africa where unemployment rates have exceeded 25 percent for most of the last decade.

As immigration to South Africa is very heterogeneous, we repeat our analysis focusing on four separate education groups (less than primary completed, less than secondary completed, secondary completed plus some college and, finally, college graduates)¹ Interestingly, we find that the negative average employment effect we have documented is higher for the medium and highly skilled.

The remainder of the paper is organized as follows. Section 2 provides an overview of the related literature, whereas section 3 discusses the South African migration history. Section 4 introduces the data, whereas section 5 contains our empirical analysis. Section 6 concludes the paper.

¹The definition of educational categories by the South African census is slightly different from the U.S.. In particular, "secondary completed" and "some college" are combined into one category. Therefore, caution is needed in comparing our numbers with figures from other studies, for example Borjas (2006).

2 Related literature

Our paper is related to two strands of the literature. First, it is a contribution to the distinguished body of work which has studied the labor market effect of immigration. Second, it represents one of the first systematic studies of the effect of South-South migration and, thus, of the challenges and opportunities of developing and medium-income countries which are local attractors of international labor flows.

Two approaches have been traditionally followed to understand the labor market effect of immigration. The first, which is known as the "spatial correlation" methodology, exploits the variation in the distribution of immigrants across different geographic areas in the destination country. Among the early contributions to this literature, Card (1990) studied the effect of the 1982 Mariel boatlift on the Miami labor market. Notwithstanding the large immigration shock – the inflow of Cuban immigrants led to an increase in the labor force in the Miami metropolitan area of approximately 7% – he found very little effect in terms of natives labor market outcomes. Studies following a similar strategy have been carried out on a variety of other destination countries. They include the analysis of the effect of the forced repatriation of "pieds noirs" from the North African colonies to France (Hunt 1992), the analysis of the impact of Russian immigration to Israel in the 1990's (Friedberg 2001), the study of the effect of recent immigration to Germany by Pischke and Velling (1997), etc. Similarly to Card (1990), all these studies have found only a very limited impact of immigration on the local labor $market.^2$

A second approach has been instead pioneered by Borjas (2003), and has focused on a national-level analysis. The main idea behind this methodology is that the findings of spatial correlation studies might be biased for

 $^{^{2}}$ See Friedberg and Hunt (1995) for an excellent review of this literature.

two main reasons. First, immigrants do not distribute themselves randomly across geographical regions in the destination country: they tend to cluster in areas in which the economy is stronger and where the demand for the services they can provide in the labor market is more sustained. In addition, the inflow of immigrants in a certain area of the country might lead to a reaction by natives, who could decide to relocate elsewhere, where the labor-market pressure is lower. Both these potential sources of bias lead to underestimate the true labor market effect of immigration in spatial correlation studies. For this reason, Borjas (2003) argues that a more appropriate setup to carry out the analysis is the national one. By focusing on this framework, the analysis picks up average national labor market effects and, under the assumption that migration out of the destination country's labor market is limited, this strategy will minimize the bias brought about by natives' reaction to migration. Borjas (2003) exploits the variation in the distribution of migrants across 32 different skill levels, each characterized by a given educational attainment and extent of labor market experience. Differently from the studies based on the spatial correlation approach, he finds a substantial negative impact of immigration on the wages of native workers. Aydemir and Borjas (2007) use the same methodology to compare the experience of two destination countries, i.e. Canada and the United States, with that of Mexico, an important source of migrants, and find that the changes in the supply of workers brought about by migration do have the expected impact on the labor market outcomes of individuals who have not moved.³ A more recent study by Ottaviano and Peri (2011) has called into question some of the results by Borjas (2003), arguing that even within the same skill cell, migrants and native workers are not perfect substitutes. Under this assumption, the authors find a much smaller effect of immigration on native workers wages, which is actually positive on average.

 $^{^{3}}$ Mishra (2007) has obtained similar results for the case of Mexico.

The two approaches we have discussed can be linked, as has been suggested by Borjas (2006) in a recent study which uses US census data covering the period 1960–2000. Interestingly, he finds that inflows of foreign workers in a US subnational geographic unit (state or metropolitan area) are associated with lower in-migration rates, higher out-migration rates, and a decline in the growth rate of the native workforce. Importantly, he also finds that the native migration response attenuates the measured impact of immigration on wages in the local labor market, suggesting that taking into account this dimension is important to estimate the true effect of immigration.

The analysis we carry out in this paper is related to both strands of the literature. We exploit the variation in the distribution of migrants across geographical areas in South Africa as in the "spatial correlation approach". In addition, we define skill as in national labor-market studies. In addition, as in Borjas (2006), we control for the lagged dependent variable to address the endogeneity of the migration decision, i.e. the non-random allocation of migrants across space.

This paper is also related to the small literature which has analyzed labor flows to South Africa. Several contributions in this tradition have investigated the main features of migration to this country. Crush and Williams (2010) and Landau and Segatti (2009) contain a broad overview of the phenomenon, with some interesting insights on the evolution of the recent migration policy. McDonald (2000) is instead a collection of essays looking at the evolution of the phenomenon in the early post–Apartheid era, drawing on a series of original individual level surveys. Bhorat, Meyer, and Mlatsheni (2002) focuses instead on the emigration of skilled workers from the Southern African region. To the best of our knowledge, to this date there has been no systematic study of the effect of labor migration on natives' labor market outcomes. The purpose of this paper is to fill this important gap in our understanding of the phenomenon.

3 Migration to South Africa

South Africa has been the destination of large cross border labor flows at least since the mid of the nineteenth century, when migrants from Lesotho, Malawi, Mozambique and Zimbabwe came to work in the sugar cane fields of Natal and the recently opened diamond mines in Kimberly (Crush 2000). Ever since, migration and the debate around migration have been a mainstay of the public policy arena in the country. Systematic, reliable data on the size of the immigrant population for the pre-Apartheid period are difficult to obtain, but we can distinguish four main channels through which workers have entered the country: as contract laborers, especially in the mining sector; as informal migrants, to work mainly in the construction, service and agricultural sectors; as refugees, following the eruption of civil conflicts in neighbouring states and, finally, as the result of a "white flight", brought about by the creation of new post–colonial governments in neighbouring countries starting in the sixties.

Public policies towards immigrants and immigration have greatly varied over time. Contract migration in the mining sector has been introduced right after the discovery of the gold fields in the Witwaterstrand area in the 1880s, and has long been perceived as a critical input in the industry. Fierce competition among employers has prevailed up until the 1920s, when a central recruiting agency (the Mine Labour Organisation) became the only gate into the mining industry for migrants. Recruitment offices were established in the countries surrounding South Africa, and modern transportation networks were also introduced to ferry migrant workers to the mining regions. This type of migration was mainly temporary, and agreements were reached with the neighbouring nations to insure that workers will return home.

As a result of these efforts, the number of contract workers employed in the sector rose quickly. By the 1920s, approximately 100 thousand foreign workers were employed in the South African gold mines (Crush 2000). By 1940, the figure had reached 170 thousand and, by 1960, 233 thousand. Immigrant contract employment peaked in 1970 at approximately 265 thousand workers. Similarly, informal immigrants employed in the construction, service and agricultural sectors have also been welcomed throughout this period.

In the last two decades of the Apartheid regime, growing racial tensions, coupled with a more active role played by labor unions in the domestic labor market, led the South African government to perceive black migration as the source of political threat. As a result, starting from the early seventies, immigration – both legal and illegal – decreased substantially, thanks both to a reduction in the demand for foreign workers by domestic businesses and also to the stricter border enforcement policies, which were put in place by the government (Crush 2000). At the same time, up until the end of Apartheid, white immigrants have been welcomed to the country, and policies have even been put in place to facilitate their arrival (free passage was offered to European immigrants during the sixties and seventies). Finally, the general stance towards refugees has been one of limited tolerance, especially in the case of the Mozambicans, who fled their country in large numbers following the civil conflict which saw South Africa as one of the main players.

In the post 1994 period, census data show that migration to South Africa has been characterized by a steady increase in the number of foreigners residing in the country. Interestingly, the flow of foreign workers has been remarkably less volatile than in other parts of the continent (Lucas 2006), even though in many cases it has remained temporary in nature. Over the period 1996-2007 the overall number of foreign born in South Africa has grown from approximately seven hundred thousand to one million two hundred thousand,⁴ i.e. an increase of approximately 74 percent. As a result,

⁴These figures suggest that the South African census, as it is true also for the US census, includes information not only on "legal" migrants, but also on individuals who are in the country illegally. In fact, recent estimates by Crush and Williams (2010) suggest that,

in 1996 migrants represented 2.1 percent of the total population, whereas in 2007 they made up 2.94 percent of the total (see Figure 1). The importance of foreign workers is even greater. If we focus on males in the labor force (i.e. those who are either working or seeking work), the share of immigrants over the period grew from 4.6 percent in 1996 to 6.1 percent in 2007 (see Figure 2).

Notwithstanding this sizable favorable dynamics, many observers have argued that even in the aftermath of Apartheid's demise, the South African migration policy stance has remained overall rather restrictive (Peberdy 2001). This stance was reflected in the 1991 Aliens Control Act, which has been nicknamed 'Apartheid's last act' (Landau and Segatti 2009), and which was the cornerstone of South African immigration policy in the nineties. Drafted to simplify all the previous immigration laws enacted after 1937, it generated fundamental tensions after the transition to the democratic regime and was ultimately declared unconstitutional. Following this decision, a lengthy process was started to substantially reform the existing immigration policy framework, which culminated in the Immigration Act of 2002 and in the subsequent Immigration Amendment Act of 2004. The two pieces of legislation are oriented towards favoring highly skilled immigration and investors. In particular, four different categories of work permit (quota, general, exceptional skills and intra-company transfer) have been introduced, together with a business permits and a wide variety of other entry categories, which in general do not allow to work. The initial quota allocation, as presented in February 2003, allowed for approximately 740000 yearly permits. Since then, there has been a dramatic revision of the system, and in 2011 only 35000 work permits could be attributed trough the quota system, covering 53 occupations (skills) deemed 'scarce and critical'. An explicit goal of the

between 1990 and 2004, only approximately 110 thousand legal immigrants have arrived in South Africa, i.e. a much smaller figure than the one reported in our data.

Immigration Act of 2002 and its amendment of 2004 was also the uprooting of the widespread xenophobic feelings (see for instance Klotz 2000), even though as some observers have pointed out, no specific tools to this end have been discussed in the legislation.

Besides this important reform, which had mainly a multilateral character, another important recent development in migration policy has been the result of the active role played by South Africa in the new South African Development Community protocol. Even if the agreement has been substantially watered down in comparison to the original proposal made by the SADC secretariat in 1995, it still contains important provisions calling for the facilitation of trans-border movement of people among member countries. As a result, new bilateral agreements have been signed with Mozambique (2004) and Lesotho (2007), that are aimed at progressively lifting border controls with these countries.

Table 1 uses information on country of birth of migrants, which was collected in the 1996 and 2001 censuses (unfortunately the same information is not available for 2007), to produce a picture of the evolution of the sources of South African migrants. What is immediately apparent is the growing importance of Africa. Between 1996 and 2001 the share of foreigners originating in the continent increased by 3.1 percentage points, from 67.6 to 70.7 percent of the total. Particularly significant is the role played by Mozambique: by 2001, well over a quarter of the total stock of migrants to South Africa came from that country, the result of years of civil wars and persisting economic difficulties which the transition to democracy did not completely solve. The second most important country of origin is Zimbabwe and, in the five years included in our sample, the number of migrants originating from this country has increased by over twenty five percent. Restricting our sample to males in the labor force, the importance of Africa as the main origin further increases. In fact, by 2001 almost four out of five migrant males in the labor force originated from other African countries.

The second element which emerges from Table 1 is the slight decline in the importance of Europe as a source of migrants. In 1996, individuals born in the continent represented approximately 23 percent of the total migrants, whereas by 2001 that share had declined to 22.3 percent. Looking at the male labor force, the importance of European migrants declines even more, and by 2001 they represented only 15% of foreign workers. Interestingly, there has been a significant decline in the relative importance of the UK as a source country. This trend, and the sustained outflow of skilled workers from South Africa, has been the subject of much concern both in the academic debate (see Bhorat, Meyer, and Mlatsheni 2002 and Waller 2006) and among the public. However, even if skill shortages have been important in some sectors of the economy (in particular in healthcare, see Bhargava and Docquier 2008), the brain drain problem in the case of South Africa is likely to have been blown out of proportion. In fact, as of 2000, only 7.5% of the tertiary educated South Africans were living outside their country of origin (Docquier and Marfouk 2006). This figure is very low by middle income country standards and it is just "average" in relation to advanced economies.⁵

4 Data

For our analysis we use three surveys carried out by the Statistical Office of the Republic of South Africa, which have been made available through the International IPUMS website (https://international.ipums.org/international/). The 1996 and 2001 data are a ten percent sample from the population census, and cover approximately 3.6 and 3.7 million individuals, respectively. The 2007 data are instead taken from the South African Community Survey,

 $^{^5 \}mathrm{The}$ corresponding figure for Italy in 2000 is 10%, for the Netherlands 9.6%, for Germany 5.2% etc.

and cover approximately 2.2 percent of the population or 1.1 million individuals.⁶ A wealth of information is collected, including both labor market outcomes and important individual level-characteristics. Our analysis will be restricted to men in the 16-65 age group, who participate in the civilian labor force (i.e., are either working or seeking work).⁷ Furthermore, the large size of the samples allows us to fully exploit the spatial dimension of migration, taking advantage of the heterogeneity in the distribution of foreign workers across localities. In particular, we will be able to use information at the district level (there are 56 districts in South Africa). An individual is defined to be an immigrant if he is foreign born.

As for measures of labor market outcomes, we have information on each individual's employment status (i.e., whether he is working or seeking work), type of employment (i.e., whether a person is self-employed, or works for someone else, either for pay or as an unpaid family worker) and total income. The latter is defined as the total personal income in local currency (rand) from all sources in the previous twelve months, and in all three samples the data are recoded to the midpoints of the broad intervals given in the original data. The data suffer from the standard "top coding" problem, as the top interval is coded to its lowest possible value (e.g, code 360,001 for 360,001+). Unfortunately the data does not allow us to measure labor income (separately from other sources of income) nor wages (separately from the number of hours worked).

One of the individual level characteristics we consider is educational attainment, which is measured according to the following four categories: less than primary (the individual has completed less than 5 years of primary edu-

 $^{^6{\}rm The}$ 1996 and 2001 census data under count the total population by, respectively, 10.7 percent and 18 percent.

⁷One reason we exclude women from the sample is that there is more uncertainty for women on the time they enter and exit the labor market, thus our measure of labor-market experience -see below- would be very noisy.

cation), less than secondary completed (the individual has between 5 and 11 years of education), secondary completed plus some college (the individual has at least 12 years of education, but has not completed college) and college completed (the individual has at least completed 16 years of education).⁸

Figure 3 reports histograms for the three years in our sample, where we compare native and immigrant men in the labor force. Several interesting patterns emerge. First, the share of individuals who have not completed a primary education has fallen for both groups: for natives, from 26.8 percent in 1996 to 15.4 percent in 2007, whereas for immigrants the decline has been from 31.7 percent in 1996 to 19.2 percent in 2007. Second, highly skilled workers are becoming more common both among foreign born and natives. Among natives, between 1996 and 2007 the share of males in the labor force with a college degree has increased from 2.8 percent to 5.3 percent. Among the foreign born, the increase has been even more substantial: from 6.5 percent to 11.1 percent. In other words, in 2007 more than one out of ten foreign born males in the labor force had a college education, compared to one out of twenty natives. Considering also the intermediate categories, the pattern that emerges from the data is one in which on average today's South African immigrants are at least as educated as their domestic counterparts, and their presence is particularly strong at the very top of the educational attainment scale.

As has been forcefully argued by Borjas (2003) and Borjas (2006), skills are acquired both before and after an individual enters the labor market and, as a result, workers who have the same level of education, but different levels of experience, are imperfect substitutes in production.⁹ For this reason, to be able to assess the impact of foreign workers on natives labor market opportunities, we need not only to take into account the formal schooling

⁸Notice that, in the data, high school graduates are lumped together with individuals with some college and, as a result, we cannot distinguish the two categories.

⁹See also Ottaviano and Peri (2011) for an even finer distinction.

received by them, but also how long these workers have been active in the labor market.

To do this, we follow Borjas (2003) and define a skill group in terms of both schooling and labor market experience. The latter is identified as the number of years that have elapsed since the individual has completed school. So, we assume that the age of entry into the labor force is 16 for a worker in the "less than primary completed" category and 17 for a worker in the "less than secondary completed" category. We assume instead that the typical individual with a high school education or some college enters the labor force at 21, whereas the typical college graduate enters the labor force at 23. This definition reflects the assumption that individuals enter the South African labor force at the legal working age of 15 years old and there is possibly a one year lag between the end of school and the entry into the labor force. Our measure is necessarily rough, though, as individuals might take for instance longer than the statutory number of years (we use four) to complete a college education or might decide not to immediately enter the labor market. Furthermore, this measure is particularly problematic for immigrants as it does not distinguish between experience which has been acquired working in the destination country, and experience which has been acquired elsewhere.

To carry out our analysis, we assume that the maximum number of years of labor market experience is 40, and we follow the literature and create eight broad categories of labor market experience, based on five–year intervals.

Table 2 and Table 3 report summary statistics on the distribution of natives and immigrants by skill category. What is immediately apparent is that in all the three years in our sample, immigrants are particularly numerous at the very top of the skill distribution. For instance, in 1996, an immigrant is more than four times as likely as a native to have a college degree and 36-40 years of labor market experience. In 2007, this likelihood has further increased to five times. Immigrants are only slightly more likely than natives to be at the bottom of the skill distribution, i.e. not to have completed a primary education and have very limited labor market experience. These results reinforce our initial findings that today educated immigrants are an important component of South Africa's foreign workers population, and that immigrants play a particularly important role in the supply of the very high skills.

Our rich dataset also allows us to capture the distribution of immigrants across different localities within South Africa. Figure 4 illustrates the dynamic of immigration in three districts which have been particularly affected by the phenomenon in the period we are considering: the City of Johannesburg metropolitan municipality in the Gauteng province, the district of Lejweleputsa in the Free State province, and the district of Ehlanzeni in the Mpumalanga province. The Johannesburg metropolitan area has seen the number of foreign born male workers almost treble between 1996 and 2007 from 50 thousand to 136 thousand and, as of 2007, immigrants made up 12.6% of the total population. The immigration dynamic in the Lejweleputsa district has been instead more volatile, mirroring the fortunes and the demand for foreign workers of the dominant mining sector. In 1996 there were slightly more than 40 thousand foreign born in the province, representing about 20% of the total population. The number had decreased to approximately 12 thousand in 2001, whereas by 2007 it had edged back to approximately 22 thousand, or 14.6% of the total population. Finally, the Ehlanzeni district, at the border with Mozambique's Limpopo province, has seen its immigrant population peak in 2001 at approximately 25 thousand (13% of)the total), whereas by 2007 it had declined to 19 thousand or 10.5% of the total population.

We will exploit this rich variation in the data to carry out our empirical analysis. Our main measure of the impact of immigration on local labor markets is given by p_{ijt} , i.e. the share of foreign born in the labor force of a particular skill group *i* in district *j* at time *t*, which is defined as:

$$p_{ijt} = M_{ijt} / (M_{ijt} + N_{ijt})$$

where M_{ijt} is the number of foreign born workers in skill group *i* in district *j* at time *t* and N_{ijt} represents the corresponding number of natives.

Before proceeding with our regression analysis, in Figure 5 we present two scatter plots linking the inter-censual change in the immigrant share, and the changes in native individuals employment rate and (log) income. The first picture suggests that natives employment rate in a given cell (defined as a skill profile in a given district) is negatively correlated with changes in the immigrant share in that cell (the coefficient of the fitted line is - 0.65 and is statistically significant). The second picture, on the other hand, suggests the lack of a significant correlation between native income and the immigrant share (the coefficient of the fitted line is 0.12 and is not statistically significant). However, the figures also show that not all districts characterized by large inflows of immigrants saw a deterioration of natives' employment outcomes, and similarly the income of native workers in several districts was affected by the inflow of foreign workers. This highlights the importance of controlling for additional observable and non-observable characteristics, and we will do so in the analysis carried out in the next section.

5 Empirical specification

To assess the labor market effect of immigration in South Africa, we exploit both the variation in the distribution of foreign workers across different skill levels and across local labor markets within South Africa. Following the literature (Borjas 2006), we estimate the following specification:

$$L_{ijt} = s_i + r_j + q_t + (s_i * r_j) + (s_i * q_t) + (q_t * r_j) + \beta_p p_{ijt} + \beta_x X_{ijt} + \varepsilon_{ijt}$$
(1)

where the dependent variable L_{ijt} is a labor market outcome for native workers in skill group j (32 education by experience groups), district i (56 districts), and Census year t (3 years), and p_{ijt} is the main variable of interest. Controls include a vector of fixed effects s_i , indicating the group's skill level; a vector of fixed effects r_j indicating the district of residence, and a vector of fixed effects q_t indicating the time of the observation. These fixed effects control for differences in labor market outcomes across skill groups, local labor markets and over time. The interaction terms $s_i * q_t$ and $q_t * r_j$ control, respectively, for secular changes in the labor market outcomes of each skill group and in the district structure of labor market outcomes over the period we are considering in our sample, i.e. 1996-2007. The interaction $s_i * r_j$ indicates instead that we are identifying the coefficient of interest, β_p from changes in natives' labor market outcomes and immigration rates that occur within a region/skill cell.

We carry out two sets of regressions, focusing on men in the working age group (16-65) in the labor force. The first focuses on the effects of immigration on native workers' employment rates, and the results are reported in Table 4. The second considers instead the effects of immigration on native workers' total income, and is reported in Table 5. In all our specifications, standard errors are clustered at skill-district level.

In the first three columns of Table 4, we consider the effect of immigration on natives' employment rates. All specifications suggest that immigration has a negative impact on total natives' employment rate, as well as on the employment rate of native employees and self employed individuals. In column 1, we present the basic estimates of the adjustment brought about by immigration on total employment rate, defined as the share of employed natives in the total labor force. The estimated coefficient β_p is -0.667, with a standard error of 0.042. In other words, an increase by 10 percentage points in labor supply in a skill group, brought about by immigration, leads to a 6.7 percentage points decrease in natives' total employment rate.

In columns (2) and (3) we look instead at the impact of immigration on the share of native employees in the labor force¹⁰ and on the share of natives self employed in the labor force. The result suggests that much of the adverse labor market impact of immigration is due to the negative effect it had on native employees.

In columns (4) through (6) we repeat the analysis carried out in columns (1) through (3), controlling for the size of the employment in each cell. The sign and significance level of our initial findings is unaffected, and the size of the coefficient of our key explanatory variable is not affected.

In columns 7, 8, and 9 of Table 4 we include the lagged dependent variable, i.e. the pre-existing employment rate of natives in the area, to address the endogeneity of the migration decision, i.e. the non-random allocation of migrants across space. Given that only three censuses are available for South Africa, to carry out this estimation we need to restrict our analysis to 2001 and 2007, and as a result we lose about one third of our observations. Notwithstanding this, the size of our estimated coefficients is remarkably similar to what we have found in the first panel of the table, and also the overall significance level of our result is unaffected.

In Table 5 we turn to consider the effect of immigration on natives' income levels. In particular, we start by considering the impact on the total income earned by male individuals in the labor force (column 1), whereas in columns 2-4 we consider different subgroups of individuals, i.e. all those in employment (column 2), the employees (column 3), and the self employed

¹⁰This is defined as the number of natives employees in the total labor force.

(column 4). As it can be seen from columns 1 and 2, the effect of immigration on the total income of individuals in the labor force and on employed individuals is negative. The same holds when we consider only the self employed in column 4, whereas from column 3 we can see that the impact on the income of the employees is positive. However, none of these coefficients is statistically significant. In the remaining four columns of the Table (4-8), as we did in Table 4, we control also for the lagged dependent variable, to address the endogeneity of the migration decision, i.e. the non-random allocation of migrants across space. Once again, even though the sample size decreases substantially in this case, our findings are broadly comparable to those we obtain without adding this control.

Our analysis thus suggests that the immigration shock in the South African labor market has been absorbed mainly through an adjustment in the number of domestic workers employed, rather than through a change in income earned. These results should be interpreted though with due caution, as our "price" measure of labor market outcomes is far from ideal, as it combines both adjustments in unit wages, as well as in the number of hours worked. Thus, it could well hide a decline in unit wages, which has been compensated by an increase in the number of hours worked by the native. Unfortunately, our data do not allow us to disentangle these two effects.

As we have discussed in section 4, there is substantial heterogeneity in the composition of the immigrant population in South Africa. In particular, the immigration shock over the period included in our study has been particularly strong among the highly skilled: in 2007, more than one out of ten foreign born individuals had a college education, about twice as much as in 1996. At the same time, also among the natives the share of highly skilled increased substantially, but it reached only 5.3 percent of the total population in 2007. For this reason, it is interesting to separately analyze the labor market effect of immigration, by looking at different skill groups. This is done in the four

panels of Table 6, where we consider the impact of immigration on those individuals with less than primary education (Table 6a), on those which have less than secondary education (Table 6b), those with a secondary education plus some college (Table 6c) and those with a college education (Table 6d). The structure of the analysis is similar to the one carried out for the overall immigrant population in Tables 4 and 5, i.e. we look both at employment and income outcomes. For brevity, we do not separately report here the results including lagged native employment, as they are broadly comparable to those without this additional control.

The analysis provides some interesting insights. First, the negative systematic impact of immigration involves all skill levels, the only exception being low skilled self employed natives, who appear not to have been significantly affected by the presence of immigrants. Second, and more importantly, we find that the negative average results obtained in Table 4 are stronger for more highly skilled natives, and in particular, for individuals who have completed a secondary education or have a college education. For instance, the results in column (1) of Table 6c and 6d suggest that a ten percent increase in the share of foreign born is correlated with a 6.9 and 8.2 percent decline in the total employment rate respectively for natives who have completed a secondary and a college education. Also in the case of the highly skilled though, there is no evidence of an adverse effect of immigration on native income levels.

6 Conclusions

In this paper we have carried out what is, to the best of our knowledge, the first systematic study of the labor market effects of immigration to South Africa in the post–Apartheid era. We have obtained several interesting results. First, we have argued that migration as a share of the population has increased by about 50% over the period included in the sample. Second, we have shown immigrants to South Africa are at least as educated as natives, and that highly educated foreign individuals are especially important at the very top of the skill distribution. Third, our analysis of the labor market outcomes has shown that immigration has had a negative effect on natives' employment outcomes, but not on total income. Interestingly, skilled South Africans appear to be the most negatively affected subgroup of the population.

However, it should be noted that the correlations we uncover in the employment regressions can be interpreted in four different ways. First, we can understand the negative coefficient as evidence of a negative causal impact of international migration on South African natives' employment rates. Second, we can view the negative coefficient as support for a negative causal impact of international migration on South African natives' flows within the country, i.e. natives react to the presence of foreign workers by relocating to other districts within the same country and, as a consequence, natives' employment rates decrease. Third, the negative coefficient can be interpreted as showing the negative causal impact of international migration to South Africa on natives' flows to other countries, i.e. South African emigration to other countries. In this case, the less favorable labor market conditions for natives, brought about by immigration, lead natives to move to other countries. While these first three interpretations are different, they share a common message: all of them imply a causal effect running from international migration to South African natives' outcomes through the less favorable labor market conditions natives face because of immigration. In particular, according to these interpretations, international migration causes natives' displacement, either in the form of work displacement or in the form of physical displacement. The fourth interpretation of the negative coefficient on the migration share in the employment rates' regressions is related to reverse causality. In particular, the negative correlation could be driven by emigration of South African native workers which causes international migration inflows. According to this interpretation, South African workers leave the country for reasons unrelated to immigrant inflows to South Africa, for example due to improved labor market condition abroad. As South African workers move abroad, they leave vacant positions, which are taken up by migrants moving to South Africa. In the next step of this project, we are going to establish the direction of causality in the employment regressions by using an instrumental variable estimation strategy.

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Figure 1: Stock of foreign born in the total population, 1996-2007

Figure 2: Stock of foreign born in the male labor force





Figure 3a: Educational Attainment of natives and foreign born, 1996



Figure 3b: Educational Attainment of natives and foreign born, 2001



Figure 3c: Educational Attainment of natives and foreign born, 2007

Figure 4: Main immigrant receiving districts



City of Johannesburg

Lejweleputswa District



Ehlanzeni District





Figure 5: Scatter plots immigration and native's labor market outcomes



| | | | e 1: Migrants by | country of orig | IN | | | | |
|-----------------|----------|-------|------------------|-----------------|---------|-------|------------------------|-------|--|
| | | 1 | .996 | 2001 | | | | | |
| | All migr | ants | Male 16-65 labo | or force pop. | All mig | ants | Male 16-65 labor force | | |
| | stock | rates | stock | rates | stock | rates | stock | rates | |
| AFRICA | 466935 | 0.676 | 259162 | 0.770 | 713298 | 0.707 | 372689 | 0.797 | |
| Eastern Africa | 290302 | 0.411 | 158558 | 0.471 | 466640 | 0.463 | 263634 | 0.564 | |
| Malawi | 10152 | 0.014 | 5089 | 0.015 | 26054 | 0.026 | 15610 | 0.033 | |
| Mozambique | 183597 | 0.260 | 110301 | 0.328 | 265176 | 0.263 | 167953 | 0.359 | |
| Zambia | 12990 | 0.018 | 4972 | 0.015 | 23493 | 0.023 | 8345 | 0.018 | |
| Zimbabwe | 73042 | 0.103 | 34549 | 0.103 | 130090 | 0.129 | 63196 | 0.135 | |
| Middle Africa | 10377 | 0.015 | 4139 | 0.012 | 23974 | 0.024 | 10569 | 0.023 | |
| Nothern Africa | 1652 | 0.002 | 498 | 0.001 | 3853 | 0.004 | 1500 | 0.003 | |
| Southern Africa | 154692 | 0.219 | 91250 | 0.271 | 206760 | 0.205 | 88913 | 0.190 | |
| Botswana | 10480 | 0.015 | 6767 | 0.020 | 17518 | 0.017 | 6705 | 0.014 | |
| Lesotho | 95062 | 0.135 | 64745 | 0.192 | 113020 | 0.112 | 53434 | 0.114 | |
| Nambia | 28850 | 0.041 | 8549 | 0.025 | 44798 | 0.044 | 14945 | 0.032 | |
| Swaziland | 20300 | 0.029 | 11189 | 0.033 | 31425 | 0.031 | 13830 | 0.030 | |
| Western Afrcia | 9911 | 0.014 | 4717 | 0.014 | 12070 | 0.012 | 8073 | 0.017 | |
| AMERICA | 11606 | 0.016 | 3638 | 0.011 | 21938 | 0.022 | 5622 | 0.012 | |
| ASIA | 23807 | 0.034 | 7552 | 0.022 | 43540 | 0.043 | 16441 | 0.035 | |
| EUROPE | 173345 | 0.230 | 55386 | 0.165 | 225223 | 0.223 | 71543 | 0.153 | |
| United Kingdom | 97290 | 0.138 | 30392 | 0.090 | 127820 | 0.127 | 39778 | 0.085 | |
| Germany | 14427 | 0.020 | 4424 | 0.013 | 24216 | 0.024 | 6627 | 0.014 | |
| Portugal | 12667 | 0.018 | 5451 | 0.016 | 19490 | 0.019 | 7714 | 0.016 | |
| OCEANIA | 3586 | 0.005 | 1097 | 0.003 | 4393 | 0.004 | 1535 | 0.003 | |
| NS/NR | 26522 | 0.038 | 9756 | 0.029 | 10 | 0.000 | 10 | 0.000 | |

Table 1. Migrants by country of origin

| Table 2: Migra | tion share by education a | and experience | (skill cell) | | |
|----------------------|---------------------------|----------------|--------------|--------|--|
| | (15-65 male lab forc | e pop) | | | |
| Education | Years of | | | | |
| | experience | 1996 | 2001 | 2007 | |
| Less than primary | 1 - 5 | 0.0485 | 0.0517 | 0.0584 | |
| | 6 - 10 | 0.0543 | 0.0781 | 0.0983 | |
| | 11 - 15 | 0.0573 | 0.0717 | 0.1241 | |
| | 16 - 20 | 0.052 | 0.0565 | 0.1027 | |
| | 21 - 25 | 0.0584 | 0.0466 | 0.0869 | |
| | 26 - 30 | 0.0615 | 0.0461 | 0.0717 | |
| | 31 - 35 | 0.0589 | 0.0455 | 0.0831 | |
| | 36 - 40 | 0.0484 | 0.0417 | 0.0724 | |
| Primary completed | 1 - 5 | 0.0461 | 0.039 | 0.0384 | |
| | 6 - 10 | 0.0379 | 0.0532 | 0.0568 | |
| | 11 - 15 | 0.0405 | 0.0497 | 0.07 | |
| | 16 - 20 | 0.0365 | 0.0445 | 0.0688 | |
| | 21 - 25 | 0.0347 | 0.0392 | 0.0647 | |
| | 26 - 30 | 0.0346 | 0.0356 | 0.0539 | |
| | 31 - 35 | 0.0336 | 0.0311 | 0.0498 | |
| | 36 - 40 | 0.0305 | 0.0342 | 0.0486 | |
| Secondary completed | 1 - 5 | 0.023 | 0.0226 | 0.0246 | |
| | 6 - 10 | 0.0294 | 0.0319 | 0.0421 | |
| | 11 - 15 | 0.0431 | 0.0403 | 0.0448 | |
| | 16 - 20 | 0.0526 | 0.0535 | 0.0459 | |
| | 21 - 25 | 0.0671 | 0.0623 | 0.0634 | |
| | 26 - 30 | 0.096 | 0.0864 | 0.069 | |
| | 31 - 35 | 0.1307 | 0.1361 | 0.0953 | |
| | 36 - 40 | 0.1458 | 0.1836 | 0.137 | |
| University completed | 1 - 5 | 0.0689 | 0.0731 | 0.0977 | |
| | 6 - 10 | 0.0872 | 0.0902 | 0.099 | |
| | 11 - 15 | 0.0918 | 0.1238 | 0.1092 | |
| | 16 - 20 | 0.1056 | 0.1358 | 0.1218 | |
| | 21 - 25 | 0.1182 | 0.1629 | 0.1378 | |
| | 26 - 30 | 0.1407 | 0.1852 | 0.1597 | |
| | 31 - 35 | 0.1398 | 0.2413 | 0.1813 | |
| | 36 - 40 | 0.176 | 0.2613 | 0.2543 | |

| Table 3: Native | es' share by education | and experience | (skill cell) | |
|----------------------|------------------------|----------------|--------------|--------|
| | (15-65 male lab for | ce pop) | | |
| Education | Years of | | | |
| | experience | 1996 | 2001 | 2007 |
| Less than primary | 1 - 5 | 0.9515 | 0.9483 | 0.9416 |
| | 6 - 10 | 0.9457 | 0.9219 | 0.9017 |
| | 11 - 15 | 0.9427 | 0.9283 | 0.8759 |
| | 16 - 20 | 0.948 | 0.9435 | 0.8973 |
| | 21 - 25 | 0.9416 | 0.9534 | 0.9131 |
| | 26 - 30 | 0.9385 | 0.9539 | 0.9283 |
| | 31 - 35 | 0.9411 | 0.9545 | 0.9169 |
| | 36 - 40 | 0.9516 | 0.9583 | 0.9276 |
| Primary completed | 1 - 5 | 0.9539 | 0.961 | 0.9616 |
| | 6 - 10 | 0.9621 | 0.9468 | 0.9432 |
| | 11 - 15 | 0.9595 | 0.9503 | 0.93 |
| | 16 - 20 | 0.9635 | 0.9555 | 0.9312 |
| | 21 - 25 | 0.9653 | 0.9608 | 0.9353 |
| | 26 - 30 | 0.9654 | 0.9644 | 0.9461 |
| | 31 - 35 | 0.9664 | 0.9689 | 0.9502 |
| | 36 - 40 | 0.9695 | 0.9658 | 0.9514 |
| Secondary completed | 1 - 5 | 0.977 | 0.9774 | 0.9754 |
| | 6 - 10 | 0.9706 | 0.9681 | 0.9579 |
| | 11 - 15 | 0.9569 | 0.9597 | 0.9552 |
| | 16 - 20 | 0.9474 | 0.9465 | 0.9541 |
| | 21 - 25 | 0.9329 | 0.9377 | 0.9366 |
| | 26 - 30 | 0.904 | 0.9136 | 0.931 |
| | 31 - 35 | 0.8693 | 0.8639 | 0.9047 |
| | 36 - 40 | 0.8542 | 0.8164 | 0.863 |
| University completed | 1 - 5 | 0.9311 | 0.9269 | 0.9023 |
| | 6 - 10 | 0.9128 | 0.9098 | 0.901 |
| | 11 - 15 | 0.9082 | 0.8762 | 0.8908 |
| | 16 - 20 | 0.8944 | 0.8642 | 0.8782 |
| | 21 - 25 | 0.8818 | 0.8371 | 0.8622 |
| | 26 - 30 | 0.8593 | 0.8148 | 0.8403 |
| | 31 - 35 | 0.8602 | 0.7587 | 0.8187 |
| | 36 - 40 | 0.824 | 0.7387 | 0.7457 |

| Table 4: The labor market effect of immigration on natives employment | | | | | | | | | | |
|---|----------------------|-------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|--|
| VARIABLES | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | |
| | Native | Native | Native Self- | Native | Native | Native Self- | Native | Native | Native Self- | |
| | Employment | Employees | employment | Employment | Employees | employment | Employment | Employees | employment | |
| | Rate | Rate | Rate | Rate | Rate | Rate | Rate | Rate | Rate | |
| Migration share | -0.667*** (0.042) | -0.499*** (0.042) | -0.103*** (0.024) | -0.671*** (0.042) | -0.503*** (0.042) | -0.102*** (0.024) | -0.631*** (0.058) | -0.449*** (0.060) | -0.096*** (0.036) | |
| Education, experience, year and any two-way interactions FE | yes | yes | yes | yes | yes | yes | yes | yes | yes | |
| Log total population | no | no | no | yes | yes | yes | no | no | no | |
| Lagged dependent var. | no | no | no | no | no | no | yes | yes | yes | |
| Constant | 0.918*** | 0.609*** | 0.165*** | 0.935*** | 0.706*** | 0.025 | 1.053*** | -0.276*** | 0.672*** | |
| | (0.034) | (0.043) | (0.025) | (0.061) | (0.073) | (0.038) | (0.050) | (0.059) | (0.033) | |
| Observations | 5,330 | 5,330 | 5,330 | 5,330 | 5,330 | 5,330 | 3,539 | 3,539 | 3,539 | |
| R-squared | 0.969 | 0.957 | 0.889 | 0.969 | 0.958 | 0.889 | 0.974 | 0.968 | 0.913 | |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|----------------------------------|---------------------------------|-----------------------------------|--|----------------------------------|---------------------------------|-----------------------------------|--|
| VARIABLES | Log tot income (lab force) | Log tot income (employed) | Log tot income of employees | Log tot income of self- employed | Log tot income (lab force) | Log tot income (employed) | Log tot income of employees | Log tot income of self- employed |
| Migration share | -0.123 (0.252) | -0.023 (0.212) | 0.143 (0.229) | -0.420 (0.709) | -0.142 (0.343) | -0.034 (0.297) | 0.016 (0.308) | -0.010 (0.920) |
| Education, experience, year and any two-way interactions | | | | | | | | |
| FE | yes | yes | yes | yes | no | no | no | no |
| Lagged dependent var. | no | no | по | no | yes | yes | yes | yes |
| Constant | 13.313*** (0.283) | 13.428*** (0.240) | 11.603*** (0.189) | 13.665*** (1.000) | 13.858*** (0.518) | 15.557 (.) | 12.361*** (0.548) | 23.387*** (1.092) |
| Observations | 5,322 | 5,321 | 5,268 | 4,805 | 3,530 | 3,529 | 3,472 | 3,023 |
| R-squared | 0.977 | 0.975 | 0.973 | 0.886 | 0.981 | 0.978 | 0.976 | 0.910 |

Table 5: labor market effect of immigration on natives income

Robust standard errors in parentl

*** p<0.01, ** p<0.05, * p<0.1

Notes: Migration share is measured over total labor force population (natives and migrants). Columns 5-8 for the lagged dependent variable.

| | Table | | Table od. labor market effect of minigration by skin group – less than primary | | | | | | | | | | |
|------------------------|------------|-----------|--|------------|-----------|--------------|------------|-----------|--------------|--|--|--|--|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | | | | |
| | Native | Native | Native Self- | Native | Native | Native Self- | Native | Native | Native Self- | | | | |
| | Employment | Employees | employment | Employment | Employees | employment | Employment | Employees | employment | | | | |
| VARIABLES | Rate | Rate | Rate | Rate | Rate | Rate | Rate | Rate | Rate | | | | |
| Migration share | -0.487*** | -0.394*** | -0.023 | -0.489*** | -0.395*** | -0.023 | -0.391*** | -0.303** | -0.026 | | | | |
| | (0.091) | (0.089) | (0.034) | (0.091) | (0.089) | (0.034) | (0.136) | (0.130) | (0.053) | | | | |
| Education, experience, | | | | | | | | | | | | | |
| year and any two-way | yes | yes | yes | yes | yes | yes | yes | yes | yes | | | | |
| Log total population | no | no | по | yes | yes | yes | по | no | no | | | | |
| Lagged dependent var. | no | no | no | по | no | no | yes | yes | yes | | | | |
| Constant | 0.839*** | 0.813*** | 0.037 | 0.748*** | 0.717*** | 0.027 | 0.480*** | 0.491*** | 0.010 | | | | |
| | (0.081) | (0.079) | (0.037) | (0.088) | (0.087) | (0.041) | (0.084) | (0.117) | (0.031) | | | | |
| Observations | 1,343 | 1.343 | 1,343 | 1,343 | 1,343 | 1,343 | 895 | 895 | 895 | | | | |
| R-squared | 0.968 | 0.962 | 0.790 | 0.968 | 0.962 | 0.790 | 0.972 | 0.968 | 0.818 | | | | |

Table 6a: labor market effect of immigration by skill group – less than primary

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---------------------------------|------------|-----------|--------------|------------|-----------|--------------|------------|-----------|--------------|
| | Native | Native | Native Self- | Native | Native | Native Self- | Native | Native | Native Self- |
| | Employment | Employees | employment | Employment | Employees | employment | Employment | Employees | employment |
| VARIABLES | Rate | Rate | Rate | Rate | Rate | Rate | Rate | Rate | Rate |
| Migration share | -0.502*** | -0.396*** | -0.094** | -0.525*** | -0.417*** | -0.088* | -0.523*** | -0.373*** | -0.111* |
| | (0.091) | (0.084) | (0.045) | (0.092) | (0.084) | (0.045) | (0.132) | (0.130) | (0.062) |
| Education, experience, year and | | | | | | | | | |
| any two-way interactions FE | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| Log total population | no | no | no | yes | yes | yes | no | no | no |
| Lagged dependent var. | no | no | no | no | no | no | yes | yes | yes |
| Constant | 0.558*** | 0.419*** | 0.121*** | 0.533*** | 0.386*** | 0.141*** | 0.730*** | 0.829*** | -0.029 |
| | (0.039) | (0.049) | (0.035) | (0.066) | (0.079) | (0.040) | (0.055) | (0.053) | (0.023) |
| Observations | 1,344 | 1,344 | 1,344 | 1,344 | 1,344 | 1,344 | 896 | 896 | 896 |
| R-squared | 0.980 | 0.976 | 0.877 | 0.981 | 0.977 | 0.879 | 0.984 | 0.981 | 0.901 |

Table 6b: labor market effect of immigration by skill group – less than secondary completed

| Table be. labor market effect of miningration by skin group – secondary completed | | | | | | | | | |
|---|------------|-----------|--------------|------------|-----------|--------------|------------|-----------|--------------|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| | Native | Native | Native Self- | Native | Native | Native Self- | Native | Native | Native Self- |
| | Employment | Employees | employment | Employment | Employees | employment | Employment | Employees | employment |
| VARIABLES | Rate | Rate | Rate | Rate | Rate | Rate | Rate | Rate | Rate |
| Migration share | -0.693*** | -0.443*** | -0.250*** | -0.693*** | -0.442*** | -0.252*** | -0.594*** | -0.393** | -0.200* |
| | (0.108) | (0.124) | (0.083) | (0.108) | (0.124) | (0.083) | (0.151) | (0.175) | (0.111) |
| Education, experience, year | | | | | | | | | |
| and any two-way interactions | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| Log total population | по | no | no | yes | yes | yes | по | no | no |
| Lagged dependent var. | no | no | no | no | по | no | yes | yes | yes |
| Constant | 1.022*** | 0.463*** | 0.478*** | 1.068*** | 0.731*** | 0.344*** | 1.033*** | 0.664*** | 0.364*** |
| | (0.093) | (0.132) | (0.068) | (0.093) | (0.132) | (0.078) | (0.081) | (0.074) | (0.049) |
| Observations | 1,344 | 1,344 | 1,344 | 1,344 | 1,344 | 1,344 | 896 | 896 | 896 |
| R-squared | 0.968 | 0.937 | 0.917 | 0.968 | 0.937 | 0.917 | 0.973 | 0.956 | 0.935 |

Table 6c: labor market effect of immigration by skill group – secondary completed

| | Table od: labor market effect of immigration by skill group – university and above | | | | | | | | | | |
|------------------------------|--|-----------|--------------|------------|-----------|--------------|------------|-----------|--------------|--|--|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | | |
| | Native | Native | Native Self- | Native | Native | Native Self- | Native | Native | Native Self- | | |
| | Employment | Employees | employment | Employment | Employees | employment | Employment | Employees | employment | | |
| VARIABLES | Rate | Rate | Rate | Rate | Rate | Rate | Rate | Rate | Rate | | |
| Migration share | -0.817*** | -0.636*** | -0.151** | -0.816*** | -0.634*** | -0.152** | -0.711*** | -0.532*** | -0.109 | | |
| - | (0.060) | (0.084) | (0.072) | (0.059) | (0.083) | (0.072) | (0.088) | (0.123) | (0.097) | | |
| Education, experience, year | | | | | | | | | | | |
| and any two-way interactions | yes | yes | yes | yes | yes | yes | yes | yes | yes | | |
| Log total population | no | no | no | yes | yes | yes | no | no | no | | |
| Lagged dependent var. | no | no | no | no | no | no | yes | yes | yes | | |
| Constant | 0.980*** | -0.155 | 0.924*** | 1.009*** | -0.111 | 0.902*** | 1.524*** | 0.938*** | 0.811*** | | |
| | (0.107) | (0.249) | (0.163) | (0.111) | (0.253) | (0.168) | (0.187) | (0.162) | (0.094) | | |
| Observations | 1.299 | 1.299 | 1.299 | 1.299 | 1.299 | 1.299 | 852 | 852 | 852 | | |
| R-squared | 0.890 | 0.853 | 0.768 | 0.890 | 0.853 | 0.768 | 0.908 | 0.905 | 0.845 | | |

Table (d. lab aignotion by inonaite dah .1. .4 .66. .4 .6 ..